DEPRESSION COMORBIDITY:

APPLYING BRIDGE CENTRALITY IN NETWORKS TO UNDERSTAND OVERLAP WITH OTHER MENTAL DISORDERS

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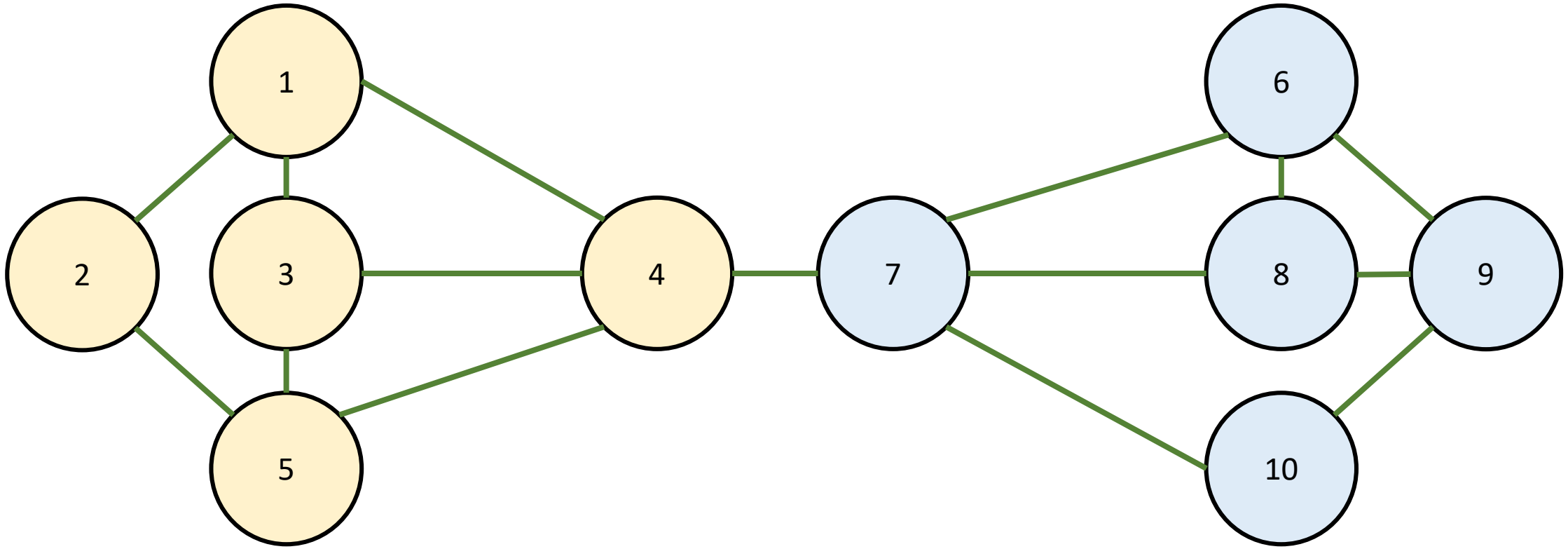
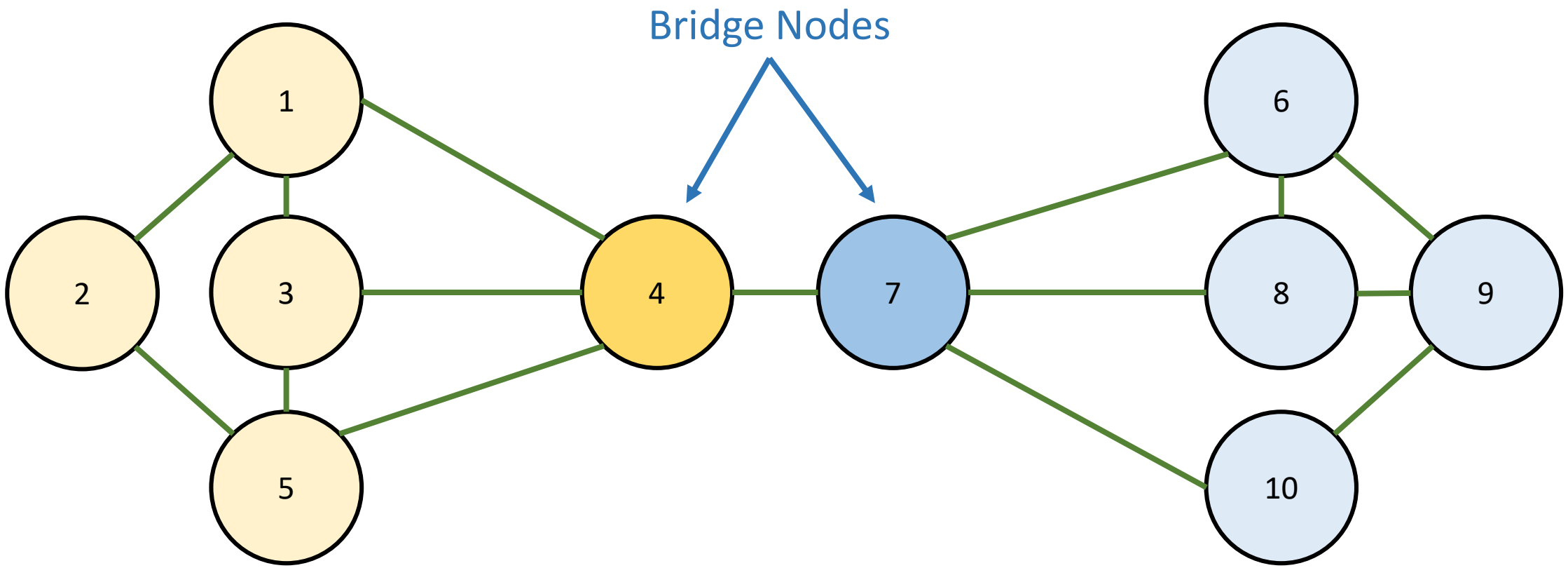
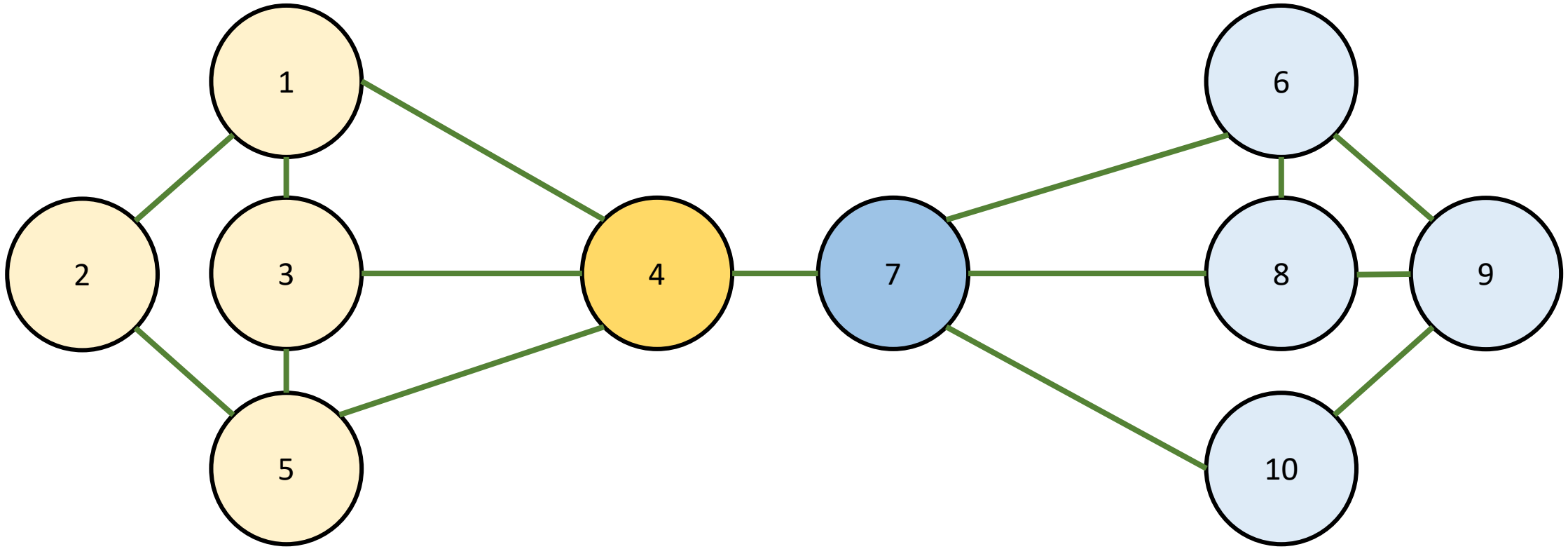
Mental Disorder Comorbidity



Adapted from Comorbidity: A network perspective (Cramer et al., 2010)


Bridge Nodes
1
2
3
4
5
6
7
8
9
10


1
2
3
4
5
6
7
8
9
10

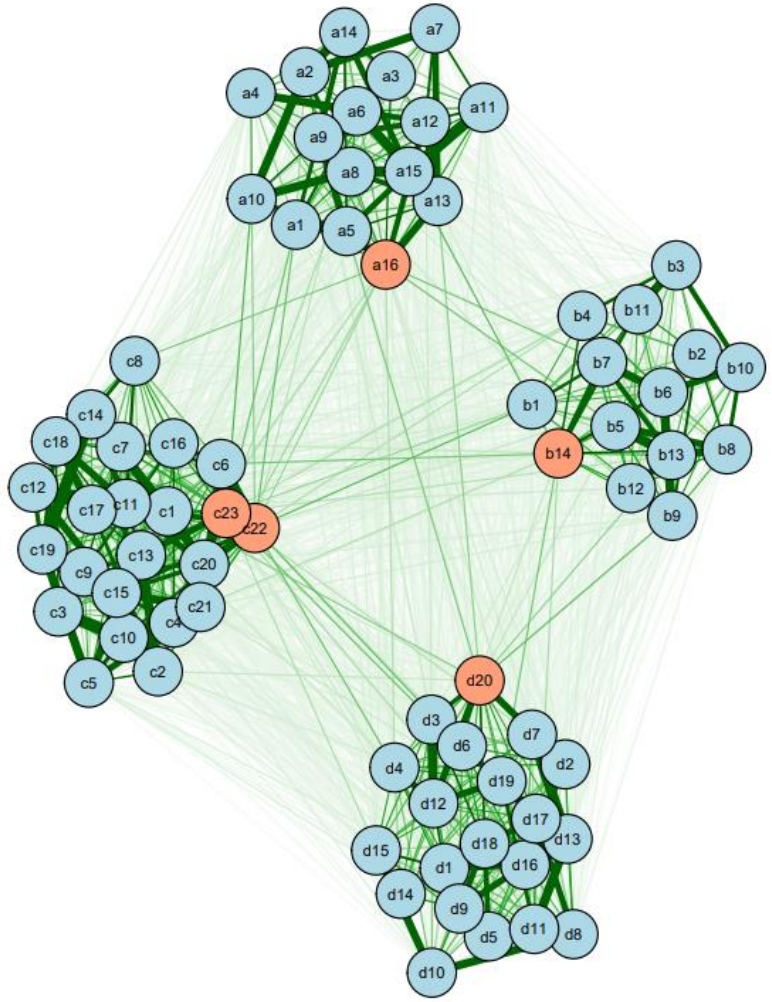
BRIDGE CENTRALITY

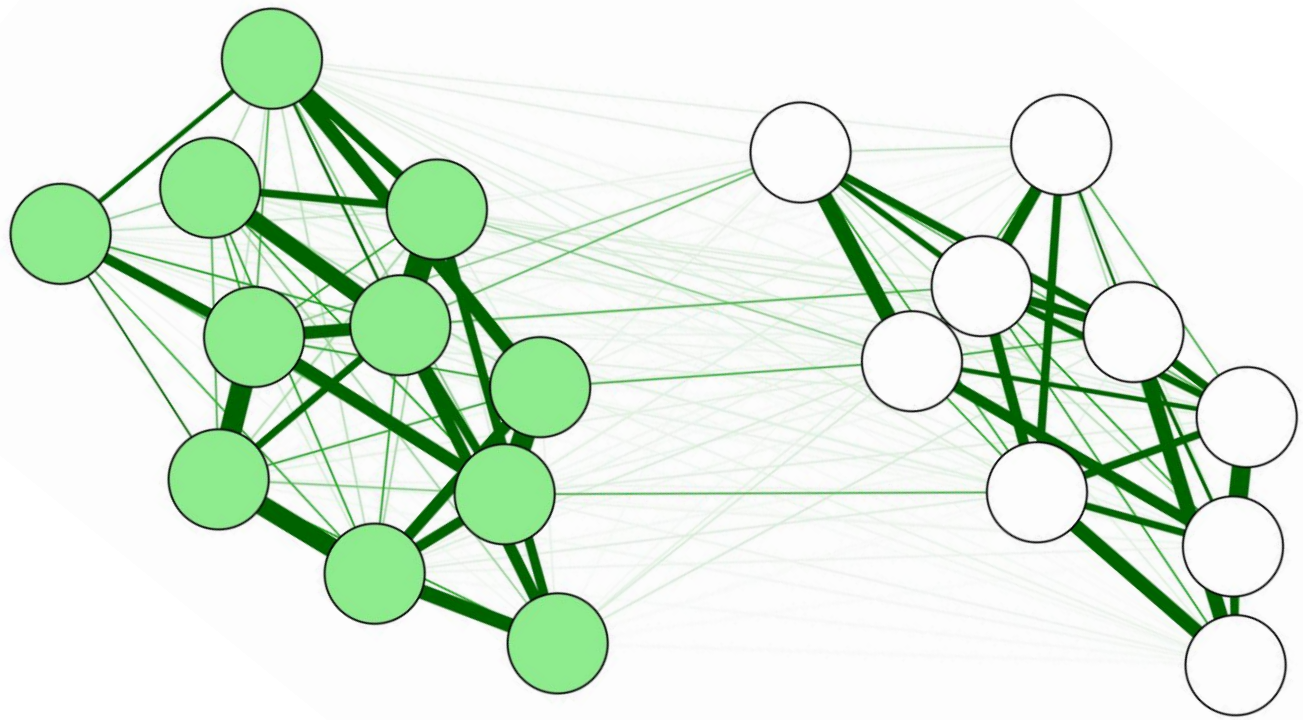
$$\textit{bridge strength} = \sum_{b \in (N(a) - V(A))} |w_{ab}|$$

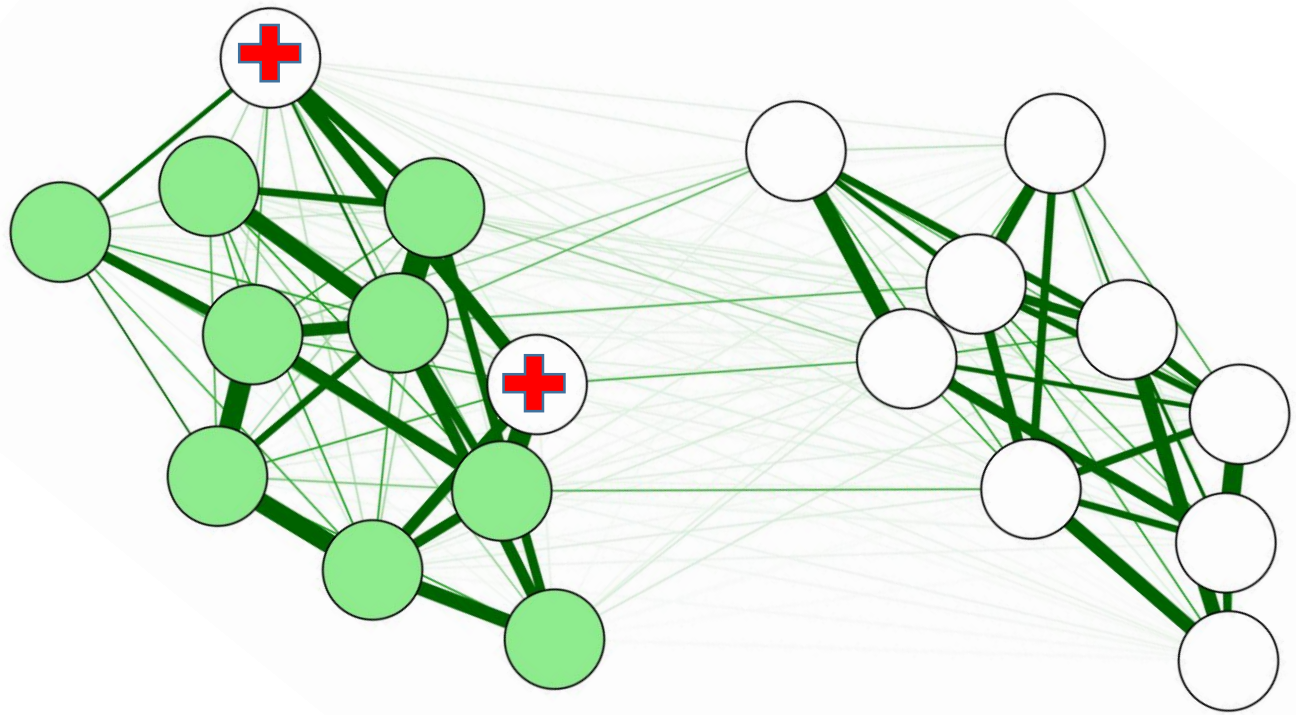
$$\textit{bridge betweenness} = \sum_{i \in V(G)} x$$

$$\textit{bridge closeness} = \frac{|V(G) - V(A)|}{\sum_{b \in (V(G) - V(A))} \sum_{e_k \in E(P_{ab})} \frac{1}{w_k}}$$

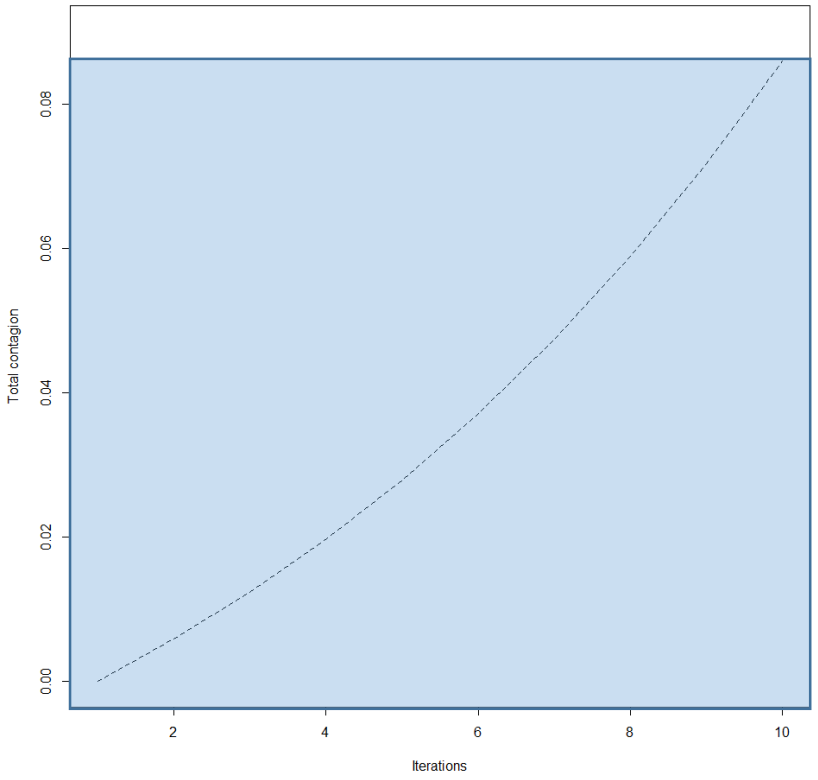
$$\textit{bridge expected influence} = \sum_{b \in (N(a) - V(A))} w_{ab}$$



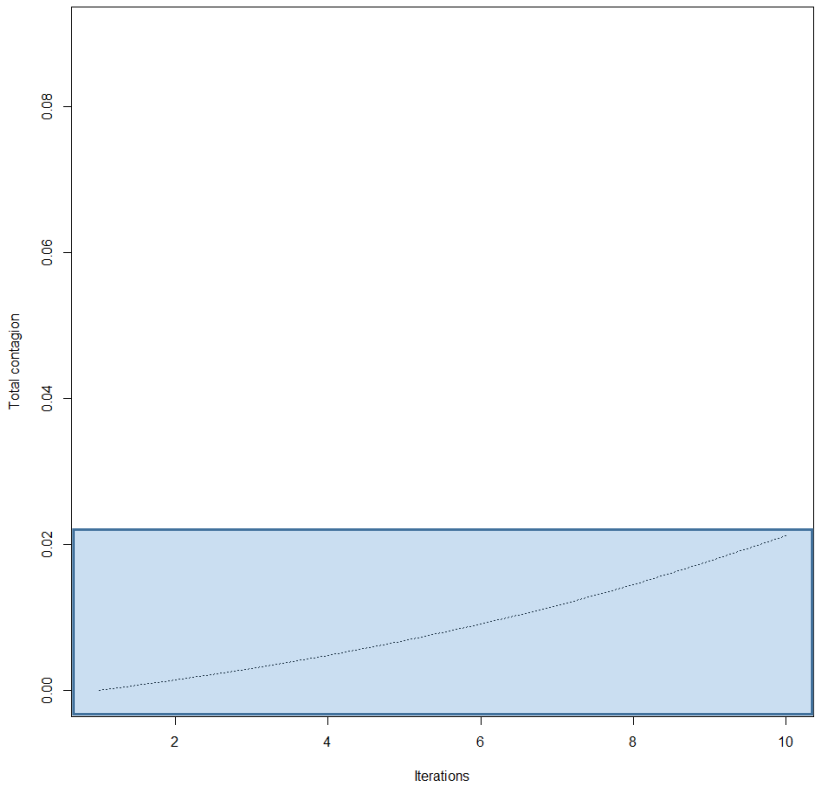




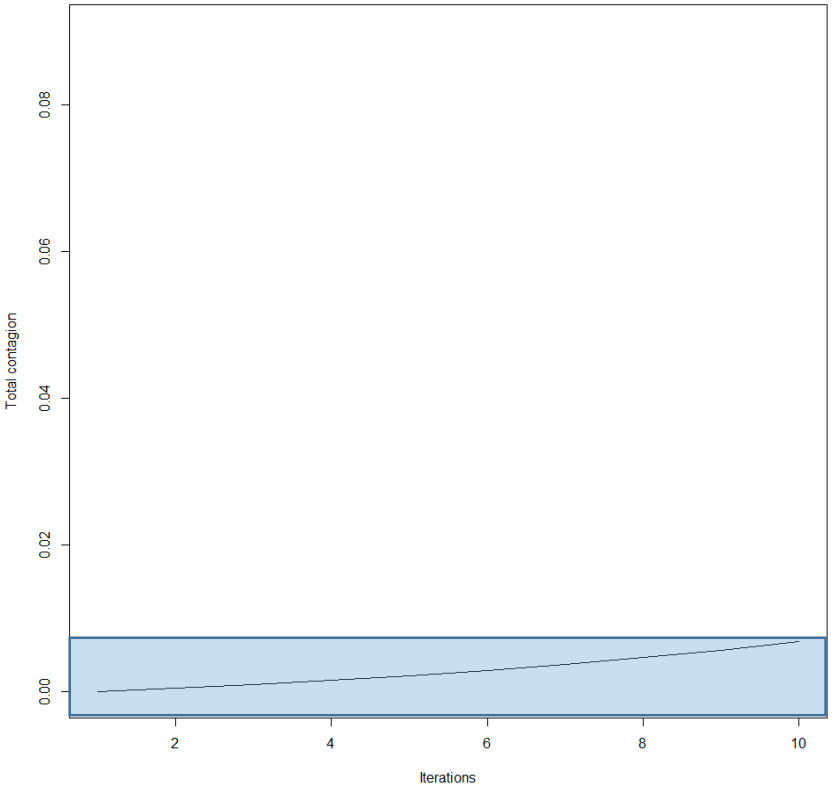
Control 1 (Strength)



Control 2 (Betweenness)



Bridge Strength



RE-ANALYSIS:

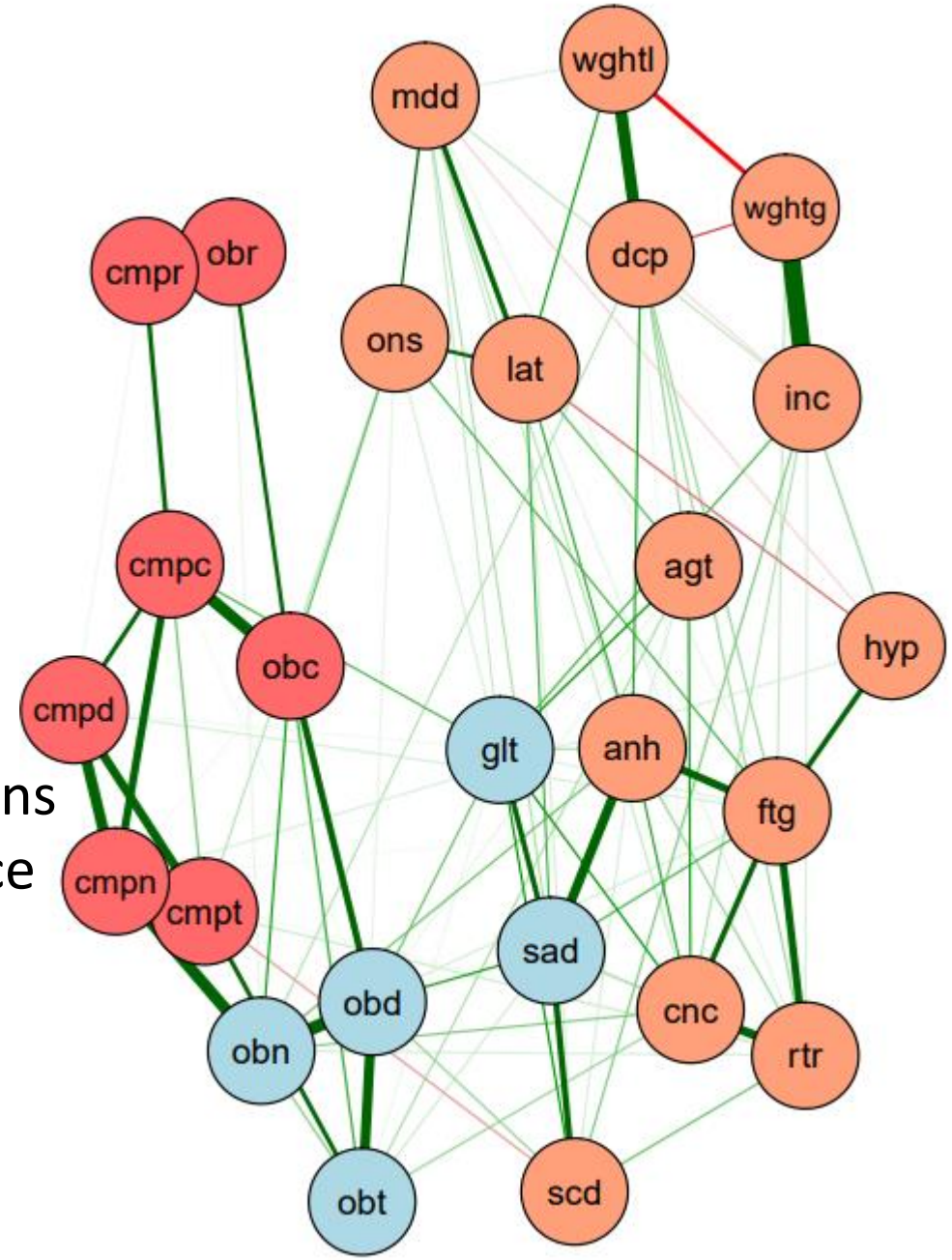
- 12 published comorbidity networks with depression
- Bridge symptoms indicated by bridge centrality
- 4 example networks:
  - Depression & obsessive-compulsive disorder
  - Depression & generalized anxiety disorder

Depression & Obsessive Compulsive Disorder

McNally et al., 2017

Depression Bridges
- Sadness
- Guilt

OCD Bridges
- Obsessional distress
- Time spent on obsessions
- Obsessional interference



Bridges

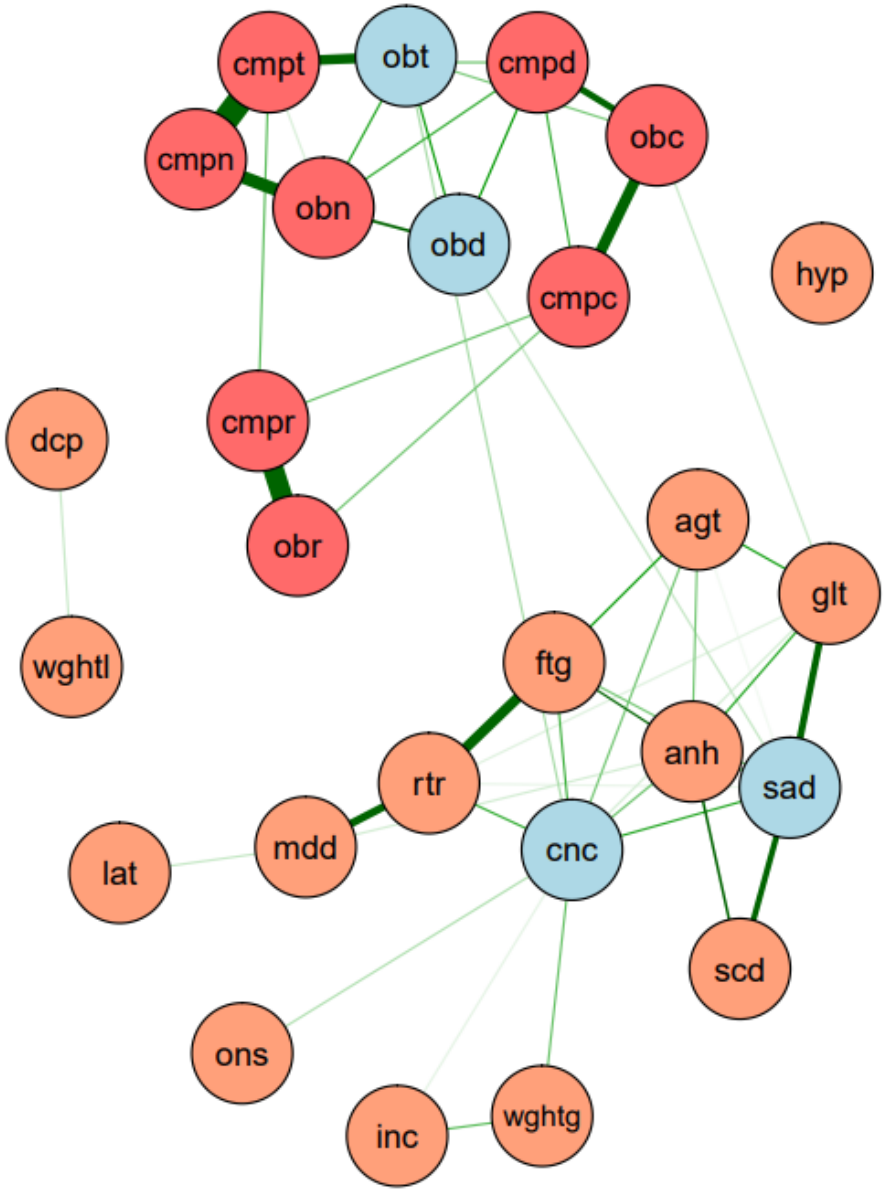
Depression

OCD

Jones et al., 2017

Depression Bridges
- Sadness
- Concentration problems

OCD Bridges
- Obsessional distress
- Time spent on obsessions



Bridges

Depression

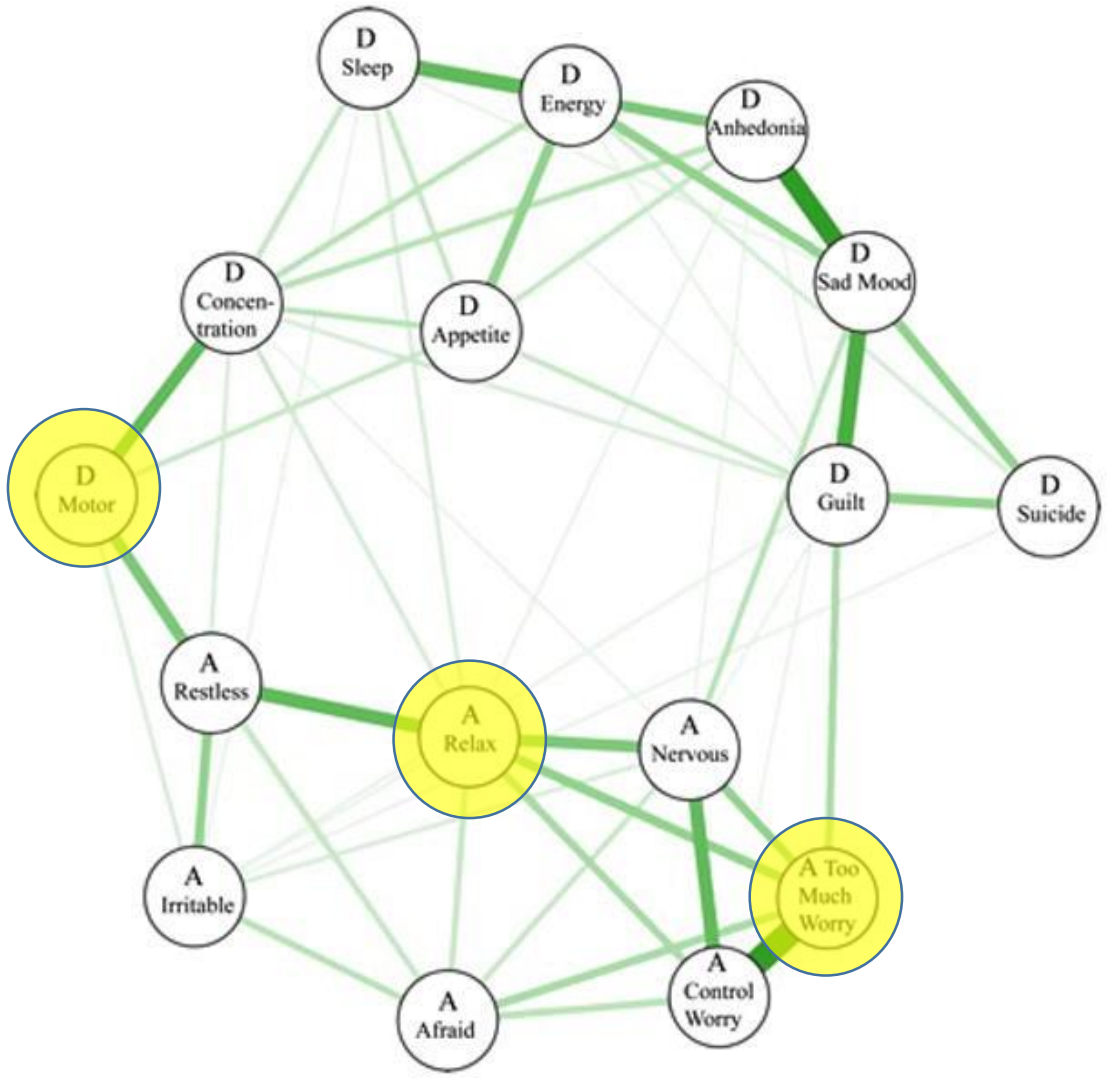
OCD

Depression & Generalized Anxiety Comorbidity

Beard et al. (2016)

Depression Bridges
- Motor agitation

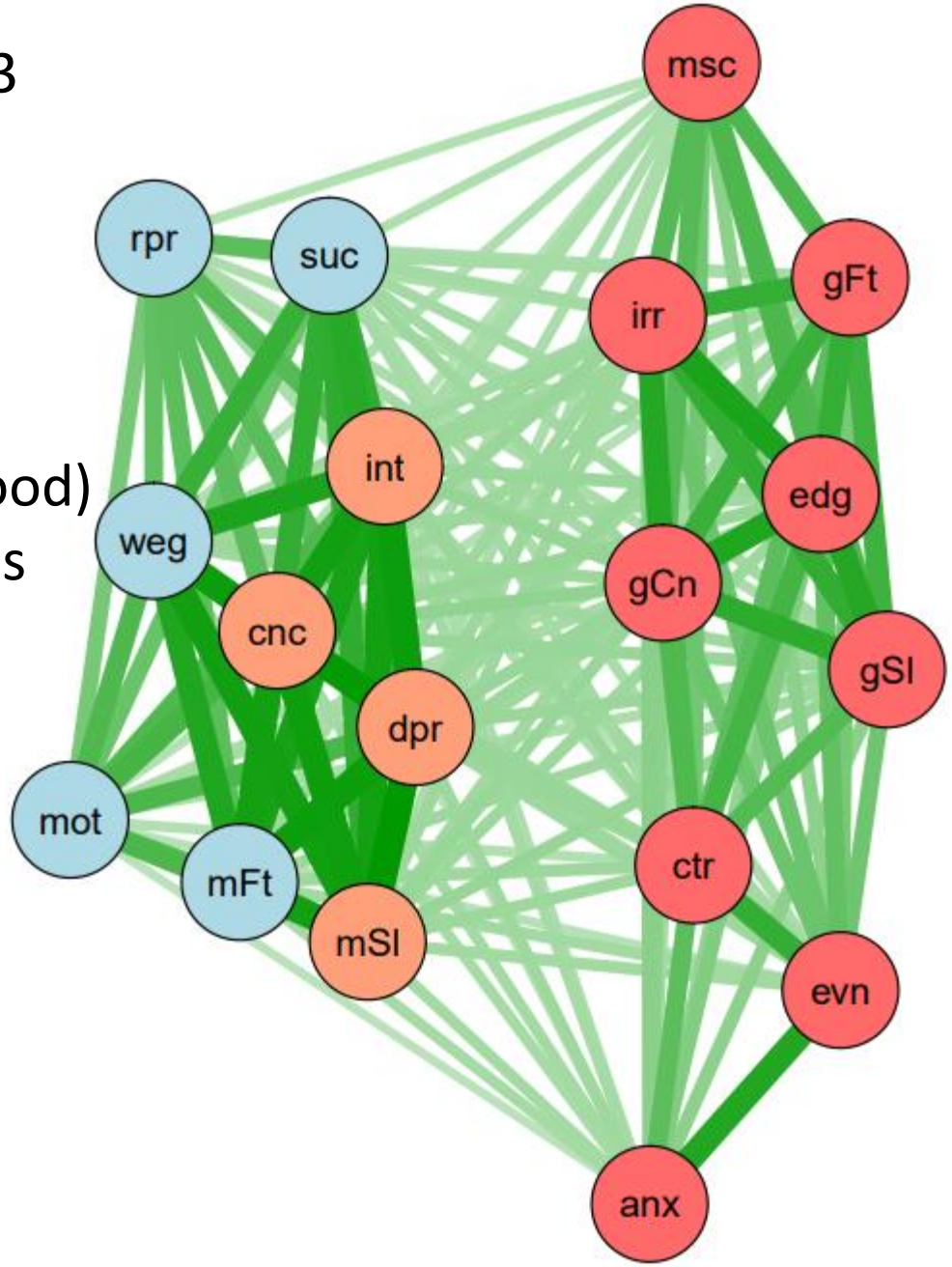
Anxiety Bridges
- Trouble relaxing
- Worry



Borsboom & Cramer, 2013

Depression Bridges
- Sadness (depressed mood)
- Concentration problems
- Loss of interest
- Sleep problems

Anxiety Bridges:
- NA

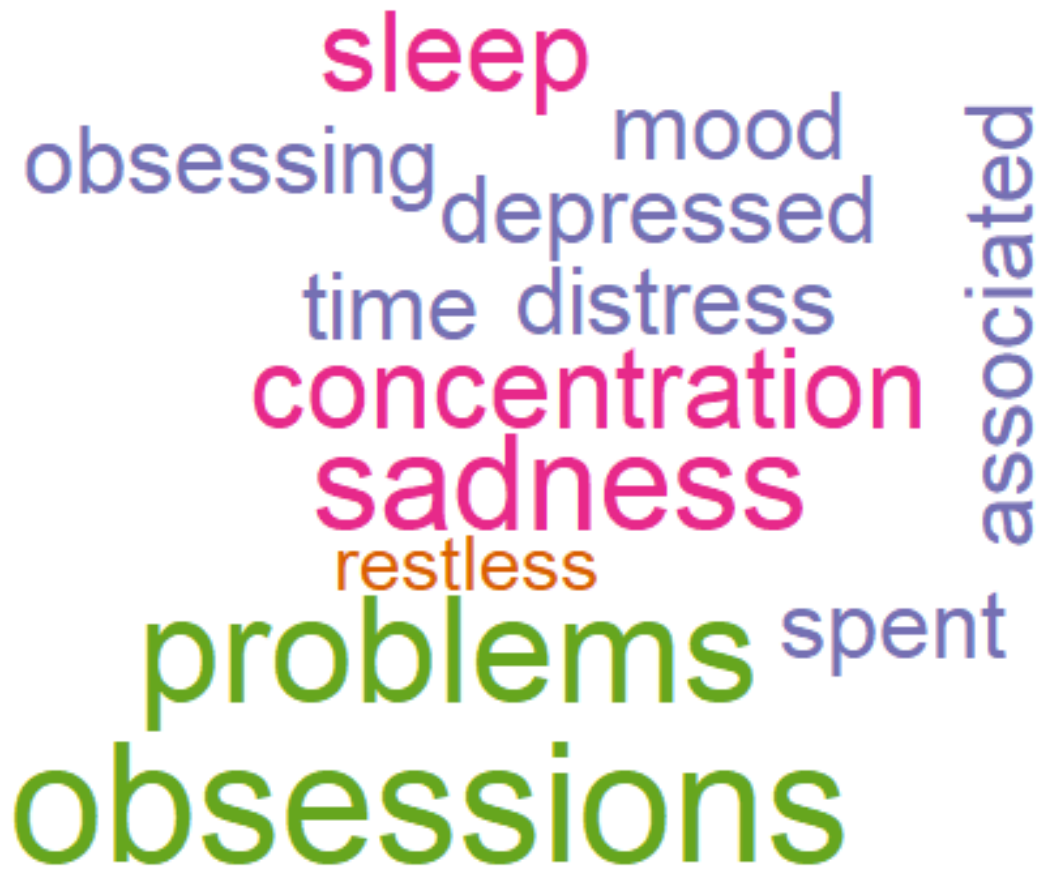


Bridges

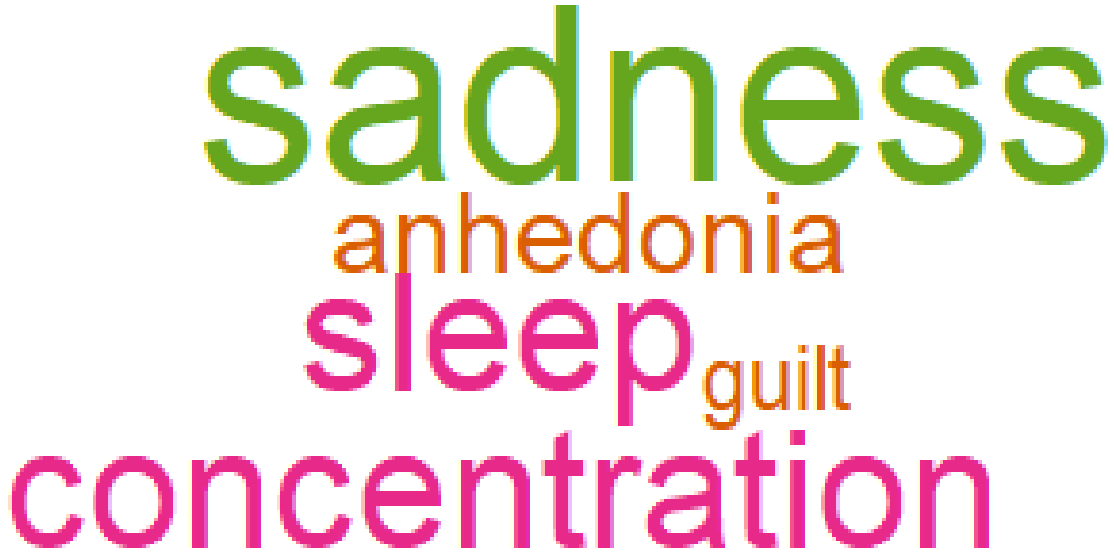
Depression

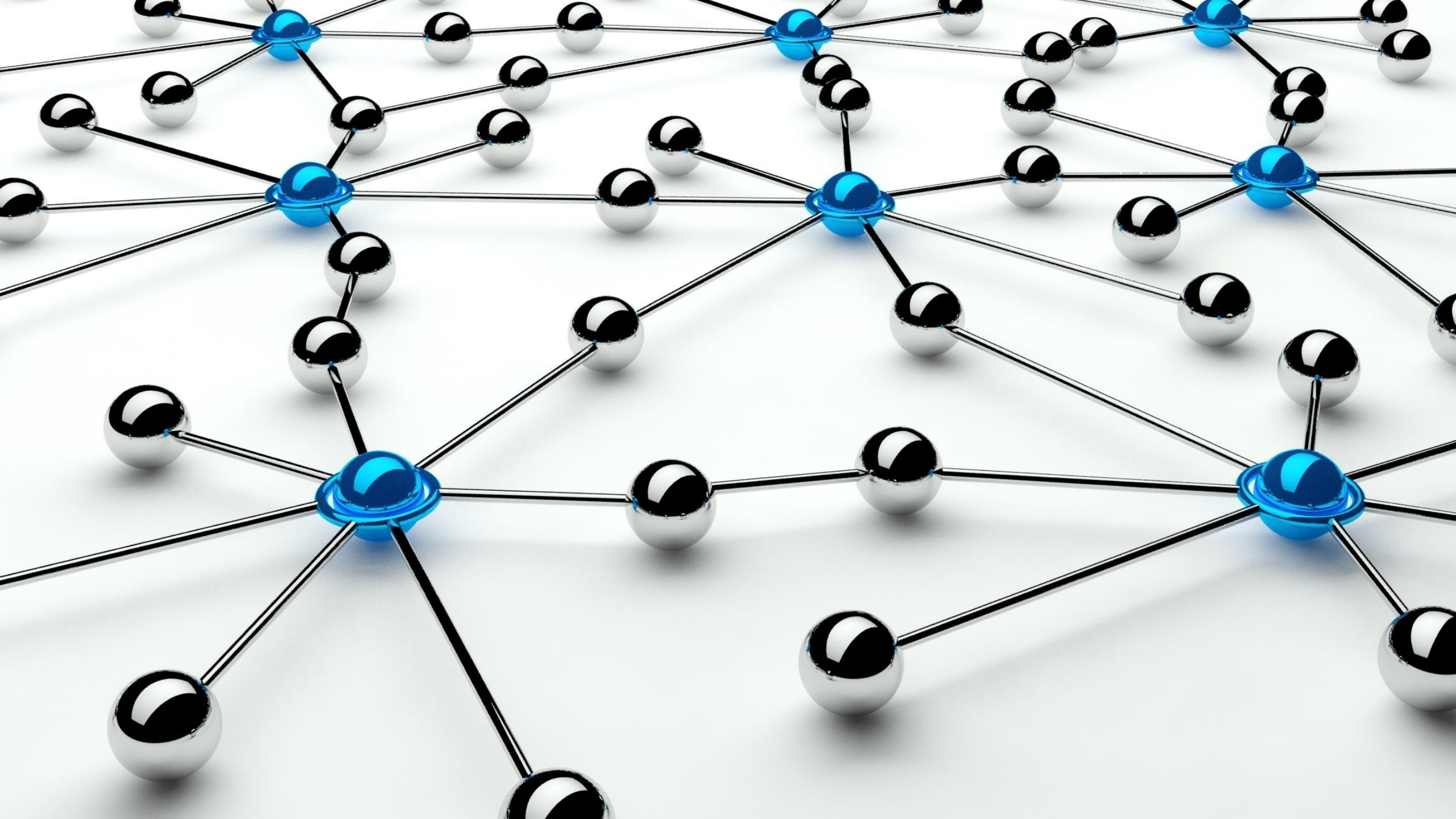
Generalized anxiety

Also analyzed: bulimia nervosa, complicated grief


sleep
mood
obsessing
depressed
time
distress
concentration
sadness
associated
restless
problems
spent
obsessions

Sadness: 8
Sleep: 5
Concentration: 5
Anhedonia: 3
Guilt: 2



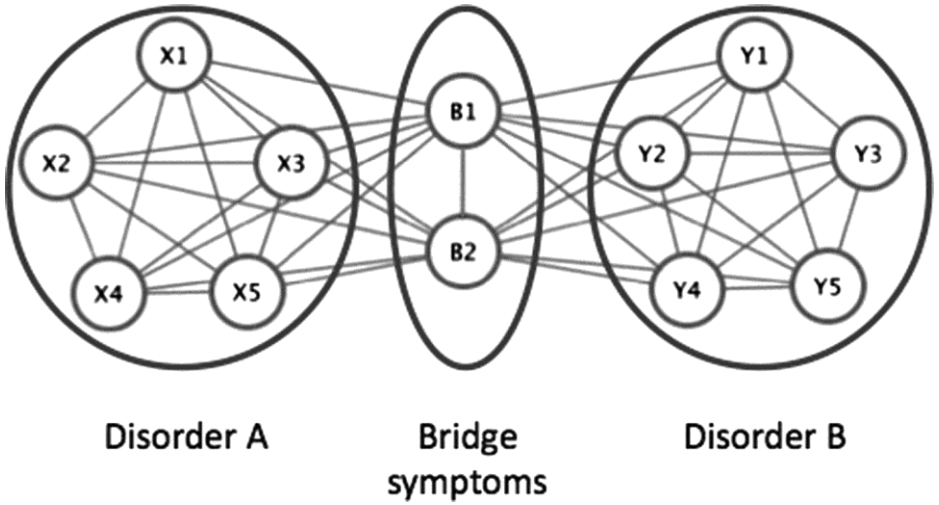


THANK YOU!

Co-authors:
Ruofan Ma
Richard McNally

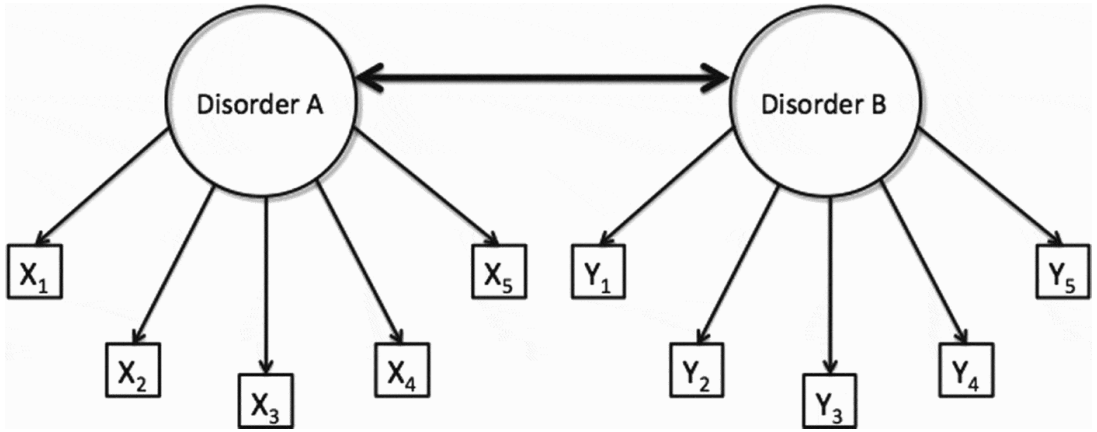
Read the paper: osf.io/c5dkj/
Use the package: *networktools*

Network view



Assumption: We have measured most of the causal variables

Latent common cause view



Assumption: We have not measured *any* of the causal variables

Cramer, A., Waldorp, L., Van der Maas, H., & Borsboom, D. (2010). Comorbidity: A network perspective. Behavioral and Brain Sciences, 33(2-3), 137-150.