

Comorbidity: a network analysis (Cramer et al., 2010)

BSc Capstone Literature Review - 1

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Goal - Cramer et al. (2010)

- Causal Relationships
- Challenge the Latent Variable Model
- “disorders are *networks* that consist of *symptoms* and *causal* relations between them” (Cramer et al., 2010).

Similar Works - Cramer et al. (2010)

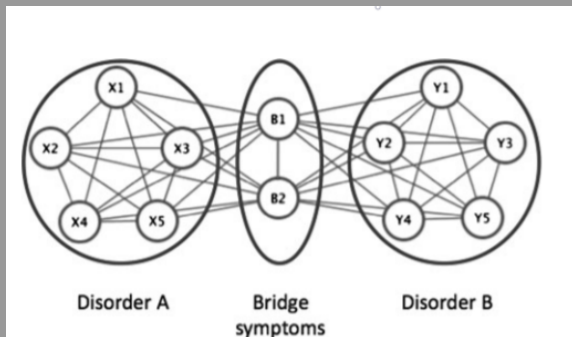
- Revolutionary Theory (limits references to similar works).
- The Oxford Journal republished with responses (Humphry and McGrane, 2010).
- Criticism of argument on Latent variables by Danks et. al. (Danks et al., 2010).

Procedures and Methods - Cramer et al. (2010)

- Focus on Comorbidity using NCS1 data from Kessler (1990-1992)
- The Theory of Complex Networks
- Statistical parameterization and Akaike Information Criterion

Procedures and Methods - Cramer et al. (2010)

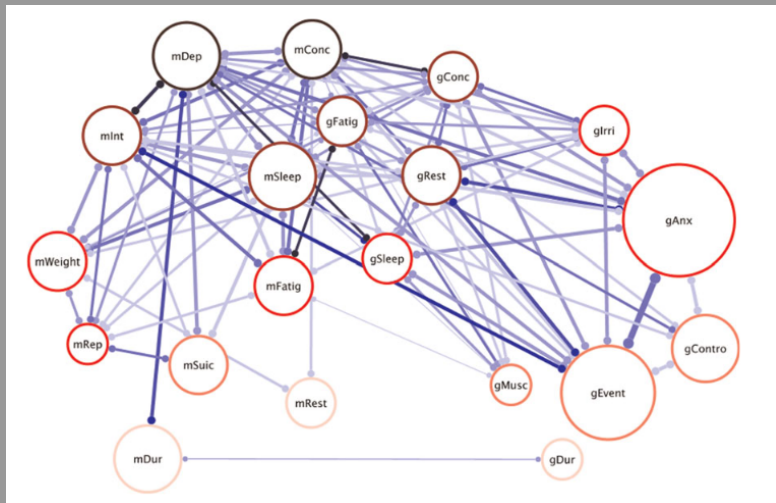
- They found a bridge model held for their goals



Procedures and Methods - Cramer et al. (2010)

- Edge Thickness: Co-occurrence
- Edge Color: Strength of Association (log odds ratio)
- Node Size: Symptom Frequency
- Node Color: Node Strength (the sum of the weights of the connected edges)

Procedures and Methods - Cramer et al. (2010)



Conclusions - Cramer et al. (2010)

- Hypothesis development
- “Pathways of comorbidity” (Cramer et al., 2010)
- A network analysis is a groundbreaking and feasible approach

Implications - Cramer et al. (2010)

- Change in predominant psychometric model
- Improve Diagnostic Models using Bridge Symptoms
- Network model supports hypothesis that Artificial Neural Networks (ANNs) are a feasible approach

Next Steps - Cramer et al. (2010)

- Account for the possibility of cyclic attributes in a latent model based on Danks et al. (2010)
- Usage of networks to build ANNs to identify comorbid disease

References

- Angélique OJ Cramer, Lourens J Waldorp, Han LJ Van Der Maas, and Denny Borsboom. Comorbidity: A network perspective. *Behavioral and brain sciences*, 33(2-3):137, 2010.
- David Danks, Stephen Fancsali, Clark Glymour, and Richard Scheines. Comorbid science? *Behavioral and Brain Sciences*, 33(2-3):153–155, 2010. doi: 10.1017/S0140525X10000609.
- Stephen M. Humphry and Joshua A. McGrane. Is there a contradiction between the network and latent variable perspectives? *Behavioral and Brain Sciences*, 33(2-3):160–161, 2010. doi: 10.1017/S0140525X10000786.
- Ronald C. Kessler. National comorbidity survey: Baseline (ncs-1), 1990-1992. URL <https://doi.org/10.3886/ICPSR06693.v6>.