



Research Summary

Development of an Instrument for Identifying Risk for Problem Gambling among Slot Machine Gamblers in Ontario

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Research Topic

Adapt FLAGS, a new instrument, to identify risk for gambling related harm and problem gambling among slot machine gamblers in Ontario.

The FocaL Adult Gambling Screen (FLAGS) is a new instrument designed to assess the degree of risk or harm an individual may be experiencing as a result of his or her gambling behaviour. FLAGS uses a hierarchy of effects approach to identify risk factors that cause or lead to problem gambling related behaviors (e.g., risky practices) or harms (e.g., negative consequences). By definition this means that factors which signal gambling harms (e.g., negative consequences, persistence) are not the same as those factors that signal risk (e.g., beliefs, motivations, impaired control). This is helpful for prevention applications because it assumes that there is a temporal order for determining causality; risk for developing gambling problems will exist in advance of the experience of negative outcomes associated with gambling. By identifying those factors that are measurable, are found to be sequentially related to development of gambling harms, and occur prior to the experience of harm means that we can target prevention efforts to specifically address risk factors thereby reducing the occurrence of gambling related harm.

Background of FLAGS

- FLAGS is composed of a series of multi-item measures or components (i.e., reflective and formative constructs) incorporating the latest developments in the science of measurement.
- Using structural equation modeling and other advanced techniques, each component was tested and found to be associated with escalating risk and harm among machine gamblers in Nova Scotia, Canada and Victoria, Australia.
- Based upon their summed scores for each of these risk indicators, an individual is assigned to one of five risk categories: Level I – No Discernable Risk; Level II - Early Risk; Level III - Intermediate Risk; Level IV - Advanced Risk; Level V – Harmed and Problem Gambling.
- FLAGS can be self administered or used in a survey and is distinctive from previous gambling instruments:
 1. *FLAGS permits the identification of risk before the gambler has experienced negative consequences or is exhibiting signs of problem gambling making it suitable for prevention applications;*
 2. *FLAGS not only identifies ‘who’ is at risk but more importantly ‘why’ in order to inform and assess stakeholder decisions undertaken to reduce gambling risk and harm making it suitable for public health surveillance and policy.*

In the current study, FLAGS was adapted and tested for use with casino slot machine gamblers in Ontario. Preliminary risk profiles including identification of early, intermediate and advance warning signs were generated and examined. The CPGI was included for comparison purposes.

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Definition of Other Terms

Reflective Constructs: A set of statements (i.e., items) that are highly correlated and represent (i.e., reflect) a single underlying latent variable (i.e., construct) such as preoccupation or persistence. The more items endorsed the greater the certainty the individual is exhibiting the underlying construct (e.g., persistence).

Formative Constructs: An exhaustive set of statements (i.e., items) that may or may not be correlated and represent different aspects or dimensions of a single underlying latent variable (i.e., construct) such as negative gambling consequences (e.g., financial, personal, social, and/or professional consequences). Endorsement is additive such that the more items endorsed the greater the severity of impact.

Hierarchy of Effects Model: A modeling approach based on the assumption certain conditions precede or influence the experience of subsequent conditions.

Problem Gambling Severity Index (PGSI): The PGSI consists of the nine scored questions of the Canadian Problem Gambling Index developed by Jackie Ferris and Harold Wynne in 2001 to identify problem gambling severity ranging from a rate of No Risk (score =0) Low Risk (Score=1-2), Moderate Risk (Score 3-7) or Severe Problem Gambling (Score=8+).

Structural Equation Modeling (SEM): SEM is a statistical technique that allows for both confirmatory and exploratory modeling examining the underlying structure of a latent variable such as problem gambling or risk for problem gambling. This permits the analyst to test theory using actual data to confirm the hypothesized relationships. It means we can operationally define our theories about risk and harm and the factors influencing the experience of risk and harm. SEM also takes into account measurement error ensuring relationships between the constructs are not biased by measurement error.

Research Design & Methods

The project was comprised of four stages:

1) Literature Search

- The literature was reviewed to up-date construct design and develop an expanded list of observable behaviours found to be highly correlated with problem gambling among slot machine gamblers.
- The findings indicated that the new gambling risk assessment instrument could be strengthened by including additional behavioural items as well as sub-screens associated with risk (situational and personal factors), and impaired control.
- A total of 190 potential indicators were generated for testing in Phase 1 of the study including risky cognitions (e.g., beliefs, motives) and risky practices (i.e., behaviours) hypothesized to place an individual at increased likelihood of experiencing harm from slot machine gambling.

2) Participant Recruitment

- In August 2008 trained staff from Focal Research went on-site at the Slots at Western Fair in London Ontario, operated by the Ontario Lottery and Gaming Corporation (OLGC) and recruited approximately 679 regular slot machine players to participate in an ongoing research panel.
- Regular players were defined as those who played slot machines at least once per month or more on a continuous basis over the past year (12 month period).

3) Phase 1: Qualitative Research

- Using the pre-screened research panel, 72 players were invited to take part in a qualitative evaluation of the revised risk screen of which 63 successfully completed all phases.
- The evaluation consisted of three components:
 - i. Completion of an independent pre-session version of the survey to test responses to the full 190 statements;

- ii. An in-session evaluation of a reduced test version of the screen (30-35 statements) varied by group;
 - iii. Participation in one of six in-depth discussion groups (6 focus groups) to examine comprehension, interpretation, and perceived veracity of each item comprising the test versions of the screen.
- The groups took place from September 18 to 20, 2008 and participants were selected to meet the criteria for sex (Men: n=29; Women: n=34), age (<35 years: n=19; 35-55: n=21; 55 years+: n=23), length of time as regular players (< 2 years: n=28; 2+ years; n=35), and by different levels of risk using the Problem Gambling Severity Index (PGSI) (Low/No Risk: n=22; Moderate Risk n=21; Problem: n=20).
 - Based on the findings from Phase 1 an initial risk assessment instrument was designed containing a reduced set of items providing more complete coverage of the risk factors and consequences associated with slot machine play.
 - There were 34 preliminary groupings, comprised of 132 statements emerging from the Phase 1 analysis for further testing including: 11 potential constructs measuring consequences including persistence; 10 measuring risk cognitions (e.g., motivations and beliefs); 7 measuring risk behaviours; 3 measuring resources; 2 measuring impaired control; and, 1 measuring persistence.

4) Phase 2: Quantitative Research

a. Data Collection

- A telephone survey was undertaken from April 22 to May 22 2009 administering the revised instrument to the pre-selected sample of Ontario slot gamblers who had consented to re-contact in Phase 1 of the study.
- An overall survey response rate of 69.2% was obtained with 374 surveys completed with eligible regular slot machine gamblers yielding a sample size that was appropriate for the research objectives.²
- The Phase 2 Gambling Risk Survey was comprised of the updated items/constructs identified during Phase 1 of the study (132 statements) as well as other demographic information (e.g., age, sex, education, household income) and general gambling behaviour and playing patterns.
- The survey took approximately 20-46 minutes to administer with an average duration of 26 minutes and was conducted by trained professional interviewers from Focal's secure data collection facility located in Halifax Nova Scotia.

b. Analysis:

- The data from the Phase 2 survey was first examined for Common Method Bias (CMB) using Harmon's one-factor test. Principal Component Analysis (PCA) using unrotated and rotated varimax solutions to ensure that the variables did not load on a single factor (indicative of method bias).
- Correlation analysis was used to examine relationships between the statements and test for multicollinearity, and response frequencies were examined for each item to assess endorsement thresholds (e.g., the number of players responding to each item).

² Structural Equation Modeling analysis using Partial Least Squares Path Analysis (PLS) was used in the data analysis phase to assess the ability of the constructs to discriminate between risk (i.e., pre-consequence) versus harm (i.e., post-consequence) and to identify problem gambling (i.e., impaired control, negative consequences, and persistence). The required sample size for using PLS analysis is either 10 times the number of items comprising the most complex construct or 10 times the largest number of independent variables (e.g., formative and reflective constructs) impacting a dependent variable (e.g., gambling risk or harm) (Chin & Newsted, 1999; Chin 1998). In this case, a number of complex constructs were considered with 34 preliminary groupings identified for testing. Therefore, 374 respondents were considered sufficient to meet the analysis requirements for Phase 2 of the study.

- Structural equation modeling (SEM) using path analysis (Partial Least Squares (PLS)) was used to examine relationships between the various constructs comprising the new instrument and the latent factors (i.e., risk, harm problem gambling measures).
- Analysis for validity and reliability was conducted to assess the constructs and a comparison was performed between results obtained for the new instrument and those for the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index.
- Partial Least Squares (PLS) analysis was used to test the overall model as well as the validity and reliability of each of the ten constructs comprising the new instrument emerging from the analysis.

Results/Discussion

- In the current study the FLAGS instrument modified for use with slot machine gamblers in Ontario performed as expected in identifying pre-harm risk for gambling problems.
- The final model was comprised of a comprehensive set of 10 multi-item indicators (5 formative and 5 reflective) that were tested using Structural Equation Modeling (SEM) and found to be sequentially related to escalating risk and harm among slot machine gamblers in Ontario.
- The ten constructs comprising FLAGS-Slots were each found to represent a distinct area of risk or harm for slot machine gamblers in Ontario and consisted of the following risk indicators:

FLAGS Risk Indicators (e.g., Constructs)	Example
Risky Cognitions: Beliefs	<i>I believe that in the long run I can win playing slots at the casino</i>
Risky Cognitions: Motives	<i>I sometimes play the slots in hopes of paying off my debts/bills.</i>
Preoccupation: Desire	<i>If I could play the machines all the time I would.</i>
Risky Practices: Earlier	<i>When gambling on a slot machine I usually play as fast as I can.</i>
Impaired Control: Continue	<i>I often spend more money gambling than I intended.</i>
Risky Practices: Later	<i>I have sometimes borrowed money from others so I could go and gamble on the slots.</i>
Impaired Control: Begin	<i>I have tried to cut back on my slots play with little success.</i>
Preoccupation: Obsessed	<i>I spend considerable time planning my life around playing the slots at the casino.</i>
Negative Consequences	<i>My goals in life have been jeopardized by my slot play.</i>
Persistence	<i>I continue to gamble despite the bad things that happen to me.</i>

- Slot machine gamblers indicated whether they agreed (value=1) or disagreed (value=0) for a set of statements for each of the 10 risk indicators (i.e., constructs). The values were then summed and compared to a threshold value. Those who scored above the set threshold were considered to have an indication of risk on that dimension.
- The results for each of the risk indicators were then used to assign gamblers to one of the five risk and harm categories depending upon which risk indicators were being triggered (e.g., where the indicators fell in the hierarchy of effects):



Risk Level	Category	Description
Level I	No Detectable Risk	Do not flag on any of the constructs so have no observable risk.
Level II	Early Risk (Pre-harm)	Have indications of risky cognitions: beliefs, risky cognitions: motives or preoccupation: desire but do not have any indications of impaired control or harm (e.g., negative consequences).
Level III	Intermediate Risk (Pre-harm)	Have indications of impaired control: continue and risky practices: earlier but do not have any indications of harm (e.g., negative consequences).
Level IV	Advanced Risk	Have one or more indications on impaired control: begin, preoccupation: obsessed and risky practices: later as well as negative consequences or persistence.
Level V	Problem Gambler	Score as having experienced both negative consequences and persistence (i.e., persisting in behaviours related to harm).

- In addition to using the instrument to assign casino machine gamblers to one of five risk categories each of the 10 components represented a distinct area of risk or harm for players ranging from early risk indicators (e.g., risky beliefs and motivations) through to advanced risk indicators (e.g., preoccupation, impaired control, risky practices) and finally indicators of problem gambling (e.g., persistence, negative consequences).
- Therefore, FLAGS-Slots can also be used to assess impacts at a component level to determine how specific strategies and interventions impact the various factors contributing to risk and the development of problem gambling among slot machine gamblers in Ontario.
- This functionality means that FLAGS moves beyond traditional identification of problem gambling prevalence by providing information for use in informing, monitoring and evaluating gambling related prevention, harm reduction, social and public health policy; not only identifying ‘who’ is at risk but, more importantly, ‘why’.
- Resulting classifications were compared to those derived using the Problem Severity Gambling Index (PGSI) of the Canadian Problem Gambling Index (CPGI) with strong overlap found in classification of problem gamblers but FLAGS-Slots proved superior in classifying pre-harm gambling risk, an important threshold for prevention applications.

Limitations

The study was quantitative in nature and comprised of a large sample of regular slot machine gamblers that is suitable for refining instrument design and development. However, the sample is not a true random sample and estimates associated with use of the new instrument (i.e., estimates of problem gambling, gambling harm and risk) cannot be generalized to the population of slot machine gamblers at-large.

Moreover, in the current study the sample was used to develop the new instrument for slot machine application and, therefore, cannot be used for statistical testing to assess instrument performance. Additional research is required to assess screen performance among slot machine gamblers at large and those in the general population both within and outside of Ontario.



Conclusions

- To prevent problem gambling there is a need for an instrument that can identify risk independently of gambling harm and problem gambling; that is risk identification before gambling problems, harms or dependency develop.
- The ability to identify early warning signs for gambling risk and harm means that it will also be possible to target and assess upstream efforts to prevent risk, ultimately reducing downstream gambling harm and problem gambling.
- FLAGS adapted for slot machine gambling has proven potential for meeting this criteria both as a self-administered option for player to assess their own play as well as a practical tool for designing and evaluating prevention initiatives.
 - *FLAGS was designed to be self administered by gamblers as a self assessment tool that will inform and encourage them to minimize their risk of becoming problem gamblers and to reduce their risky practices that lead to harms.*
 - *The instrument as designed is also ideal for use by policy makers for administration to large populations to determine the prevalence of gamblers at various stages of risk and who might be experiencing harms due to gambling.*
- Most gambling screens are comprised of a brief set of statements designed to identify problem gambling severity. In contrast, FLAGS provides the gambler and policy decision makers with a clear profile of why the gambler is classified at the specific risk level that leads to clearly defined points of concern or solutions.
- Ten highly reliable constructs provide a detailed picture of the prevalence of risk factors directly associated with gambling behaviour. It, therefore, serves as an excellent benchmark tool against which the success of these initiatives and policies can be measured.
 - *For example, initiatives could be designed to influence those at intermediate risk who are defined by FLAGS as having impaired control in that they continue to gamble longer than intended and they have behaviours that exacerbate this lack of control. A responsible gambling feature installed on gambling machines could be designed specifically to help these individuals control the length of their sessions. Subsequent surveys using FLAGS could determine if those who are at intermediate risk, and who consequently should benefit most from such a feature, are, in fact, using it and benefiting from that use.*

Implications & Future Research

Administering this instrument to a random sample of adults will provide information to assist in the formulation of strategies for minimizing the harmful impacts of slot machine gambling and create informed, effective policy.

Next steps for FLAGS:

- To administer to a random representative sample of machine gamblers to conduct confirmatory factor analysis on reflective constructs, hierarchy and confirm SEM Models;
- To develop and test self-administered versions for self-help;
- To adapt and test the measure for application to other gambling populations (e.g., sports betting, table games, online gambling);
- To develop a generic form of the instrument for detecting general gambling risk and harm.
- To assess an adolescent version of the measure with youth in Ontario (Focal Youth Gambling Risk Screen (FYGRS))