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The Structure of Problem Gambling

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Disclosure

- **Disclaimer:** The views expressed in this presentation are my own and do not represent the views of the Alberta Gambling Research Institute, the University of Lethbridge, or my co-investigators.
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- Spending a lot time and money. Gambling too much, gambling is variable between people
- Cravings
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- Individual differences
- Gambling more than earn, gains/losses
- Impacts on family

Background

- **What is problem gambling and what are the important components?**
- Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV and V were largely a product of **expert consensus and reviews of the literature.**
- Typically, analyses of the dimensionality of problem gambling have **focused on specific gambling severity measures.**
- Analyses of problem gambling assessments have found **one, to multiple separate factors.**

Scale Construction

- **Problem Gambling Severity Index (PGSI) development:**
 - 46 potential items (3 factors).
 - items with low correlations with the other items and/or the total score were eliminated.
 - 9-item assessment (1 factor).

- **DSM-V: Removal of illegal Acts:**
 - Arguably the strongest characterisation of problem gambling.
 - weak loading on the primary factor.
 - rarely occurs in the absence of the other diagnostic criteria.

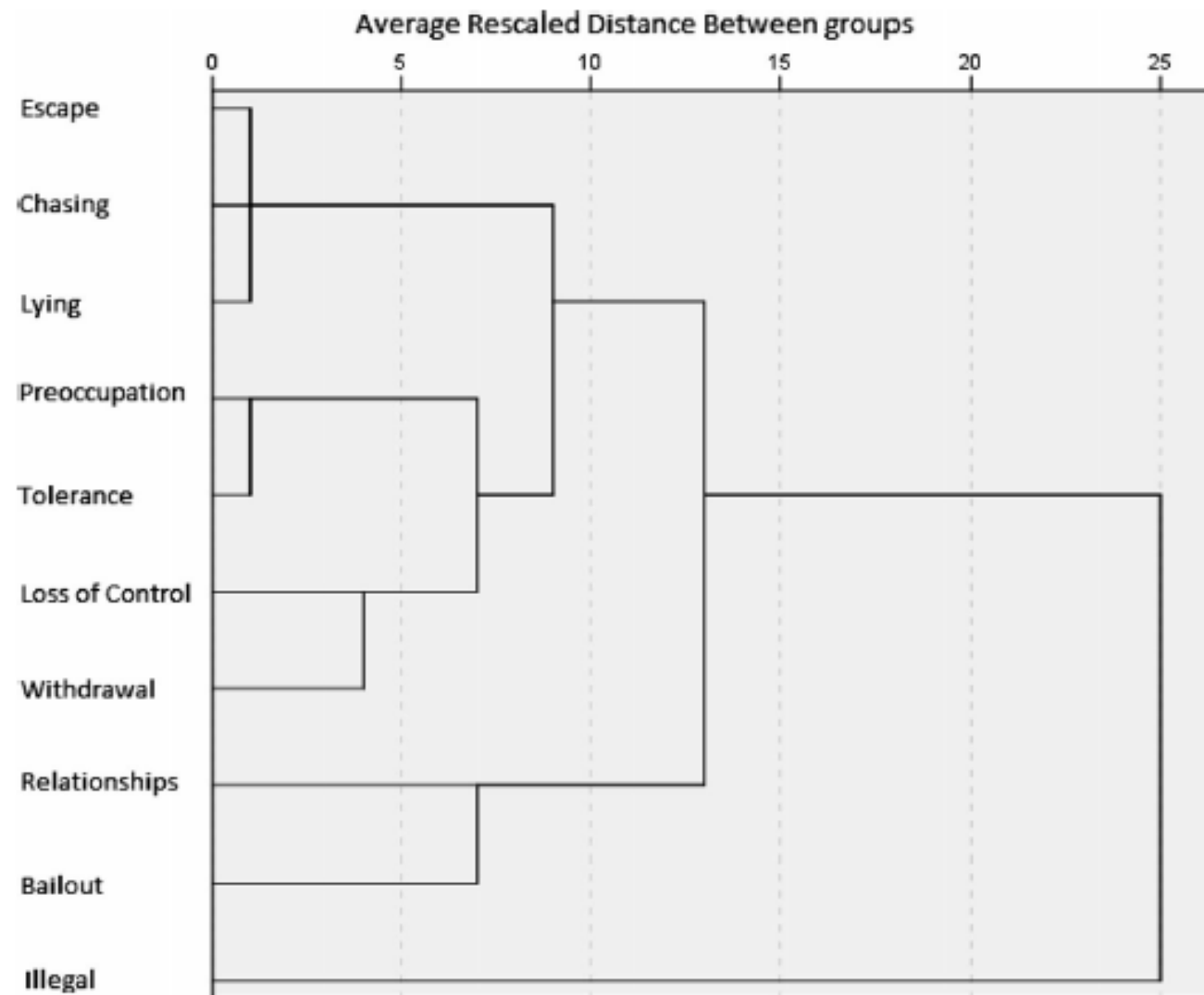
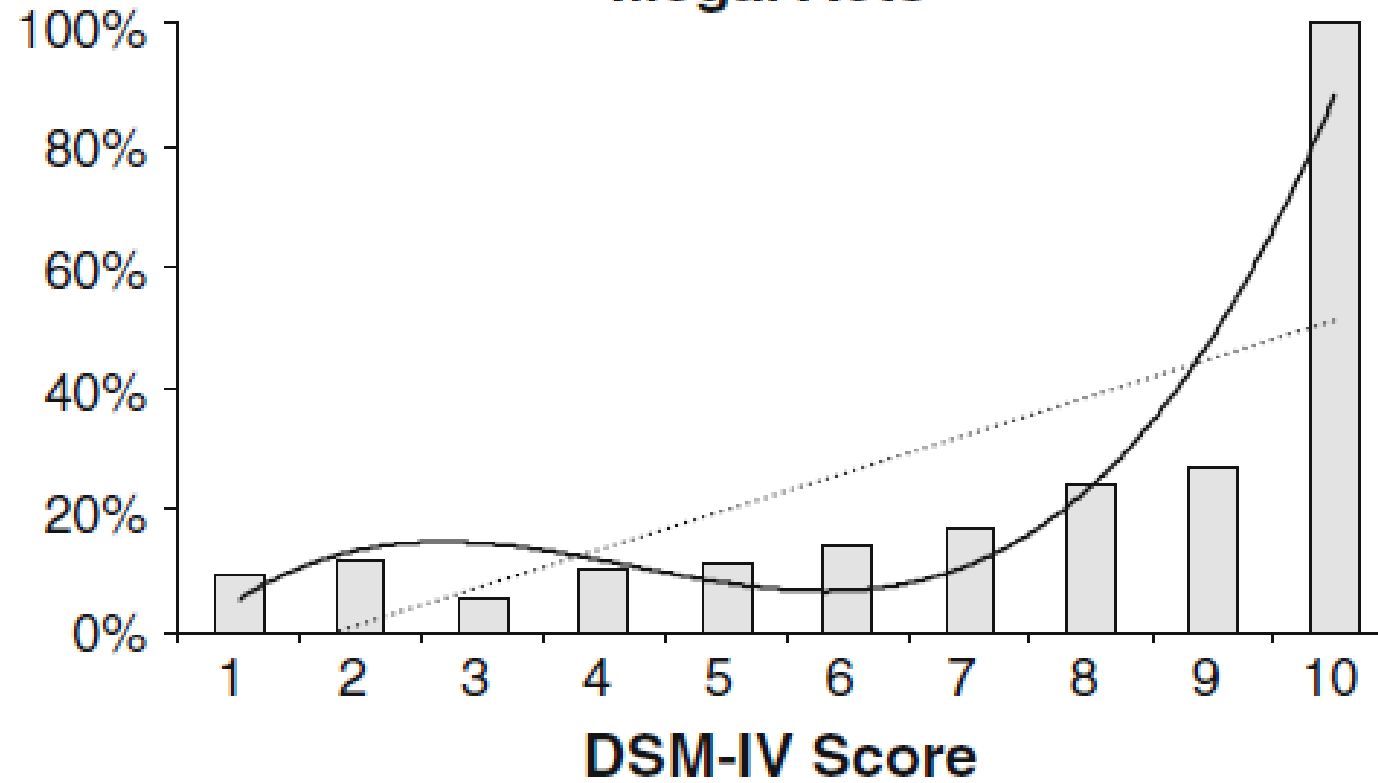


Fig. 2 Dendrogram

Illegal Acts



Gambling Heterogeneity

- **Empirical evidence**

- **Comorbidities, personality, and symptomatology** of problem gamblers have shown consistent evidence of heterogeneity in the form of either three, four, five, or eight distinct subtypes.
- Gambling Intensity.

- **Theoretical analyses**

- Pathways model: Behavioural, Emotionally Vulnerable, Anti-social Impulsivist
- Obsessive Compulsive (DSM-IV): Obsessive, Compulsive, Addicted
- Action or Escape

- **Motivational Differences**

- Gender, gambling activity, age

Purpose

- Investigate heterogeneity in problem gambling.
- Use a range of problem gambling instruments.
- Sample a large and diverse group of gamblers.
- Attempt to match assessments that use a variety of scale and data types.

Method

- Secondary analysis of data originally collected for the purposes of studying online gambling and online gamblers.
- Participants were self-recruited through banner advertising placed on a popular online gambling portal, www.casinocity.com, from 15 June to 15 December 2007.
- **“Test your gambling knowledge; take the University of Lethbridge Survey”, and “See how your gambling knowledge, attitudes and behavior compare to other people”.**
- The survey was available in seven different languages (English, French, German, Italian, Spanish, Mandarin, and Japanese).

Questionnaire

- The questionnaire contained 177 questions with independent sections on:
 - demographics,
 - gambling behaviour,
 - gambling attitudes,
 - the definition of gambling,
 - gambling knowledge and beliefs,
 - prediction abilities,
 - risk of problem gambling,
 - **and four problem gambling measures.**

Gambling Assessments

- ***South Oaks Gambling Screen (SOGS) - Revised***: The SOGS is a 13-item measure based on DSM-III criteria for pathological gambling.
- ***National Opinion Research Centre DSM-IV Screen for Gambling Problems (NODS)***: The NODS is a 17-item operationalization of the American Psychiatric Association's criteria for pathological gambling.
- ***Problem Gambling Severity Index (PGSI)***: This is a 9-item measure of problem gambling included in the larger Canadian Problem Gambling Index.
- ***Problem and Pathological Gambling Measure (PPGM)***: The PPGM is an 17-item measure that uses a 12-month time frame and classifies people into non-gambler, recreational, at-risk, problem, and pathological gamblers.

Administration

- The four problem gambling measures **contain 56 items**, with many being identical or very similar to an item in one or more of the other measures.
- To avoid redundancy, **items that had a similar counterpart in another measure were only asked once**, resulting in a total of 30 problem gambling items.
- In some instances, this resulted in **minor variations in the normal item wording or response options**.

Participants

- **12,521 participants** answered some part of the survey.
- However, only 5,196 participants completed the PGSI, 5,083 completed the NODS and PPGM, and **5,081** completed the SOGS.
- Most participants were male (64.4%),
- married (60.2%),
- between the ages of 40 and 69 years (68.8%),
- had some level of post-secondary education (29.5%),
- and earned between \$40,000 and \$60,000 annually (21.3%).
- Respondents came from **105 countries**, mostly from the United States of America (78.6%).

Item Endorsement for Problem Gambling Endorsement

	0-5%	6-%	0-5	6-
PGSI	85%	15%	4436	760
SOGS	91%	9%	4613	468
NODS	95%	5%	4813	270
PPGM	92%	8%	4699	384

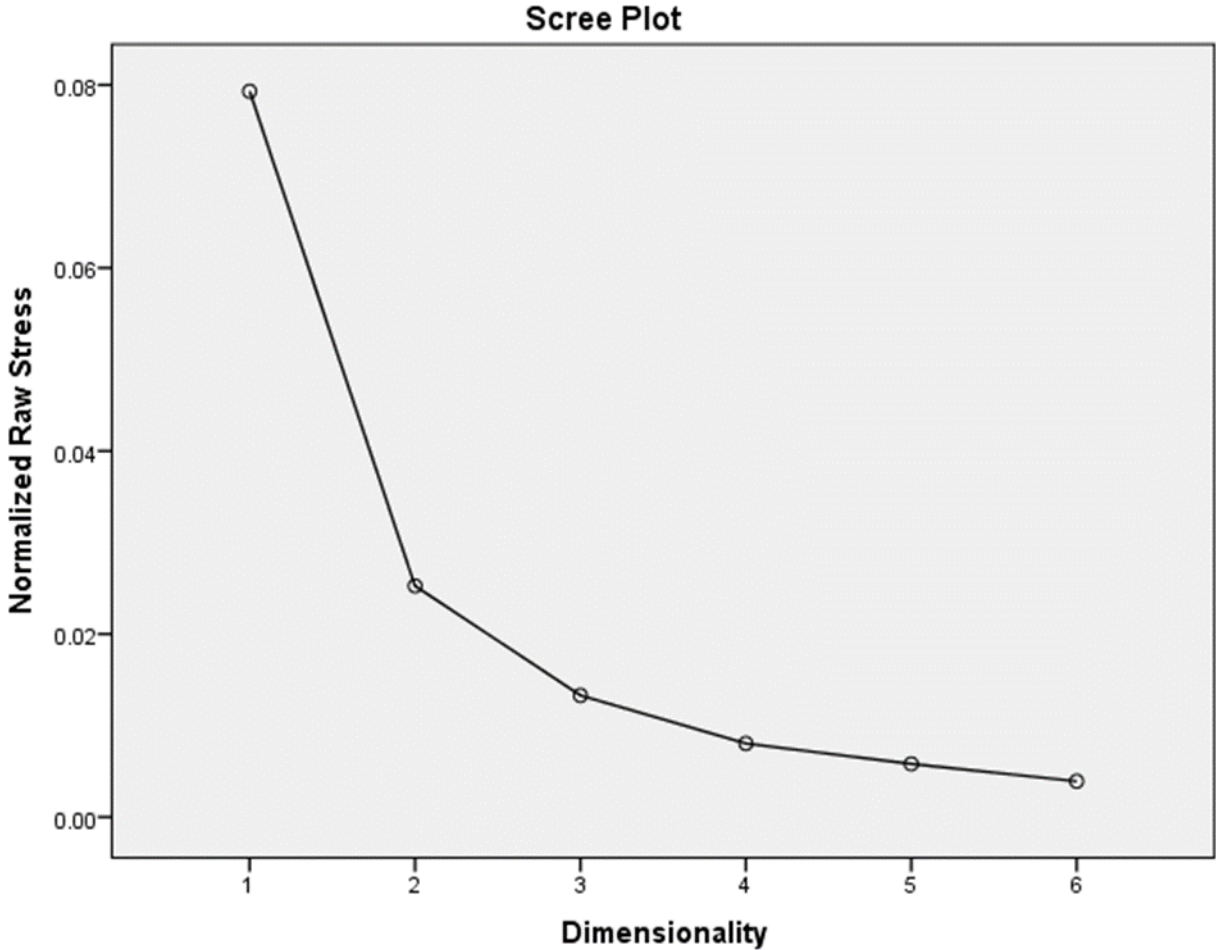
Data Preparation

- Descriptive analyses were conducted on the **raw data**.
- **All missing values** from the problem gambling measures were replaced with the **median score** (rounded up to the closest integer) from valid responses for each variable.
- NODS and PPGM use **dichotomous response** options, the PGSI uses **4-point** response options, and the SOGS uses **dichotomous and 4-point response options**.

Analyses

- **Multidimensional scaling (MDS)** procedure was used to find sets of proximal variables across unique items in the four problem gambling measures (PGSI, SOGS, NODS, & PPGM). Categorical MDS Procrustes transformation and Spline transformations.
- **Scree and bootstrapped change-point analyses.**
- **Nonlinear canonical correlations** were performed to investigate the degree of fit between the four problem gambling assessment instruments across dimensions.
- **Principal component analysis** with Promax rotation and Kaiser normalisation using the best fitting number of dimensions.

Scree Plot across Dimensions: Spline Transformation

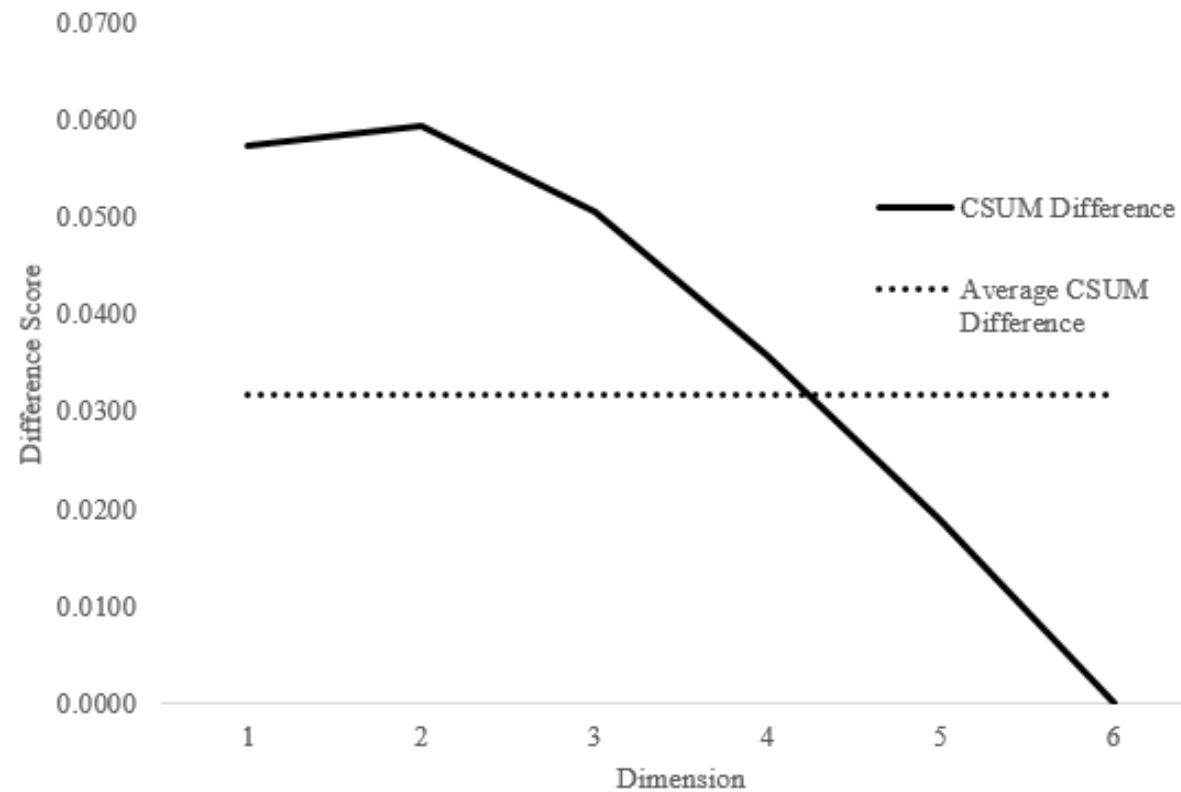


Principal Components Analysis for Categorical Data: Procrustes Transformation

Model Summary			
Dimension	Cronbach's Alpha	Variance Accounted For	
		Total (Eigenvalue)	% of Variance
1	.952	12.583	41.944
2	.458	1.795	5.983
3	.209	1.254	4.179
4	.026	1.025	3.418
5	-.095	.916	3.054
6	-.174	.856	2.853
Total	.978 ^a	18.429	61.431

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Cumulative Sum of Normalised Stress Scores: Spline Bootstrap Analysis (n=1000)



Confidence 66%

Number of Dimensions

- Scree plot appears to plateau at four dimensions.
- Principal Component Categorical Analysis for Categorical data report four significant dimensions.
- Bootstrapped analyses of normalised stress change scores appears to become constant at 4 dimensions.
- Change scores of Eigen/loss is lowest at four dimensions.

“Gambling Problems”

Item	Loading
Guilty	.79
Have a problem	.77
Bet more than can afford	.75
Gambled Longer	.72
Lied	.71
Relief	.70
Escape	.69
Gambled with larger amounts	.69
Others criticised	.67

“Financial Problems”

Item	Loading
Borrowed items	.86
Financial trouble	.82
Borrowed money	.78
Health, Stress, Anxiety	.71
Not paid money back	.67

“Health and Relationship Issues”

Item	Loading
Others say gambling is a problem	.73
Neglect children or family	.72
Health problems for you or another	.67

“Difficulty controlling gambling”

Item	Loading
Restless, irritable cutting down or stopping	.80
Successful at stopping	.78
Tried to cut down or stop	.75
Could not stop	.74

Discussion

- The multi-dimensional scaling, change-point, and canonical correlation analyses suggest **approximately four components**.
- We characterise the structure of problem gambling as:
 - **a core group of symptoms** we refer to as “gambling problems”,
 - **and three other dimensions** characterised as “financial problems”, “health and relationship issues”, and “difficulty controlling gambling”.

Discussion

- Previous factor analyses of problem gambling have also found **criteria to group into one primary cluster, often with secondary, smaller groups of criteria.**
- Toce-Gerstein et al. (2003) reported a primary group of nine out of ten DSM-IV criteria in a community sample (i.e., an in-person survey of gambling facility patrons and a general population survey).
- Christensen et al. (2015) reported a primary group of seven out of ten DSM-IV criteria (unrotated) or five out of ten DSM-IV criteria (rotated) in a treatment seeking sample.

Discussion

- These secondary criteria are typically **subclinical criteria** (i.e., Toce-Gerstein et al. 2003: ‘chasing’, Christensen et al.: ‘escape’), or a
- combination of **sub-clinical and criteria often associated with higher gambling severity** (i.e., Christensen et al. 2015: “illegal acts”, “risky relationships”, and “bailout”).
- Consequently, the literature appears to report **two related classes of gambling symptomatology**. A primary group of diverse experiences that forms the core problem gambling experience, and a second group of related experiences that form distinct sub-groups based on gambling severity (i.e., subclinical, higher severities).

Table 5 Unrotated and rotated component loadings

DSM-IV criteria	Components					
	Unrotated			Rotated		
	1	2	3	1	2	3
Preoccupation	.626	−.357	−.318	.766	.138	−.004
Tolerance	.626	−.332	−.300	.751	.158	.007
Loss of Control	.525	−.276	.248	.538	.139	.464
Withdrawal	.650	−.356	.030	.723	.158	.323
Escape	.241	−.049	.795	.089	.128	.820
Chasing	.561	.020	−.015	.484	.383	.171
Lying	.543	.358	.092	.297	.627	.189
Illegal	.207	.560	−.367	−.004	.555	−.388
Relationships	.426	.598	.013	.102	.731	.025
Bailout	.504	.483	.146	.197	.696	.199

Discussion

- This complexity appears to explain the **consistency of a unitary factor structure in some assessments** (e.g., Toce-Gerstein et al., 2003), and the **multiple factors in others** (e.g., Zimmerman et al., 1985).
- Therefore, although there appears significant consistency in the grouping of gambling criteria (i.e., one primary experience), **this experience appears diverse**.
- Further, **these different components appears to create separate classes of gamblers**, often with higher gambling severities and probably greater rates comorbid disorders.
- Our results affirms both phenomenon, and emphasizes the need for **comprehensive problem gambling assessments that include multiple, and separate components**.

What characterises problem gambling and its major components?

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Limitations and Strengths

- There were **missing responses (typically less than 1%)**, and for some analyses, they required data imputation.
- The analysis was focused on the **numerical endorsement of gambling harm criteria** as an indication of gambling severity.
- Categorical Principal Components Analysis; somewhat questionable analysis for rank response data.
- An **international survey of gamblers** of over two-thousand gamblers reporting some gambling harm.
- Analytical approaches designed to compare problem gambling **measures that use different response options.**

Questions?

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