

Pathological Gambling and the Space of Psychiatric Disorders

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Summary

- Context
- Objective
- Design and methods
- Results
- Discussion
- Conclusion

Context

- Current advances in nosology (i.e., DSM-5) brings to the fore interrelationships between disorders
- These interrelationships could inform about commonalities in etiology, clinical course and treatment response
- Two questions:
 - What is the place of PG in the nosology of psychiatric disorders?
 - What are the implications?

Context

- Previous clinical and research evidence suggests that mental disorders have other mental disorders to which they are more closely related to, and other that are less similar

Context

- Symptom presentation (e.g., phenomenology and course) in clinical experience:
 - Major depression is more related with dysthymia or GAD than with substance use disorders
 - PG has many symptoms paralleling substance use disorders

Context

- Structural studies of common mental disorders:
 - Internalizing disorders
 - Externalizing disorders
- Treatment response studies:
 - Response of different anxiety disorders to antidepressants
 - Several addictive disorders respond to CBT or naltrexone

Context

- Structural studies suggest a limited number of common causal pathways
- Disorders more related among each other may express these commonalities:
 - Comorbidity
 - Etiological factors
 - Clinical presentation
 - Clinical course
 - Treatment response

Objective

- To operationalize a formal measure of similarity between disorders
- Measure its validity by examining its prediction of incidence and prevalence prospectively
- Examine the location of PG in this map

How to measure the “distance” between mental disorders?

- Locations of each disorder in a virtual map will allow the calculation of “distances” as a formal measure of similarity
- The dimensions in the space and the location of disorders in that space can be obtained using factor analysis

How to develop a map?

- Factor analysis allows:
 - To identify latent dimensions of the disorders: each factor is an axis in the space
 - To use the loadings of each disorder in each latent factor as coordinates in a system
 - The location of each disorder in the virtual space can be used to calculate distances among disorders

Methods

- Sample: NESARC (N=34,653), completed in two Waves (2001-2002 y 2004-2005)
- Representative of the household adult population in the U.S
- Included DSM-IV diagnosis of PG
- 12-month DSM-IV diagnoses at Wave 1 were used to calculate the map

Methods II

- Identification of axes:
 - Exploratory factor analysis (EFA) was preferred over confirmatory factor analysis (CFA) to allow for cross-loadings
 - Criteria to select model: eigenvalues, fit indices, scree test and parallel analysis.
 - Each factor was a latent dimension that represented an axis in the space

Methods III

- Coordinates of the disorders:
 - Loadings of the indicators (i.e., disorders) indicate the strength of the relationship between the factor and the indicator
 - Loadings on the factors were used as coordinates over the axes to determine a position in the space

Methods IV

- Distance between disorders
 - The Euclidean distance between pairs of coordinates in the space (disorders) was obtained applying a generalization of the Pythagorean theorem for higher dimensional spaces

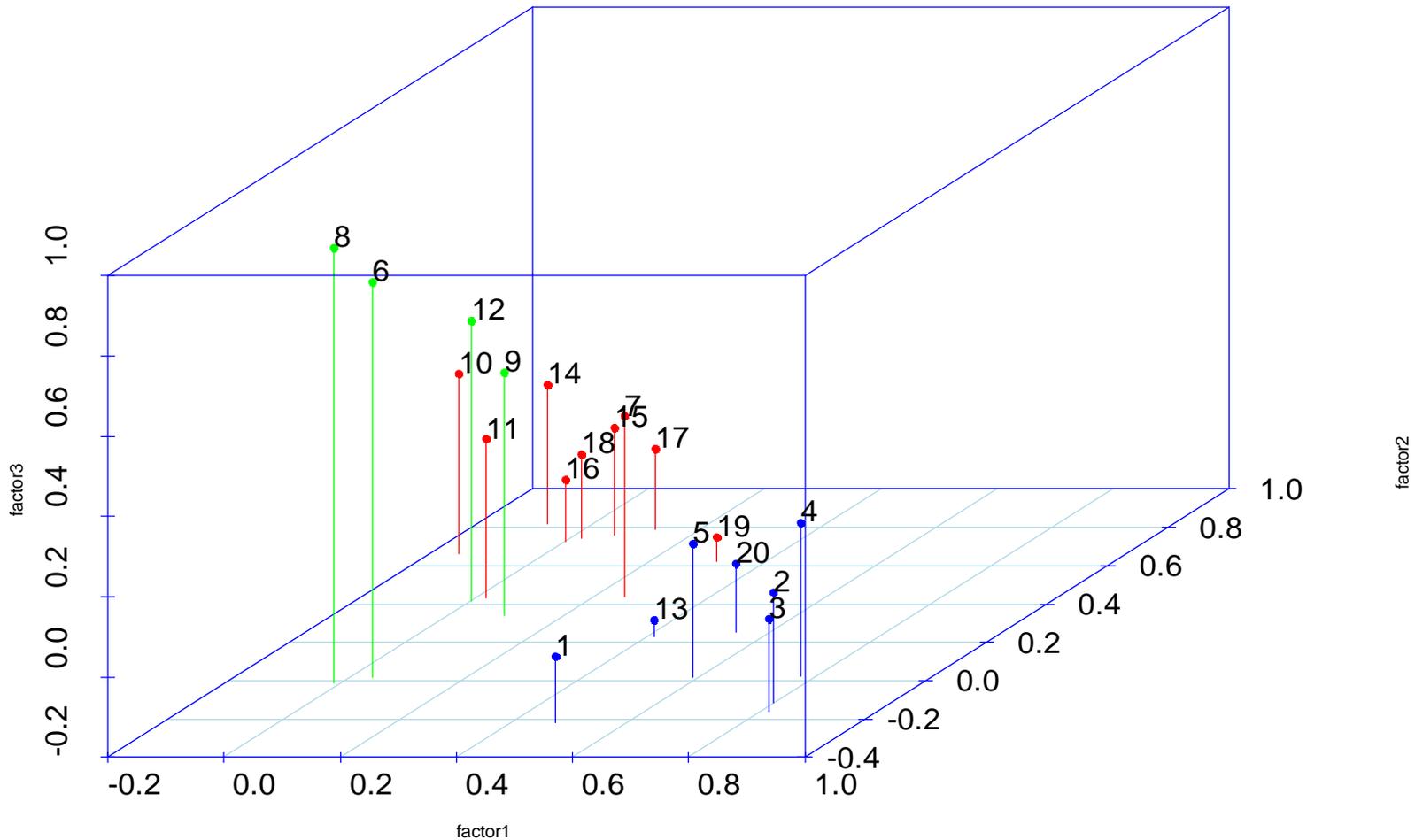
Methods V

- Predictive value of distances between disorders in the map:
 - Correlation between the distance between a pair of disorders in Wave 1 and the Adjusted Odds Ratio for their prevalence and incidence at Wave 2

Alternative measures

- The same correlation using a confirmatory (CFA) instead of an exploratory model (EFA)
- Inverse of the Odds Ratio in Wave 1

A map of mental disorders



Results: Dimensions of mental disorders

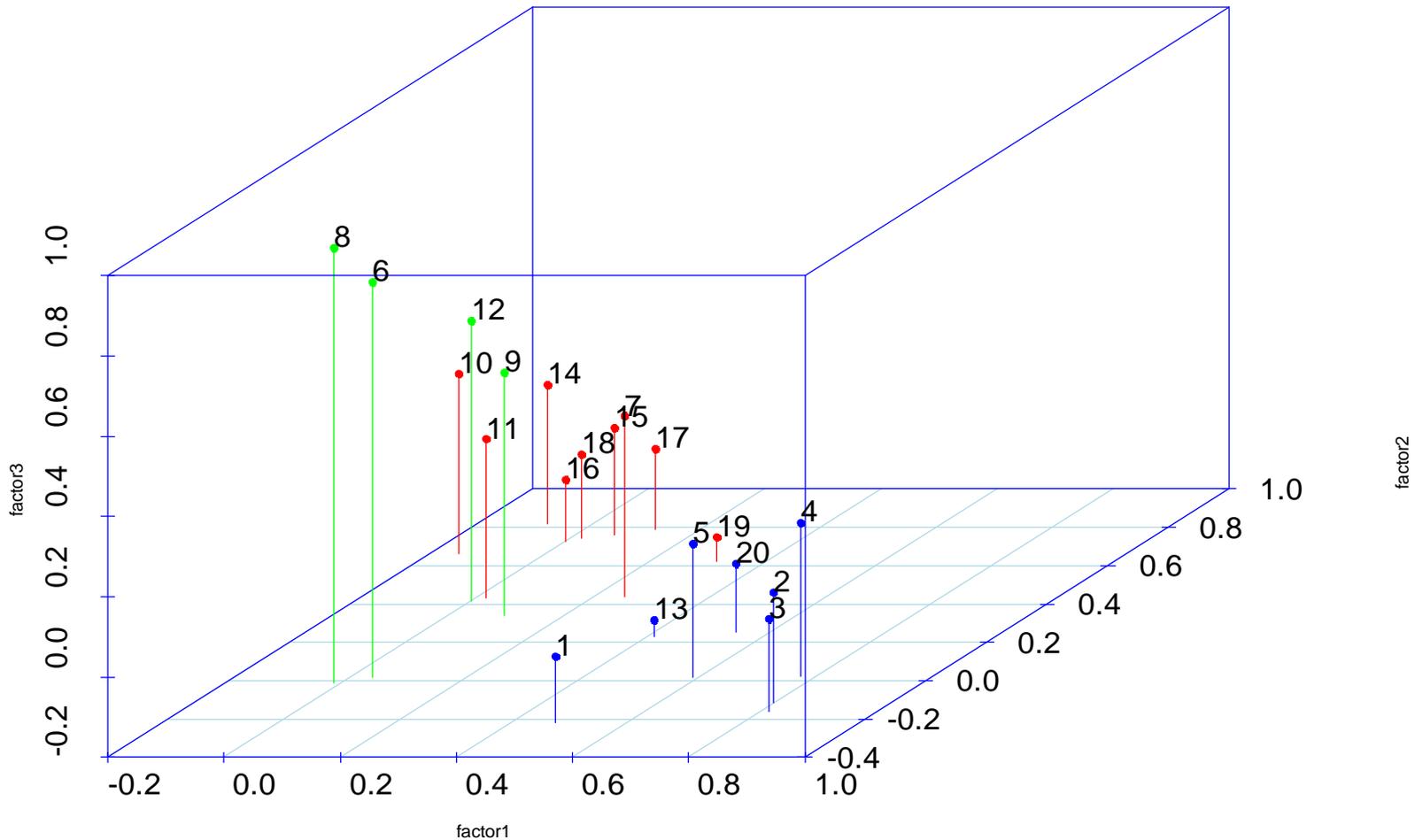
- A 3 factor model was preferred to calculate the map; however the 4 and 5 dimension models also showed good fit
- Correlation of factors:

| | Factor 1 | Factor 2 | Factor 3 |
|----------|----------|----------|----------|
| Factor 1 | 1.00 | | |
| Factor 2 | 0.49 | 1.00 | |
| Factor 3 | 0.25 | 0.42 | 1.00 |

Fit Indices

- CFI=0.99
- TLI=0.98
- RMSEA=0.008

A map of mental disorders



Results: dimension of mental disorders II

- Factor 1 had highest loadings on substance use disorders, pathological gambling and antisocial personality disorders
- Factor 2 had highest loadings on bipolar disorder, social anxiety disorder, specific phobia and the rest of personality disorders
- Factor 3 had highest loadings on major depressive disorder, dysthymia, generalized anxiety disorder and panic disorder.

Results: coordinates and distance between disorders

- Broad variation in the pattern of coordinates and distances in the space between pairs of disorders
- Largest distance was found between dysthymia and drug abuse and shortest between drug abuse and alcohol dependence

Additional analyses

- For the exploratory model (EFA), the correlation between distances in Wave 1 and the AOR at Wave 2 were -0.57 for prevalence and -0.56 for incidence
- For the confirmatory model (CFA), the correlation between distances in Wave 1 and the AOR at Wave 2 were -0.42 for prevalence and -0.38 for incidence
- Alternative measures had lower predictive value

Comments

- A limited number of underlying dimensions explain the comorbidity of mental disorders
- These results agree with previous research that support an externalizing dimension and a variable number of internalizing dimensions

Comments

- Pathological gambling was located close to other addictive disorders
- It had loadings from all dimensions
- This may represent:
 - Lack of chemical addiction
 - Alternative pathways (e.g., escape)

Comments

- Mapping mental disorders provides new pieces of information about the relationship between mental disorders
 - The cross-loadings indicate that disorders are not exclusively aligned with one dimension
 - Distance between pairs of disorders is a multivariate measure of association
 - Conceptualization of mental disorders as continuous instead of discrete entities

Comments

- Disorders included in the same DSM-IV diagnostic category tended to be closer to each other in the map
- It may also give clues as to where to locate some disorders such as PG or borderline PD.
- In addition to face validity, these diagnostic categories also have prognostic validity

Implications

- Nosological:
 - These results raise questions about the distinction between Axis I and II disorders (e.g., there is no “personality disorder” factor)
 - Internalizing and externalizing dimension are positively rather than negatively correlated.
 - Supports PG as an addictive disorder

Implications

- Etiological:
 - Disorders that are closer to each other are more likely to share liabilities
 - PG may share genes or neurocircuitry with SUD
 - Simultaneous loadings in multiple dimensions indicate multiple etiological paths, e.g., impulsivity versus escape

Implications

- Clinical:
 - Differential diagnoses can be narrowed towards diagnoses that are closer
 - In the case of PG, need to screen for substance use disorders, but also for mood and anxiety

Implications

- Therapeutic:
 - Treatment for conditions that are close to each other may overlap (e.g., several anxiety and mood disorders that are close in the map respond to SSRIs)
 - Supports the study of treatments that have been useful for substance use disorders

Summary

- Mapping mental disorders can be used to quantify their distance to each other
- This distance is a formal measure which predicts of incidence and prevalence
- This measurement has nosological, etiological, clinical and therapeutic implications

Thank you