Research Summary

The Distribution of Consumption Model: An Evaluation of its Applicability to Gambling Behaviour

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Research Topic

Clinicians and researchers have noted similarities between gambling and other dependencies, such as alcohol abuse. This suggests that epidemiological models that have been successful in describing population-level drinking may also be applicable to gambling.

One model that has been influential in alcohol research is the **Distribution of Consumption Model**, which focuses on the relationship between the average level of consumption and the proportion of heavy drinkers in a population, as well as the attendant problems of heavy drinking (i.e., cirrhosis).

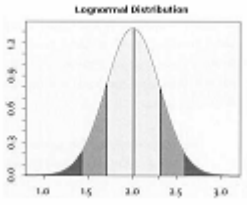
This model has produced recommendations for the overall reduction of alcohol consumption in a population, which may be relevant to a **public health approach** to problem gambling.

The goal of this project was to assess the applicability of the Distribution of Consumption Model to gambling (i.e., *gambling consumption*).

Definition of Terms

Distribution of Consumption Model: An approach used to assess alcohol consumption that suggests the availability of alcohol has a direct effect on the amount consumed and an indirect effect on the incidence and prevalence of alcohol-related illness.

Public Health Approach: A population level methodology that encourages the broad consideration of social, environmental, biological, and economical dimensions. Fundamental to this approach is the use of epidemiological methods to describe the distribution and determinants of the disorder in the population.



Lognormal Distribution: Statistical term that describes a variable, *x*, whose computed logarithm, *log(x)*, is normally distributed. Normally distributed data are represented graphically by a bell-shaped curve symmetrical around the mean. Data converted into log scores are referred to as log transformed.

Exploratory Research: Studies undertaken in areas where there has been little or no research to date. As initial forays into new areas of inquiry, exploratory research looks for associations and relationships that might form the basis for more detailed inquiry. Data gathering is no less valid in exploratory research, but the findings may be limited to the sample studied and usually cannot be generalized to whole populations.

Ontario Problem Gambling Survey (OPGS): Telephone survey administered to a sample of 5,000 Ontario adults (i.e., 18 years and older) in 2001 to collect data on gambling practices and related problems.

[1] **About the Principal Investigator:** Mary Chipman is a professor of Epidemiology and Biostatistics in the Department of Public Health Sciences at the University of Toronto.

Problem Gambling Severity Index (PGSI): Nine questions included on the CPGI that are scored to determine problem gambling severity: (1) chasing losses; (2) Escalating to maintain excitement; (3) borrowing/selling to get gambling money; (4) betting more than can afford; (5) feeling guilty; (6) criticized by others; (7) harm to health; (8) financial difficulties to household; and (9) sense of having a gambling problem.

Canadian Problem Gambling Index (CPGI): An instrument designed to assess gambling and problem gambling behaviour in general populations, geared towards the gambling opportunities available in the Canadian context. Its four levels of gambling (Severe Problem, Moderate Problem, Mild Problem, and Non-problem) render it more accommodating to the continuous nature of problem gambling.

Skewness: Statistical term that describes an asymmetrical representation of a variable, *x* (i.e., data are asymmetrical about the mean). A normal distribution has zero skewness.

- Positively skewed data appear graphically as a "tail" to the right, indicating that there are more data at the lower end of the scale than would be expected in a normal distribution.
- Negatively skewed data appear graphically as a "tail" to the left, indicating that there are more data are the higher end of the scale than would be expected in a normal distribution.

Self-Report Bias: The tendency for participants to respond on a self-report questionnaire in a *desirable* (uncritical) manner (i.e., exaggerate positive and extenuate negative personal or behavioural characteristics).

Recall Bias: The tendency for participants to recall more recent events with greater accuracy than events that occurred further in the past.

Longitudinal Study: Research design that involves observing the same group of participants over time (i.e., days, months, or years).

Research Design & Methods

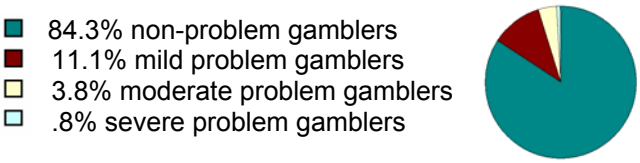
- The following research questions guided the methodology:
  1. What measure of gambling consumption is the most suitable for the Distribution of Consumption Model?
  2. How well does the **lognormal distribution** describe the distribution of gambling consumption in the sample?
  3. What is the relationship between the level of gambling consumption and the risk of developing gambling-related problems?
- The researchers undertook an **exploratory** analysis of the **Ontario Problem Gambling Survey (OPGS)**, which was conducted via telephone in 2001 with a sample 5,000 Ontario adults (i.e., aged 18 years or older).
- The OPGS collected data used to assess the following:
  - Gambling problems – the **Problem Gambling Severity Index (PGSI)** of the **Canadian Problem Gambling Index (CPGI)**.
  - Demographic characteristics – age, sex, marital status, education, employment status, and household income;
  - Gambling measures – time spent gambling, money spent on gambling, percent of income spent on gambling, and number of gambling activities.
- The OPGS categorized respondents as follows:
  1. Non-problem gambler - PGSI score = 0;
  2. Problem gambler - PGSI > 0;
     a. mild problem gambler - PGSI score 1-2;
     b. moderate problem gambler - PGSI score 3-7; and
     c. severe problem gambler - PGSI score ≥ 8.

- Respondents who reported being non-gamblers[2] , reported not spending money on gambling in the past year, or had missing data were excluded from the data analyses.
- The final sample (*N* = 3,554) included 559 problem gamblers and 2,995 non-problem gamblers.
- Various statistical measures were used to assess the data.

Results/Discussion

Gambling Problems

- The breakdown of the sample by gambling category was as follows:



Demographic Characteristics

- Significant differences between problem and non-problem gamblers were found for all demographic variables, with the exception of employment status.
- 81.9% of males and 86.6% of females were non-problem gamblers.
- 1.1% of males and .5% of females were severe problem gamblers.
- 57.1% of problem gamblers were male, compared to 48.2% of non-problem gamblers.
- The average age was 40 years for problem gamblers, and 47 years for non-problem gamblers.
- 21.5% of problem gamblers were in the 18-24 year old age group, compared to 8.0% of non-problem gamblers.
- 38.2% of problem gamblers had post-secondary education, compared to 33.8% of non-problem gamblers.
- 17.4% of problem gamblers had household incomes < $20,000, compared to 10.1% of non-problem gamblers.

Gambling Measures

- Significant differences between problem and non-problem gamblers were found for all gambling activities, with the exception of lottery tickets.
- Sports betting with a bookie showed the biggest relative difference between problem and non-problem gamblers (2.5% vs. .2%, respectively), followed by internet gambling (2.1% vs. .5%) and slot machines or video lottery terminals (VLTs) outside a casino (6.8% vs. 1.8%).
- 61.8% of non-problem gamblers spent < 30 min per month gambling, compared to 26.8% of problem gamblers.
- 24.2% of problem gamblers spent ≥ 8 hrs per month gambling, compared to 5.1% of non-problem gamblers.
- A higher proportion of non-problem gamblers participated in 1-3 gambling activities than problem gamblers.
- A higher proportion of problem gamblers participated in 4-8 gambling activities than non-problem gamblers.
- Having a partner had a protective effect against having a gambling problem.

Research Questions

What measure of gambling consumption is the most suitable for the Distribution of Consumption Model?

- The percentage of income spent on gambling was most closely related to the levels of problem gambling experienced by gamblers.

[2] 37 respondents (30 non-problem gamblers and 7 problem gamblers) indicated they did not gamble but gave positive answers to questions on detailed gambling activities. These respondents were included in the analyses.

How well does the lognormal distribution describe the distribution of gambling consumption in the sample?

- Consumption of gambling as measured by money spent on gambling and percent of household income spent on gambling were **skewed** to the right (i.e., positively skewed).
- When data were log transformed, both of these variables approached a normal distribution (for problem gamblers and non-problem gamblers).

What is the relationship between the level of gambling consumption and the risk of developing gambling-related problems?

- Respondents with the highest consumption levels for percent of income spent on gambling, number of gambling activities, and time spent on gambling had the highest risk of gambling-related problems.
- Problem gamblers showed higher consumption levels than non-problem gamblers.
- The odds of having experienced problems as a result of gambling increased significantly with higher consumption.

Limitations

- As data were collected via a survey (i.e., self-reports), many of the variables used in the analyses were susceptible to **self-report biases** (e.g., social desirability). This may have resulted in an overestimation or underestimation of the relationship between consumption of gambling and the presence of problems.
- There may have been potential **recall bias** among participants on the OPGS and/or bias due to a misunderstanding of the wording in the questionnaire.
- Several categories regarding time spent on gambling and number of gambling activities were collapsed at the upper end of the spectrum because there were too few participants in these categories; therefore, important data in these gambling categories may have been lost.
- Income was assessed in categories, which resulted in imperfect measures of percent of household income spent on gambling. Also, the number of people residing in the households was not collected. Clearly, for example, a household income supporting a five-person household has different implications than the same income supporting a one-person household.

Conclusions

- The measure of gambling consumption best associated with problem gambling levels, as measured by the CPGI, was the percent of household income spent on gambling.
- The distribution of gambling consumption in the Ontario sample was highly skewed and well described by the lognormal distribution.
- The risk of experiencing gambling-related problems increased with higher levels of gambling consumption.
- Overall, results provided strong support for the applicability of the Distribution of Consumption Model to gambling-related problems.

Implications & Future Research

- This research was intended to enhance understanding of the population dynamics of gambling and problem gambling, and to inform public health policy and practices.

- The researchers recommended the following research initiatives:
    - This work should be extended to include other jurisdictions, both in Canada and worldwide, to allow for the exploration of regional and cultural differences.
    - The factors contributing to the prevalence of gambling problems found in the OPGS should be explored and identified before proposing preventive measures.
    - Surveys including questions related to time spent gambling and money spent gambling need to be developed and/or tested to better measure gambling consumption.
    - Further exploration of the factors contributing to the risk of developing gambling-related problems (i.e., demographics, types of gambling) should be carried out in future studies.