Measurement of Gambling-Related Cognitive Distortions During the State of Gameplay

Gabriel Brooks & Luke Clark
Centre for Gambling Research at UBC, University of British Columbia, Vancouver, Canada

UBC

CENTRE for GAMBLING RESEARCH at UBC

NSERC CRSNG

ABSTRACT

Gambling-related cognitive distortions have been implicated in the maintenance of disordered gambling. Typical measures for these distortions are trait-based, focusing on dispositional tendencies and general behaviour. The concept of 'double-switching'[1] posits that gamblers 'switch off' rational beliefs when gambling. Thus, trait scales – which are completed outside of game-play -- may under-estimate the state-like component of distortions. This study seeks to develop a scale to capture participant's state beliefs, completed immediately after slot machine gambling. **Participants:** 86 university undergraduates completed the pilot study, and 124 university undergraduates completed Study 1. **Methods:** Participants completed demographics and two trait-based questionnaires: Belief in Good Luck Scale (BIGLS)[2] and Gambling Related Cognitions Scale (GRCS)[3]. Participants were credited $40.00 to play an authentic slot machine for 10 mins. Following the game, the new State Scale was administered along with the Gambling Experiences Questionnaire. **Findings:** Questions developed for the State Scale were condensed into a three-factor solution, using principle axis factoring. Initial convergent validity is demonstrated via correlational analyses. **Implications:** The State Scale may enable researchers to assess gambling-related cognitive distortions activated by gameplay.

INTRODUCTION

o Early assessments of gambling-related cognitive distortions used the '"think-aloud" method, where participants verbalized cognitions during gameplay[4]. This approach was criticized as potentially interfering with the gambling experience. Subsequently, questionnaires have become the norm to assess gambling-related cognitions[5]. Yet, these focus upon dispositional (i.e., trait) beliefs.

o Sevigny & Ladouceur (2003)[1] proposed the concept of "double switching"; where rational beliefs about gambling "switch off" during gameplay and then "switch back on" after gambling. This switching could be triggered by physiological arousal and/or conditioned cues.

o Thus, current trait scales may under-estimate or neglect the full extent of erroneous cognitions during the act of gambling.

## OBJECTIVES & METHODOLOGY

Objectives:

1) To develop a measure of state-activated gambling-related cognitive distortions, using exploratory factor analysis.

2) To demonstrate initial validation through convergent validity and qualitative responses

Questionnaires:

o Gambling Related Cognitions Scale (GRCS)[3]
o Problem Gambling Severity Index (PGSI)[6]
o Belief in Good Luck Scale (BIGLS)[2] – *Study 1*
o Gambling Experiences Questionnaire (GEQ)[7]

Study Design:

1) Participants complete demographics, the PGSI, the GRCS, and the BIGLS.

2) Participants undergo a gambling 'induction':
   o Provided $40.00 (opportunity for real cash bonus) to play real slot machine for 10 mins.
   o Given tutorial on slot machine controls.

3) Complete "state scale" questions, GEQ, and provide qualitative feedback upon end of gambling task.

Demographics & Trait Scales → Ten Minute Slot Machine Exp. → State Scales & Qualitative
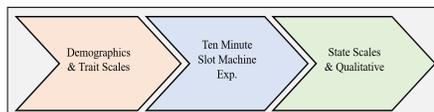
FACTOR ANALYSIS & INITIAL VALIDATION

Question Selection & Design:

o Initially 26 questions were developed
o Bipolar seven-point Likert-scale

(1) When wins occurred, more seemed to follow:

Strongly Disagree | Moderately Disagree | Slightly Disagree | Neither Disagree nor Agree | Slightly Agree | Moderately Agree | Strongly Agree

o Inspired from five documented cognitive distortions[8] and existing trait-based questionnaires.

Hot Hand Fallacy: The belief that one is experiencing a "winning streak" followed by a desire to capitalize on an expected continuation of wins.

Illusion of Control: An erroneous belief that specific forces, actions, or strategies can influence the outcome of chance-based gambling games. May be divided into "primary" (player driven) and "secondary" (supernatural driven) forces[9].

Gambler's Fallacy: Results from a failure to understand the independence of events present in most gambling games. May lead the gambler to believe an outcome (e.g. a win) is 'overdue'.

Belief in Luck: The belief that certain people, items, or times are imbued with a greater or lower likelihood to experience favourable outcomes.

Anthropomorphism: Imbuing the game with a sense of agency, resulting in feelings of competition against the machine or fair/unfair treatment.

Factor Analysis Procedure:

o Principle axis factoring with Direct Oblimin rotation was utilized (assumes detected factors correlate).

o Correlation matrix reviewed to detect bad items (e.g., autocorrelation or failure to correlate).

o Items removed due to low factor loadings or excessive multiple factor loadings.

o Items removed because of low communality, unless highly specific.

Descriptives:

N	Age	Sex (F)	Prior Slots Exp.	GRCS	BIGLS	State Scale
122	21.14 (3.40)	88	58.20%	25.78 (20.58)	30.36 (6.55)	26.97 (26.50)

Resulting Factor Solution:

	Factors			
	Illusion of Control	Experience of Luck	Hot Hand Fallacy	Machine Anthro
(1) I learned strategies from winning streaks	.852			
(2) I discovered some techniques that increased my odds	.846			
(3) I felt my skill improve throughout the game	.762			
(4) There seemed to be some winning strategies	.650			
(5) Luck played an important role in my outcome		.785		
(6) I felt particularly lucky or unlucky		.669		
(7) I was my typical lucky or unlucky self		.447		
(8) Sometimes the wins would just keep coming			.878	
(9) Sometimes it felt as if my wins wouldn't stop			.816	
(10) When wins occurred more seemed to follow			.439	
(11) My success depended upon the machine's mood				.800
(12) The machine was out to get me				.643
(13) The machine was friendly or mean to me				.630

Note: All eigenvalues > 1.00; cumulative explained variance = 58.34%; values below .300 are masked; correlations between factors ranged between $r = .14$ to $r = .47$; Cronbach's Alpha = .84.

Initial Validation:

o Positively correlates with the GRCS ($r = .614$**) & BIGLS ($r = .348$**).

o Positive associations with the GEQ subscales of 'Competency' ($r = .482$**), 'Challenge' ($r = .355$**).

o No association with GEQ subscale 'Tension' ($r = .125$), negative correlation with GEQ subscale 'Negative Affect' ($r = -.221$*).

Example Qualitative Responses:

High Scale Scorers:

"I feel helpless because I don't understand how the machine works, there seems like no specific rule that I can looking for to enhance my possibility of winning the game, all the things I can do here was just following the flow."

"I felt really lucky with this machine and i feel like it was on my side to help me."

"…if the outcome is good, I tend to use the repeat bet, while if I loss for several times, I will try to change my choice. Maybe there is some strategies for winning…"

Low Scale Scorers:

"It was my first time gambling and I hope that it will be the last. I did it for the [course] credits."

"I felt as though I were simply pushing buttons with no tangible connection to their outcome, pulled along by the flashing and whirring of the machine. A typical bait and hook scenario in my mind."

"I found it boring and unnecessary."

CONCLUSIONS

o The newly-developed state scale captured 4 established gambling distortions: Illusion of Control, Experience of Luck, Hot Hand Fallacy, Machine Anthropomorphism. 'Gambler's Fallacy' was not identified.

o The measure of sampling adequacy was acceptable (0.76) and correlational analyses demonstrate convergent and divergent validity.

o Qualitative responses indicate that high State Scale scorers enjoyed the game more and felt more skillful (on GEQ), compared to low scorers. State scores were also predicted by trait dispositional measures (GRCS).

o Overall, this study has produced a brief scale for deployment after slot machine use to assess state-activated cognitive distortions.

o This scale may permit new research avenues regarding the relationship between gambling-related cognitive distortions, the maintenance of gambling behaviour, and problem use, during the state of gameplay.

REFERENCES

1. Sevigny, S., & Ladouceur, R. (2003). Gamblers' irrational thinking about chance events: The 'double switching' concept. *International Gambling Studies*, 3(2), 149–161. https://doi.org/10.1080/1356347032000142261

2. Darke, P. R., & Freedman, J. L. (1997). The Belief in Good Luck Scale. *Journal of Research in Personality*, 31(4), 486–511. https://doi.org/10.1006/jrpe.1997.2197

3. Raylu, N., & Oei, T. P. S. (2004). The Gambling Related Cognitions Scale (GRCS): Development, confirmatory factor validation and psychometric properties. *Addiction*, 99(6), 757–769. https://doi.org/10.1111/j.1360-0443.2004.00753.x

4. Gaboury, A., Ladouceur, R. (1989). Erroneous Perceptions and Gambling. *Journal of Social Behaviour and Personality*.

5. Goodie, A. S., & Fortune, E. E. (2013). Measuring cognitive distortions in pathological gambling: Review and meta-analyses. *Psychology of Addictive Behaviors*, 27(3), 730–743. https://doi.org/10.1037/a0031892

6. Ferris, J., & Wynne, H. (2001). The Canadian Problem Gambling Index : Final report. *Canadian Centre on Substance Abuse*, 38. https://doi.org/10.1007/s10899-010-9224-y

7. IJsselsteijn, W. a., de Kort, Y. a. W., & Poels, K. (2015). Game Experience Questionnaire, 1–9.

8. Leonard, C. A., Williams, R. J., & Vokey, J. (2015). Addiction Research & Therapy Gambling Fallacies : What are They and How are They Best Measured ?, 6(4), 1–9. https://doi.org/10.4172/2155-6105.1000256

9. Ejova, A., Delfabbro, P. H., & Navarro, D. J. (2015). Erroneous Gambling-Related Beliefs as Illusions of Primary and Secondary Control: A Confirmatory Factor Analysis. *Journal of Gambling Studies*, 31(1), 133–160. https://doi.org/10.1007/s10899-013-9402-9

Contact Information: gbrooks@psych.ubc.ca