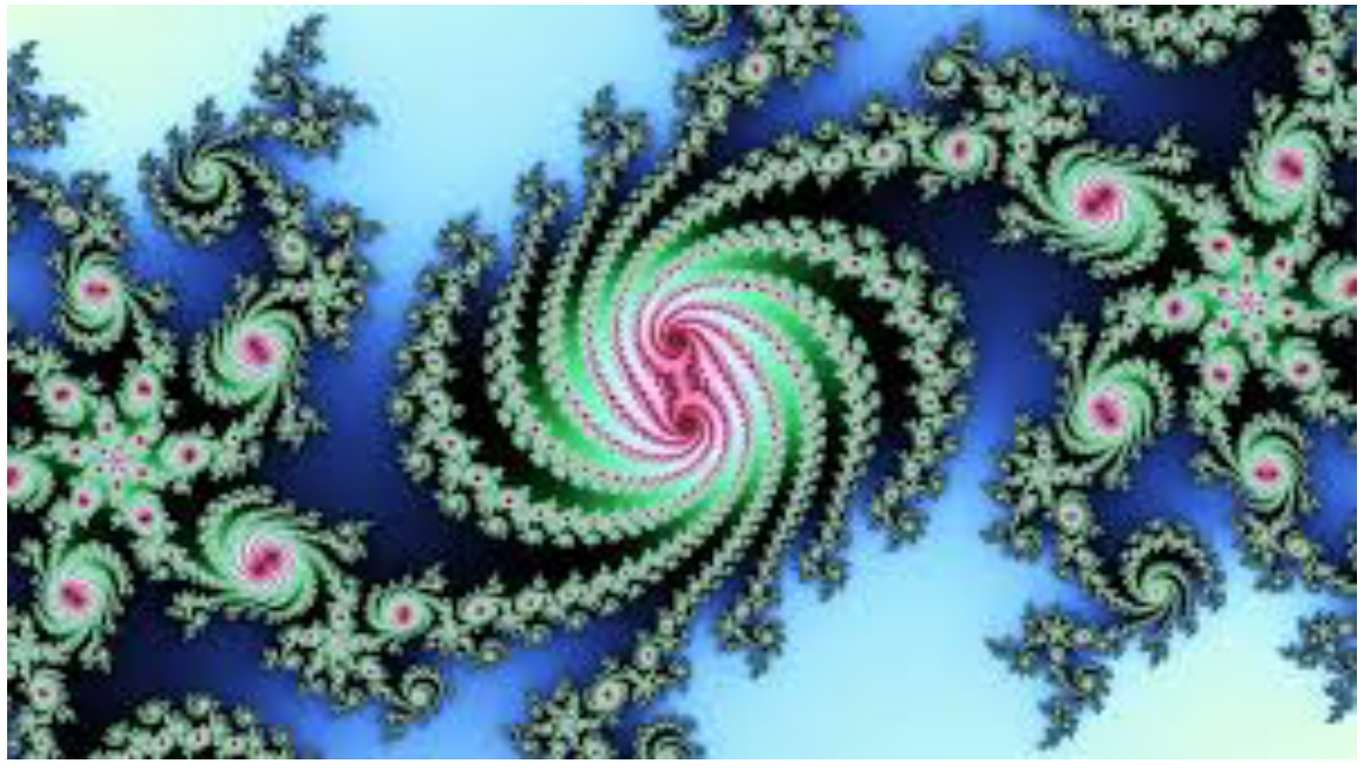
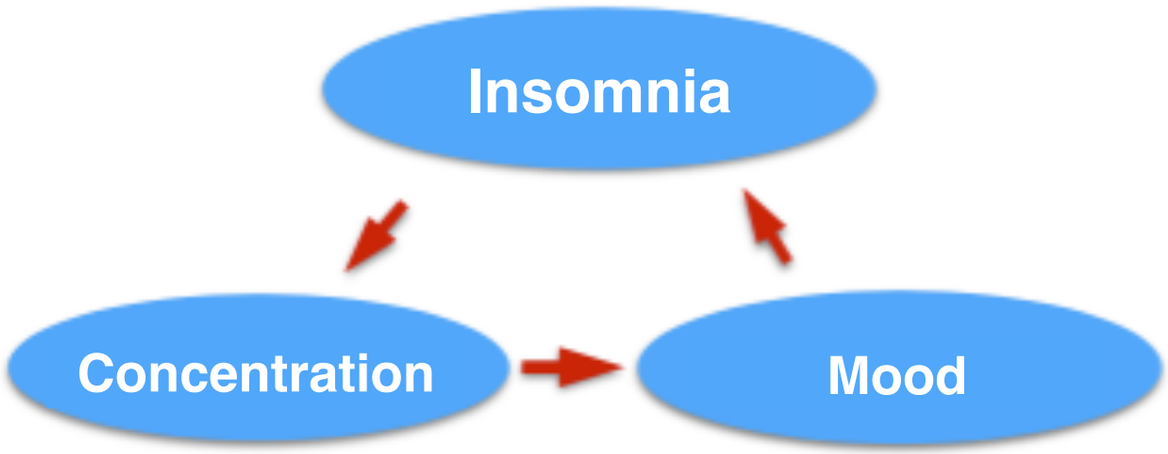


Symptom patterns and the course of depression

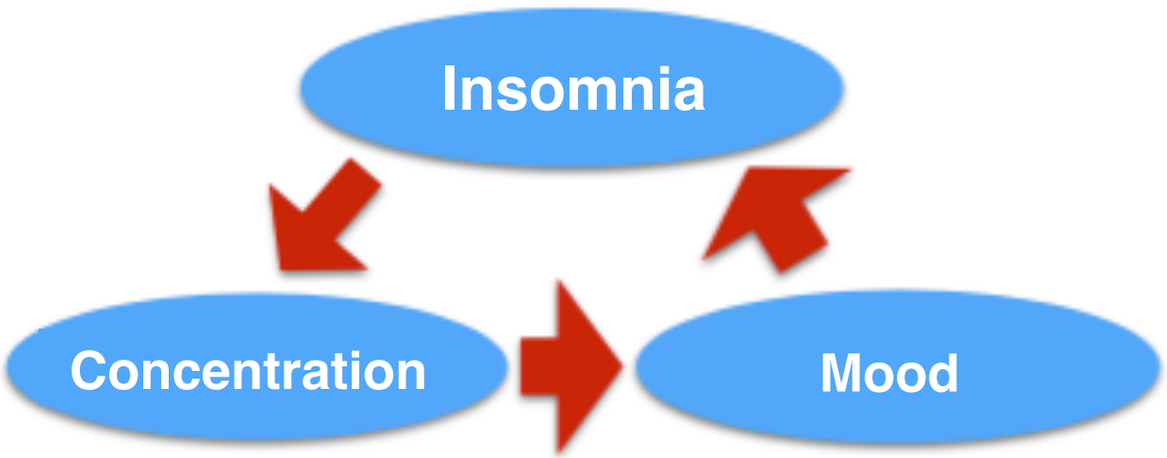
Claudia van Borkulo

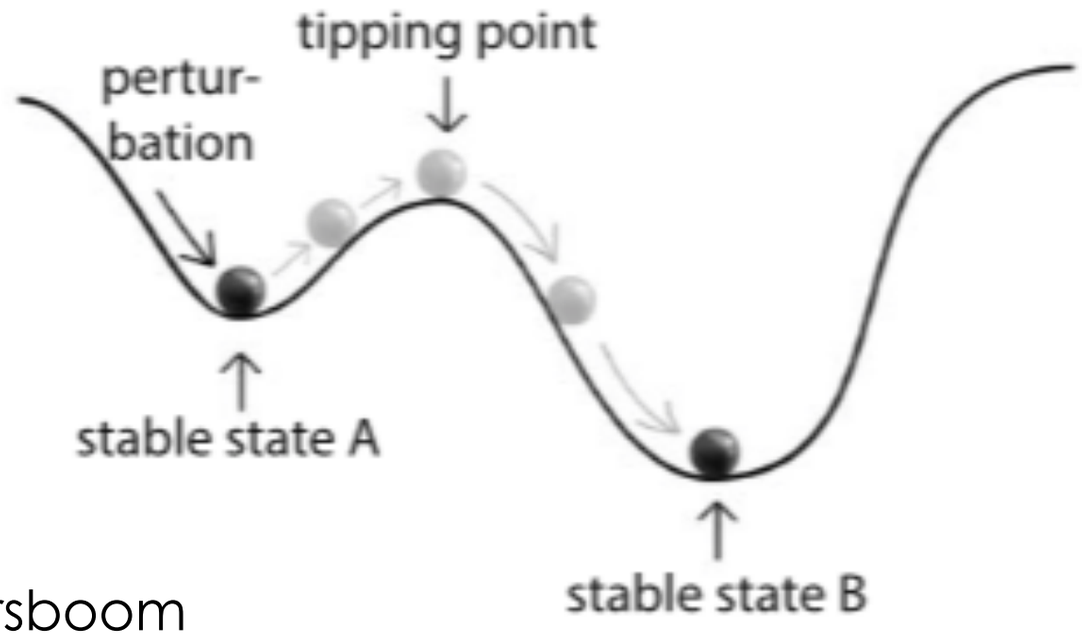
University Medical Center Groningen - University of Amsterdam
Promotors: R.A. Schoevers, D. Borsboom

Resilient system



Vulnerable system

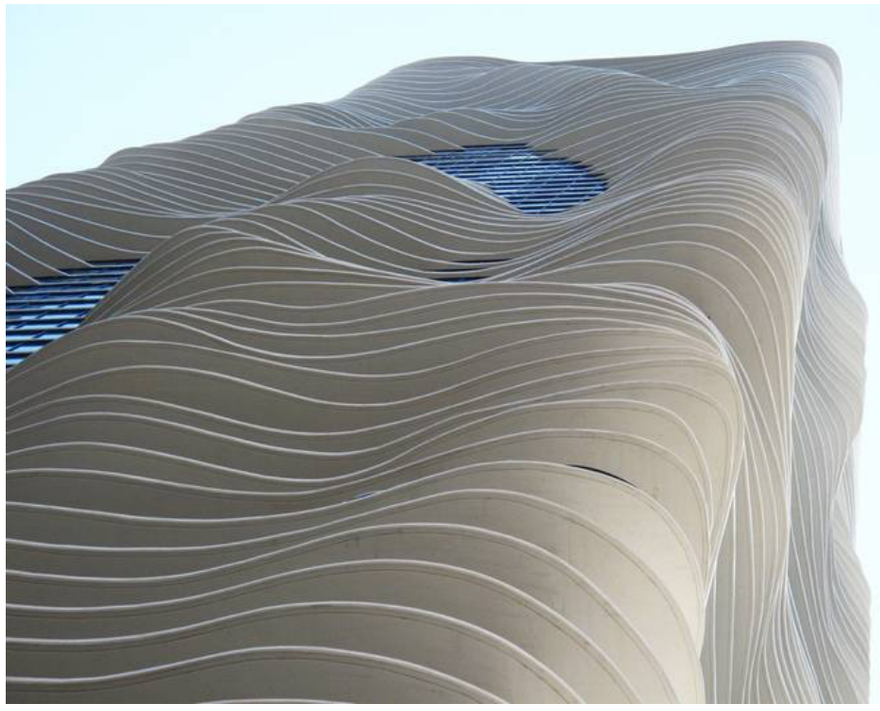




From Denny Borsboom

Outline

- Design of study
- Initial results
- Tackle some issues
- More results
- Discussion



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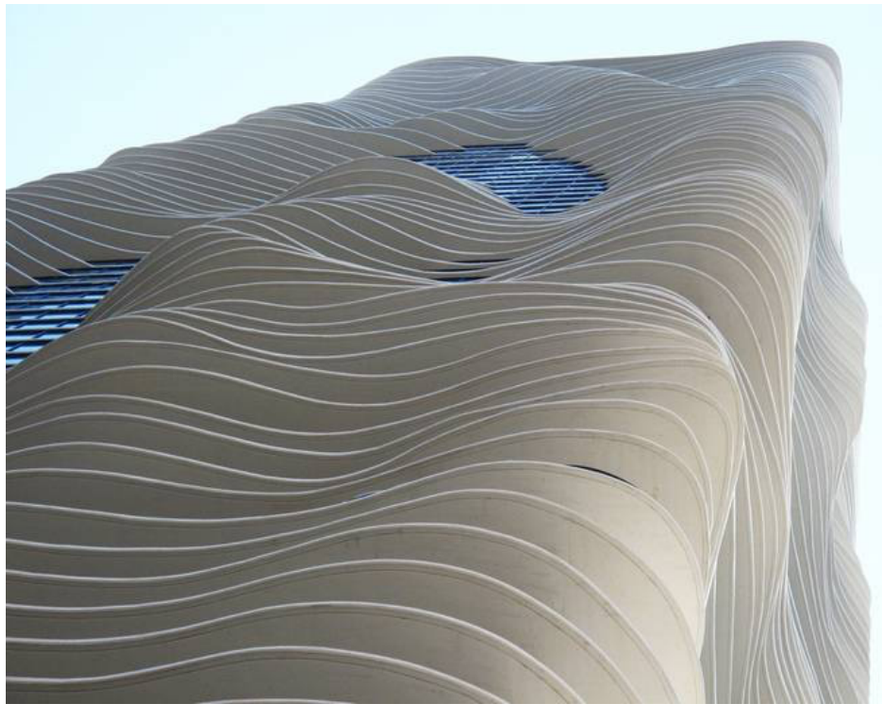

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Outline

- Design of study
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Design of study

- **515 patients with MDD at baseline**: those with persistent MDD (n = 253) and those with remitted MDD (n = 262)

- **Networks estimated on 11 DSM criteria**: from IDS at baseline

- **Comparison of networks**: Network Comparison Test

Van Borkulo, Boschloo, Borsboom, Penninx, Waldorp, Schoevers.
Association of symptom network structure with the course of depression.
JAMA Psychiatry. 2015;72(12):1219-1226.

Design of study

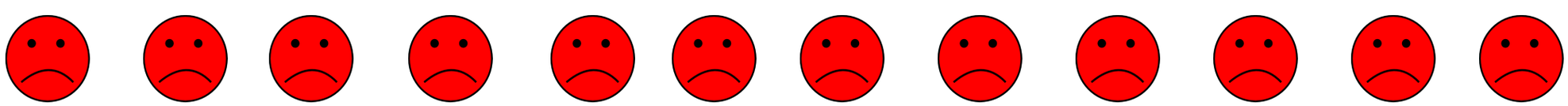
Depressed

Persister

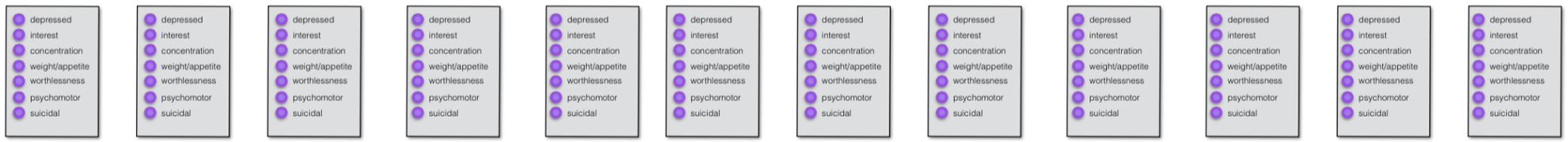
Not depressed

Remitter

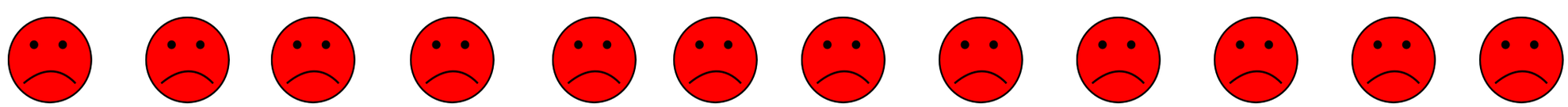
Design of study



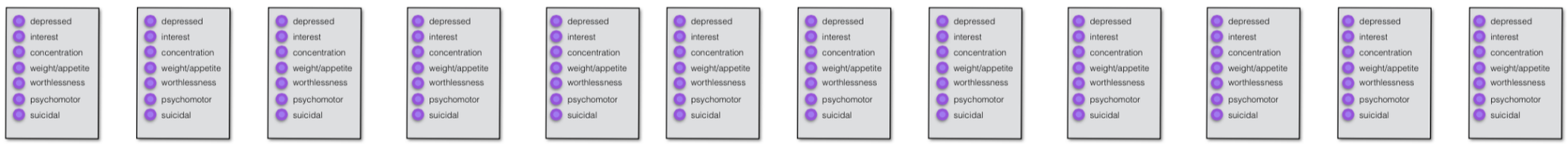
Baseline



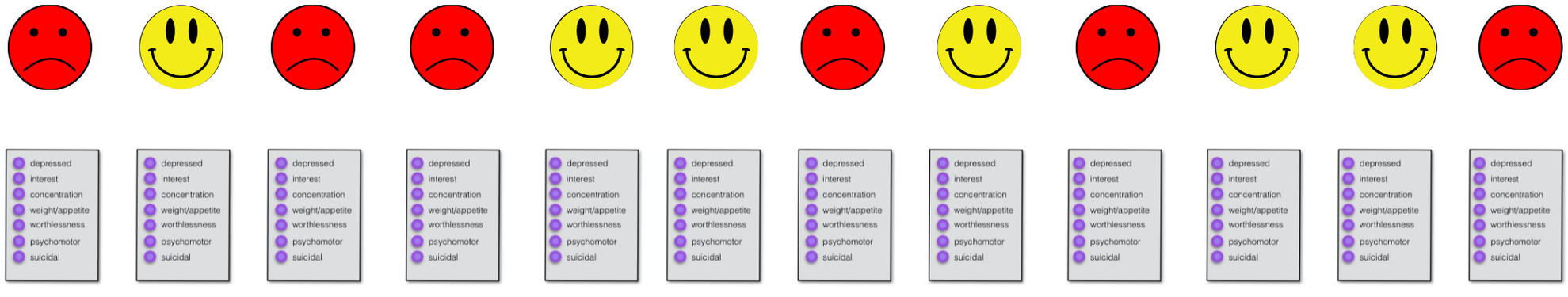
Design of study



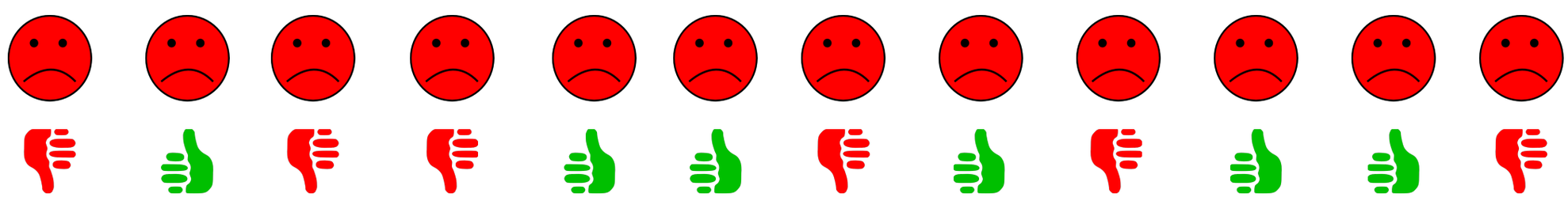
Baseline



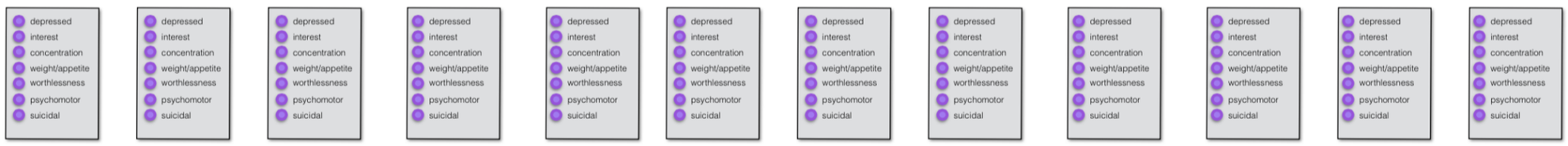
2-year follow-up



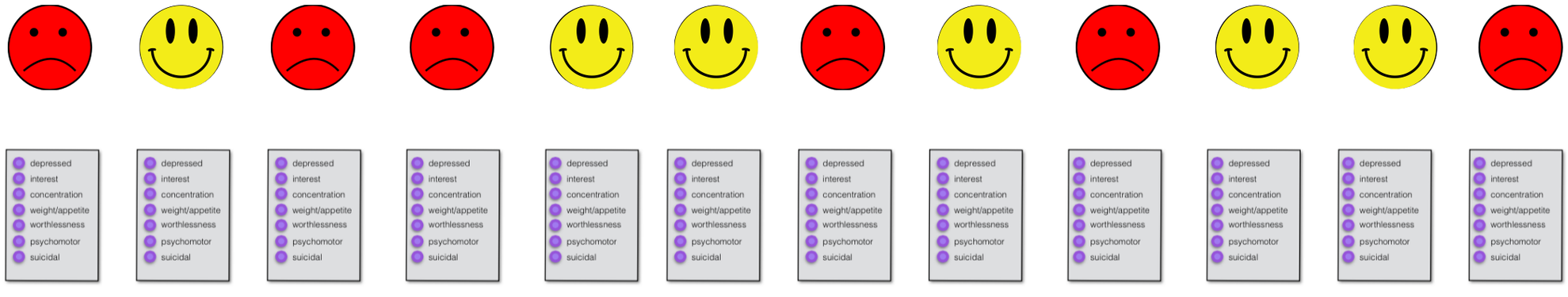
Design of study



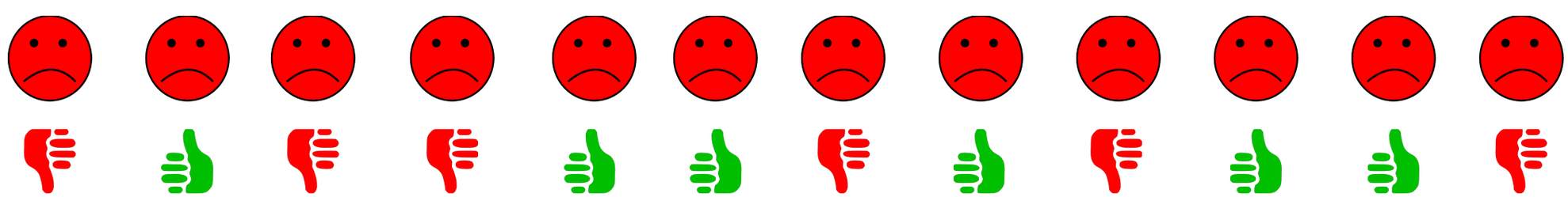
Baseline



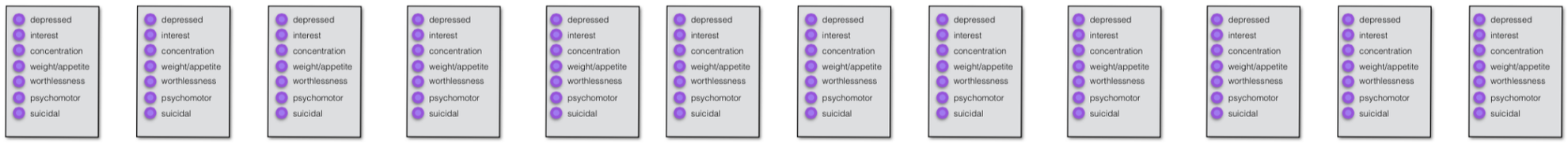
2-year follow-up



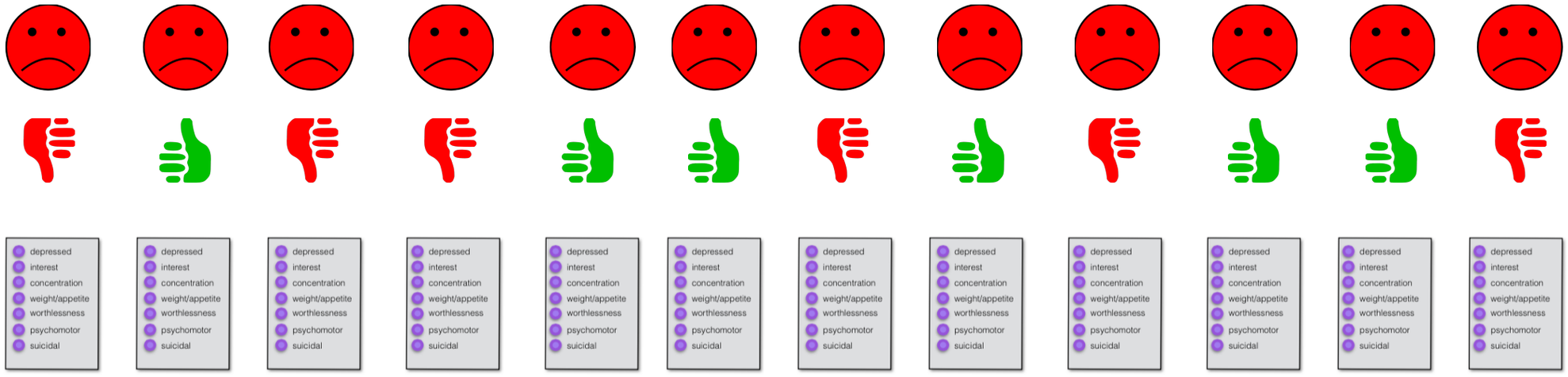
Design of study



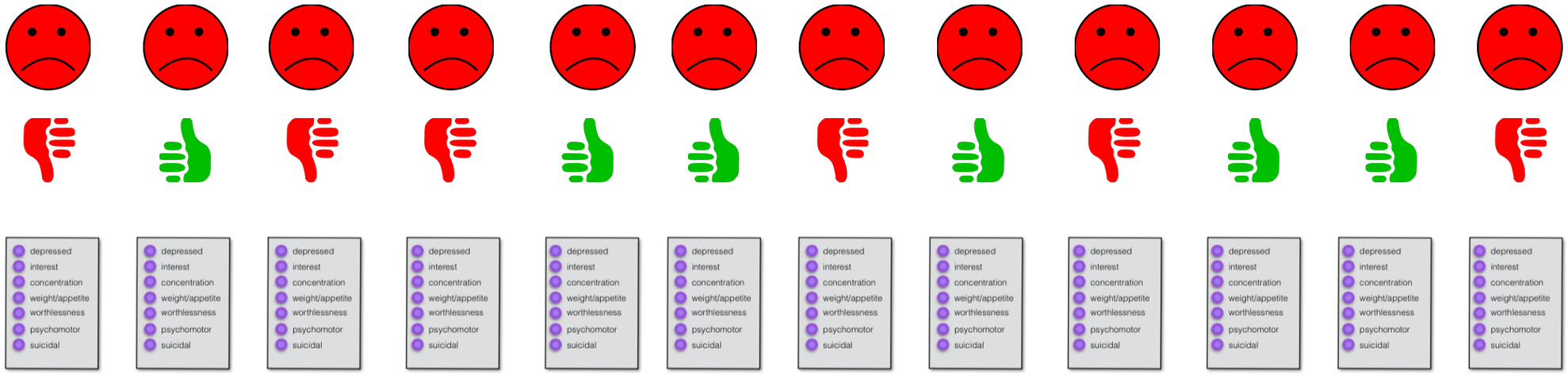
Baseline



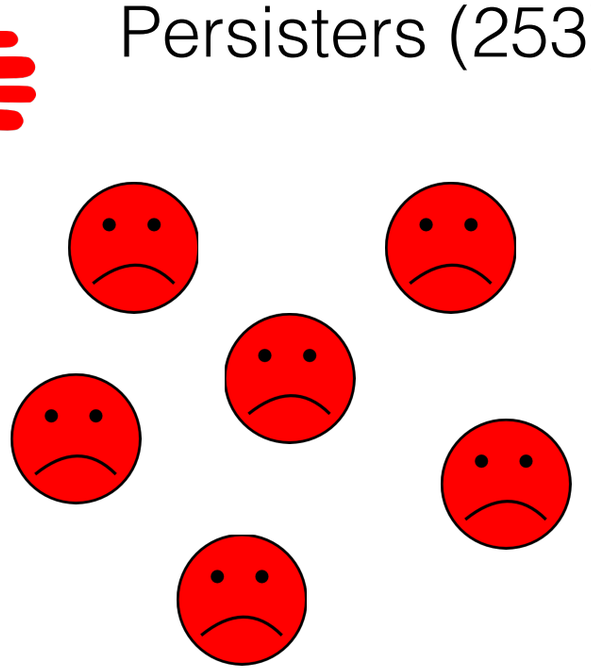
Baseline


depressed
interest
concentration
weight/appetite
worthlessness
psychomotor
suicidal

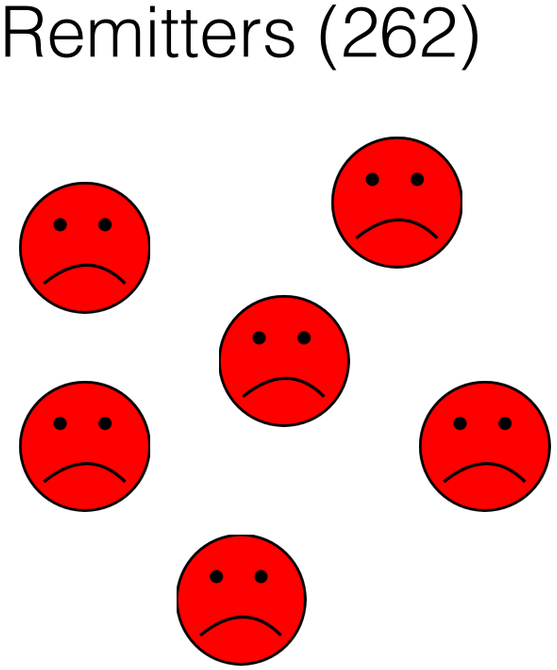
Baseline

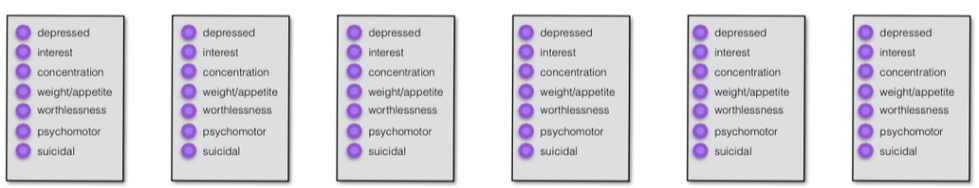


Persisters (253)

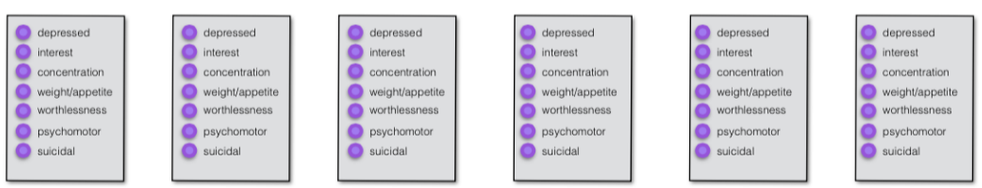


Remitters (262)





baseline



Design of study

Network estimation

- **Advanced method:** L1-regularized partial correlations — Epskamp et al., 2012

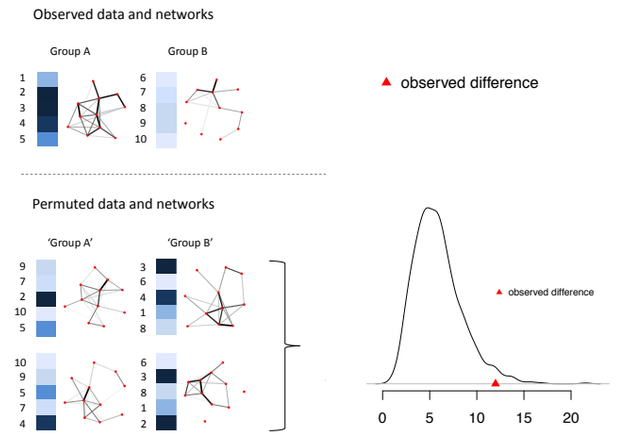
- **Regularization**: to find optimal balance between parsimony and goodness of fit of the network

- Low false positive rate — Van Borkulo et al., 2014

Design of study

Network comparison

- With newly developed Network Comparison Test (NCT)
- Permutation test
- NCT performs well in a range of circumstances
  - Type I error rate is close to the nominal significance level
  - Power is sufficiently high if sample size and/or difference between networks are large enough



Van Borkulo, Boschloo, Kossakowski, Tio, Schoevers, Borsboom, Waldorp.
Comparing network structures: A permutation test. (in prep).

Design of study

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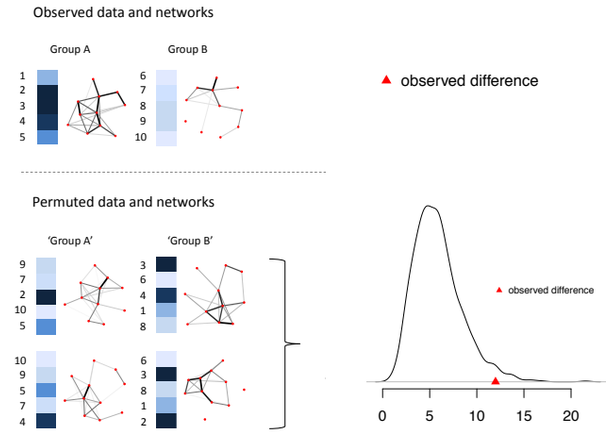

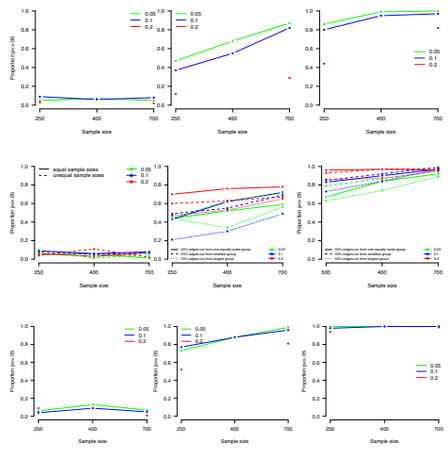

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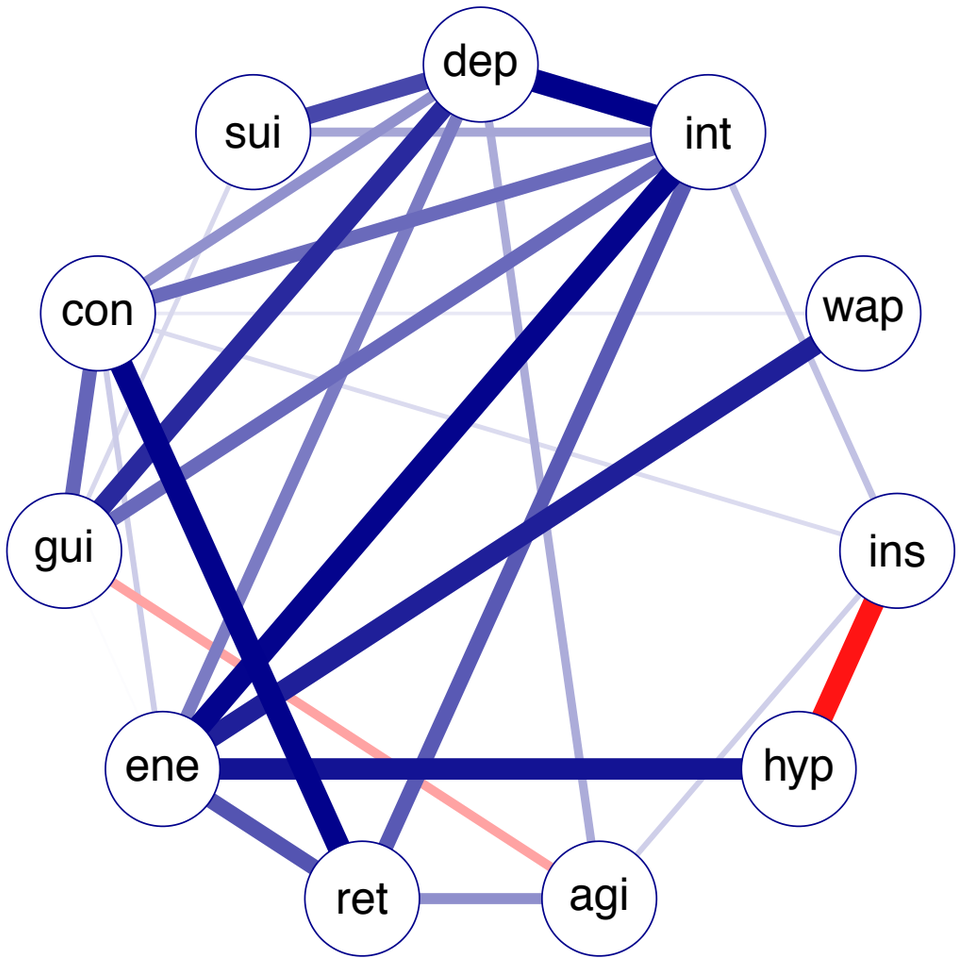
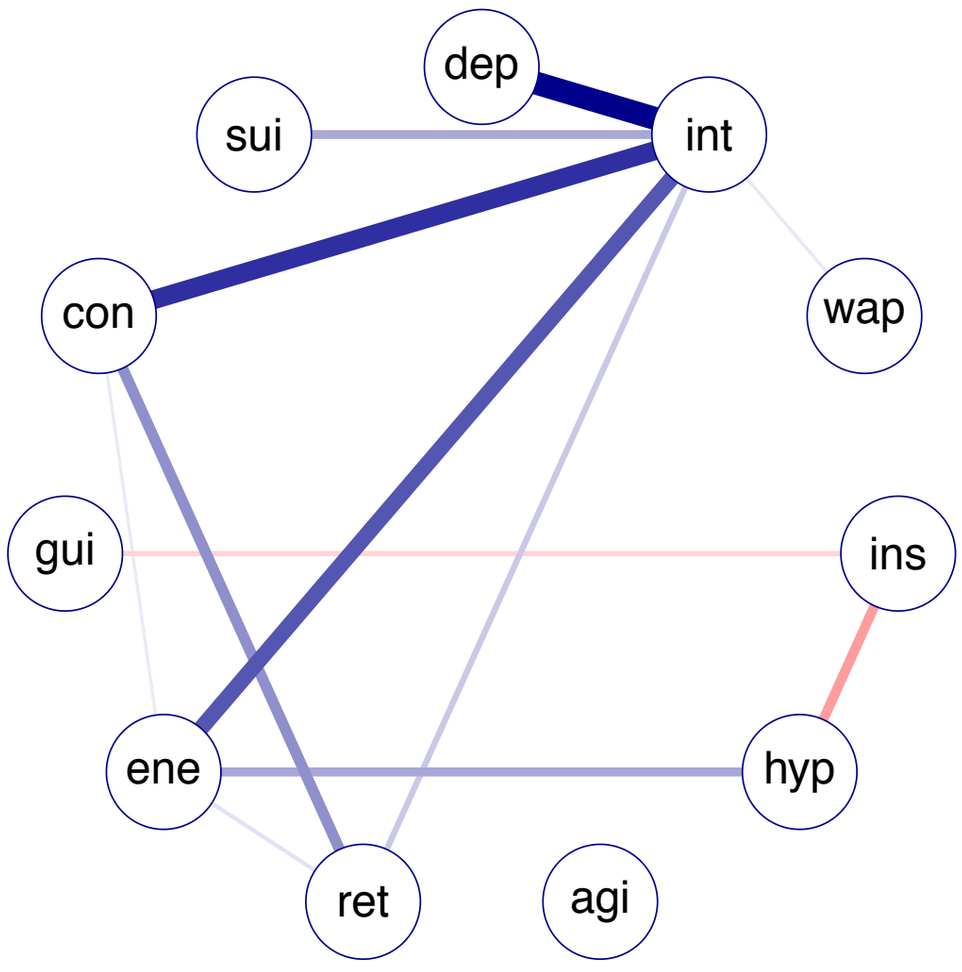
Initial results

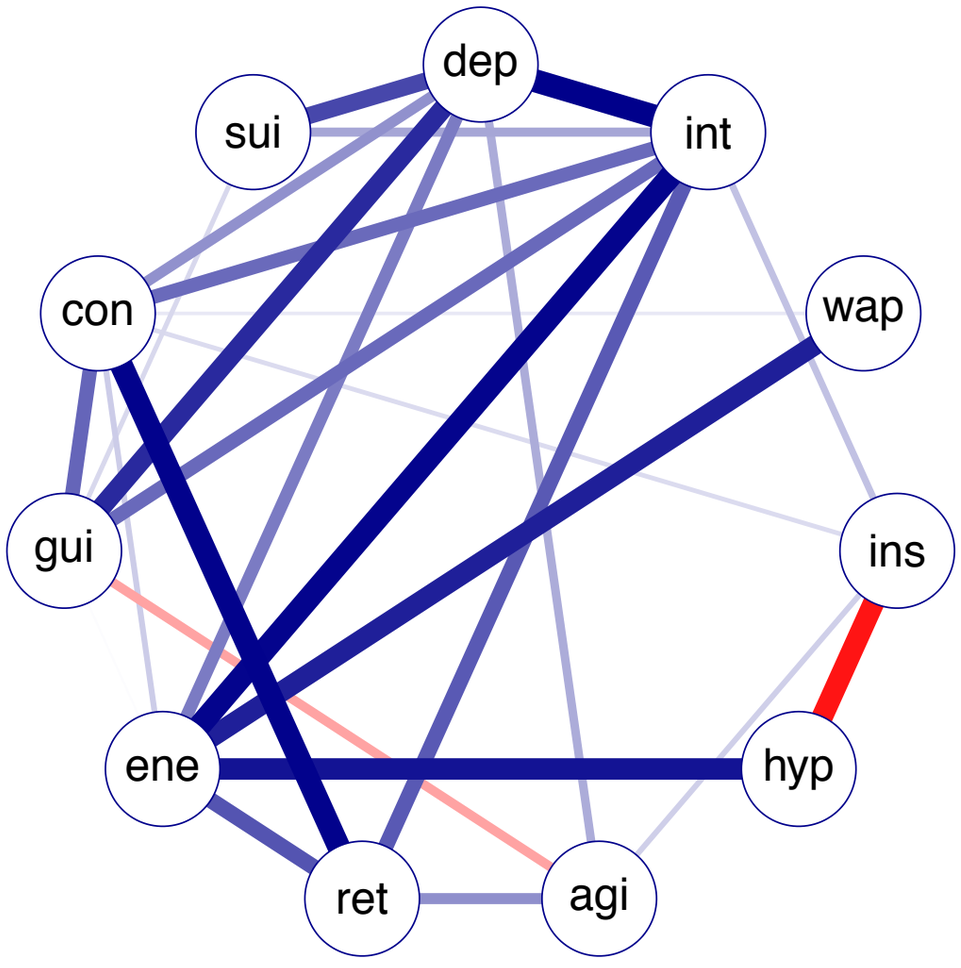


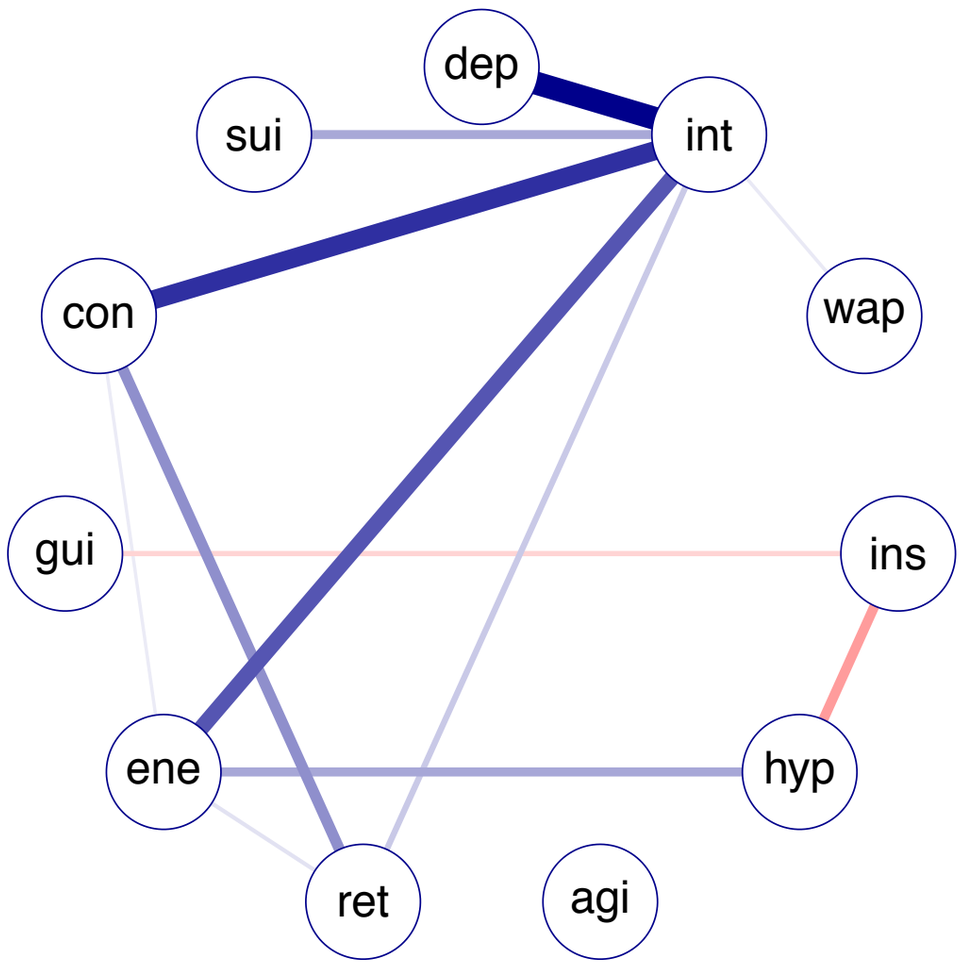
Persisters



Remitters

Initial results





Persisters

P = .01

Remitters

But…

Table 2. Analysis of Item Scores of Remitters and Persisters

Symptom (abbreviation)	Mean (*sd*)		Statistic[a]	*P* Value
	Persisters (n=253)	Remitters (n=262)		
Depressed mood (dep)	1.85 (0.75)	1.53 (0.72)	25446	< 0.001
Loss of interest or pleasure (int)	1.38 (0.71)	1.12 (0.61)	26493	< 0.001
Weight/appetite change (wap)	1.16 (0.79)	1.24 (0.79)	34990	0.27
Insomnia (ins)	1.39 (0.81)	1.15 (0.71)	27506	0.001
Hypersomnia (hyp)	0.68 (0.87)	0.79 (0.88)	35646	0.11
Psychomotor agitation (agi)	1.30 (0.85)	1.23 (0.90)	31683	0.36
Psychomotor retardation (ret)	1.26 (0.94)	0.89 (0.90)	25864	< 0.001
Fatigue or loss of energy (ene)	1.89 (0.76)	1.62 (0.70)	26568	< 0.001
Feeling guilty (gui)	1.89 (1.12)	1.78 (1.15)	31448	0.28
Concentration/decision making (con)	1.73 (0.77)	1.47 (0.76)	27039	< 0.001
Suicidality (sui)	0.99 (0.82)	0.82 (0.85)	29236	0.01

Tackle some issues

Are results confounded by baseline severity?

Two strategies to tackle this issue:

1. Match number of patients with same IDS sum score
2. Matching by partialing out severity

25	25
25	27
27	27
27	27
27	27
27	27
28	28
28	29

Tackle some issues

Are results confounded by baseline severity?

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25	**25**
25	**27**
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Tackle some issues

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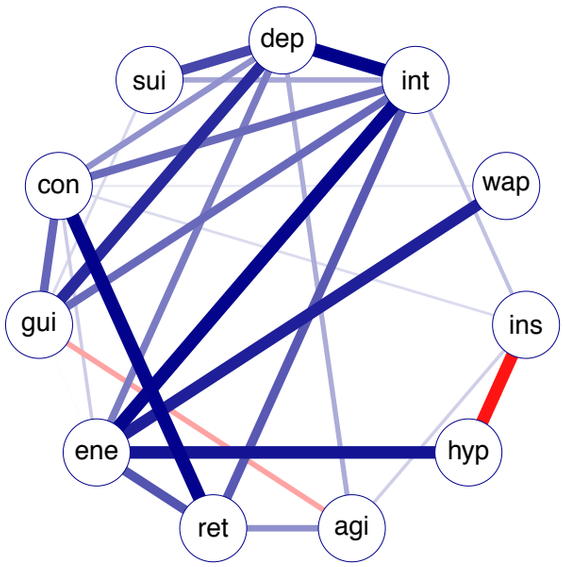
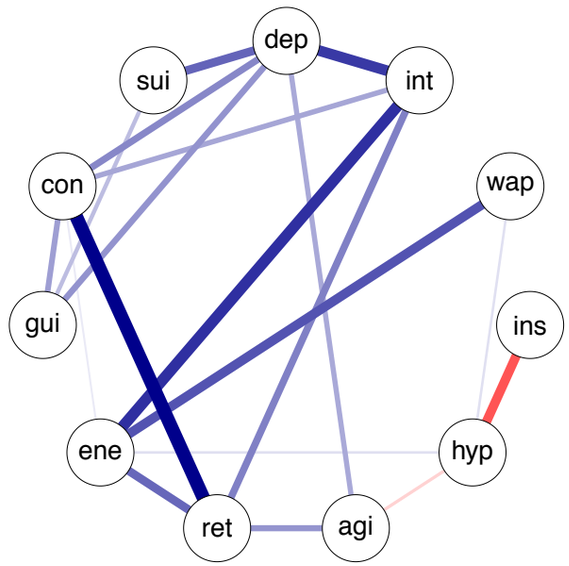
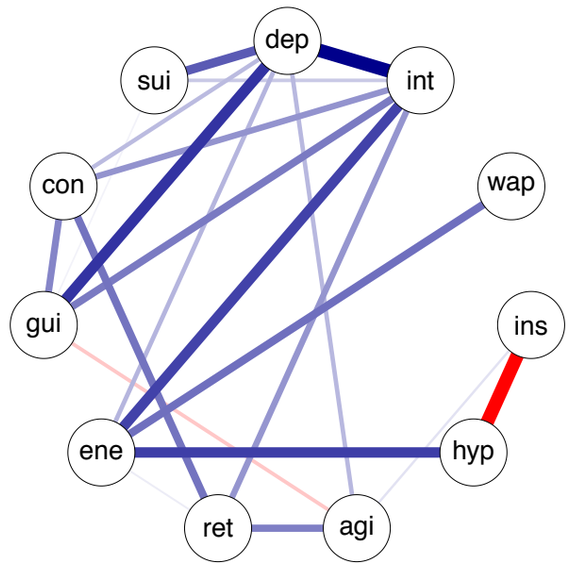
Tackle some issues

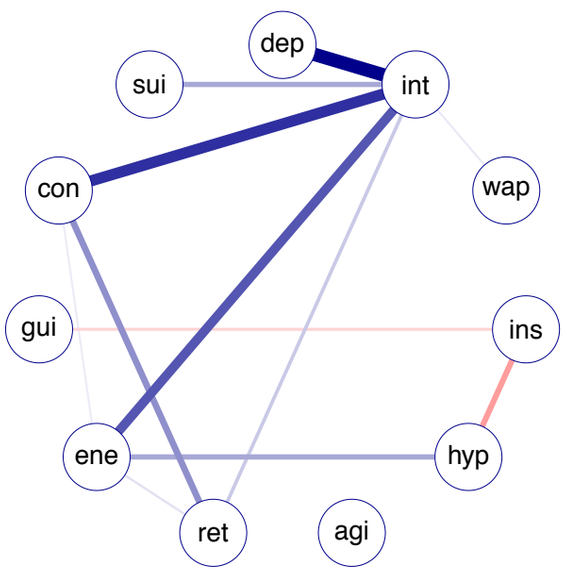
Persisters

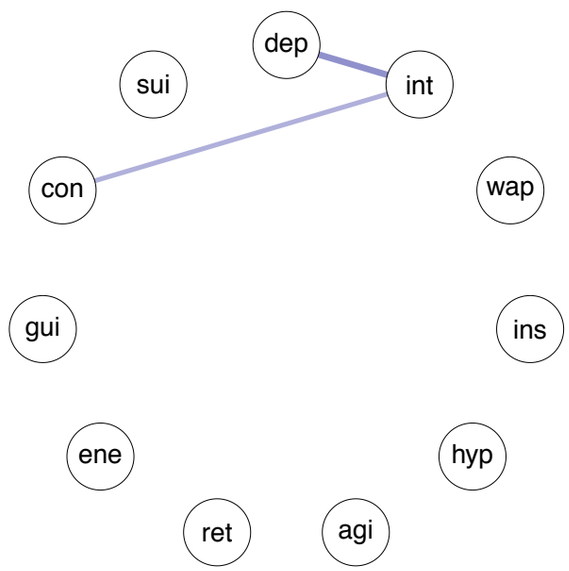


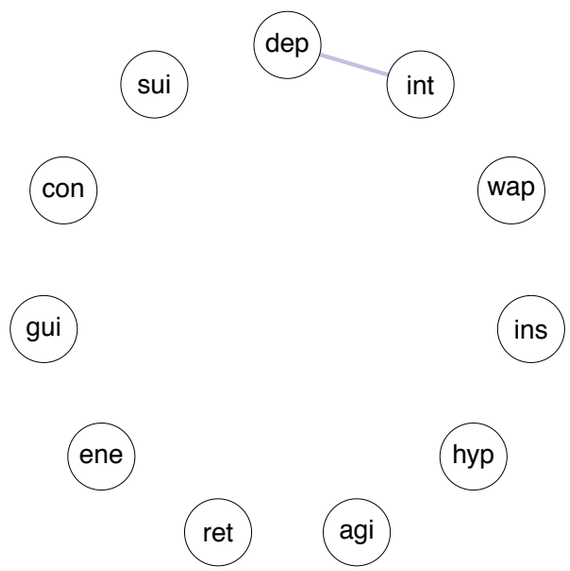




Remitters







original data
(*P* = .01)

matched on IDS
(*P* = .04)

matched on WHODAS
(*P* = .02)

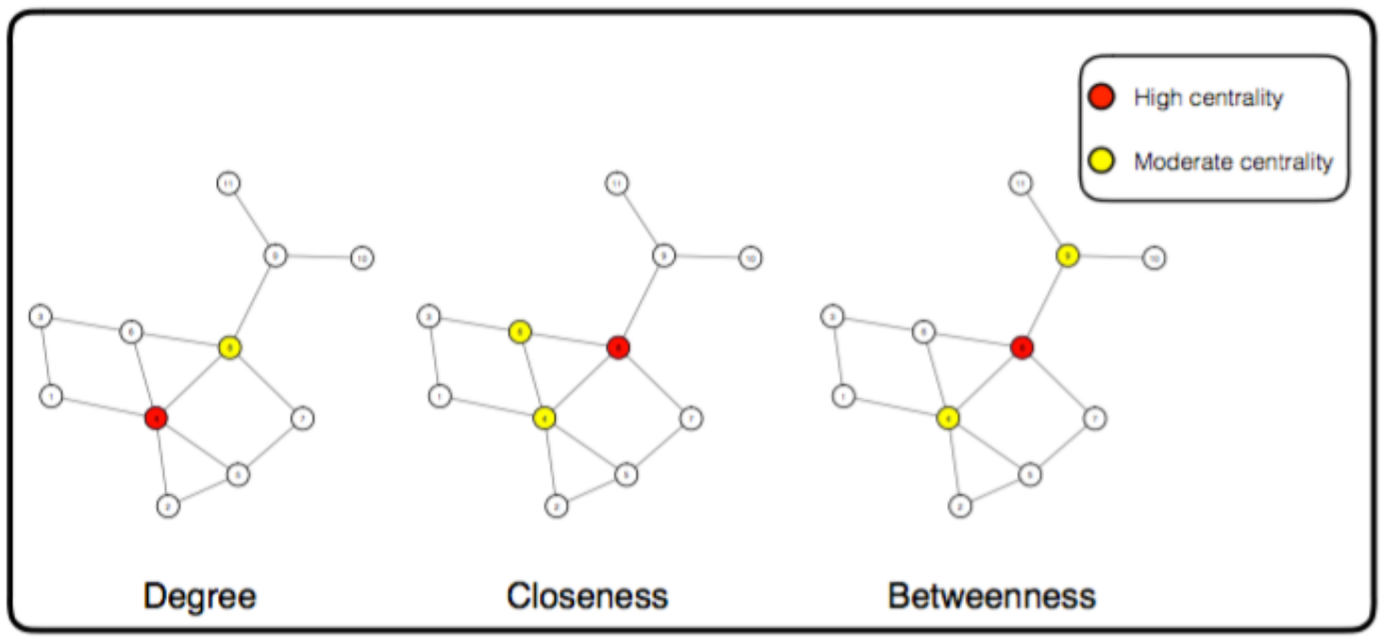
More results

4 centrality measures

- strength
- closeness
- betweenness
- eigenvector centrality

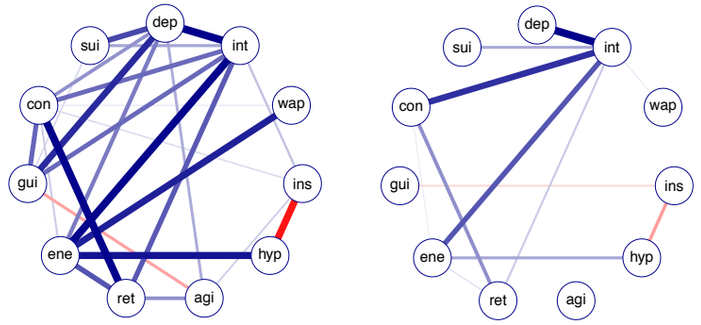
Focus on largest difference

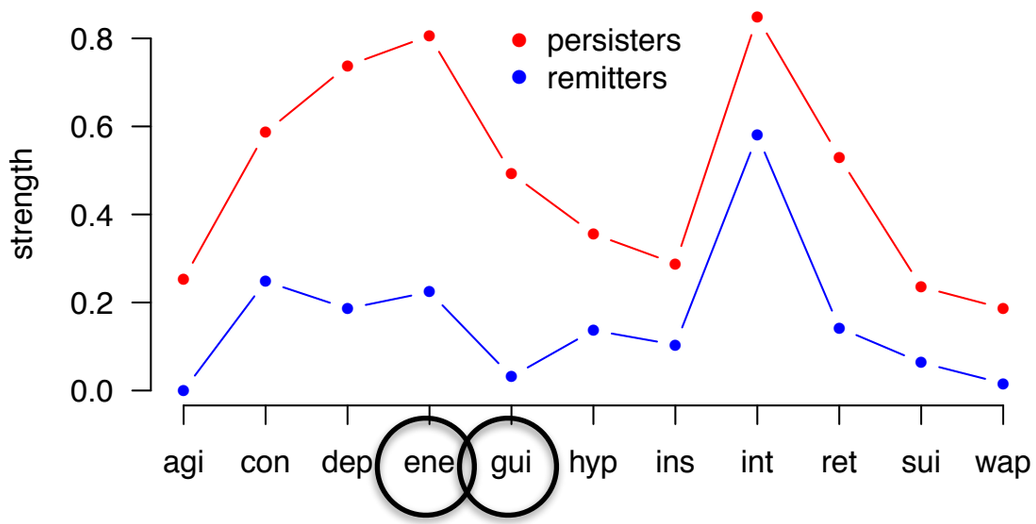
- with bootstrapping of centrality measures
- effect size is based on the difference in means



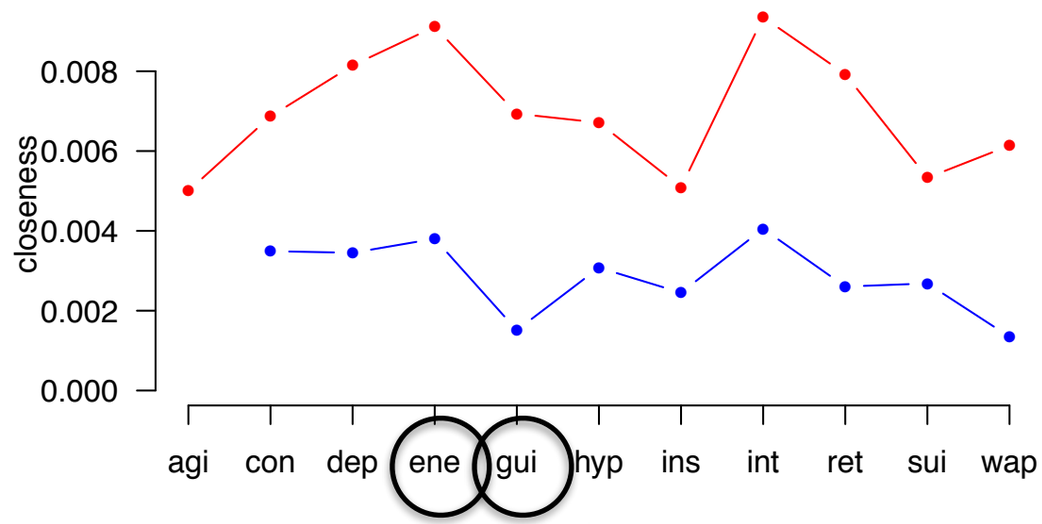
From Van Bork, Van Borkulo, Waldorp, Cramer & Borsboom. Network models for clinical psychology. (submitted)

More results

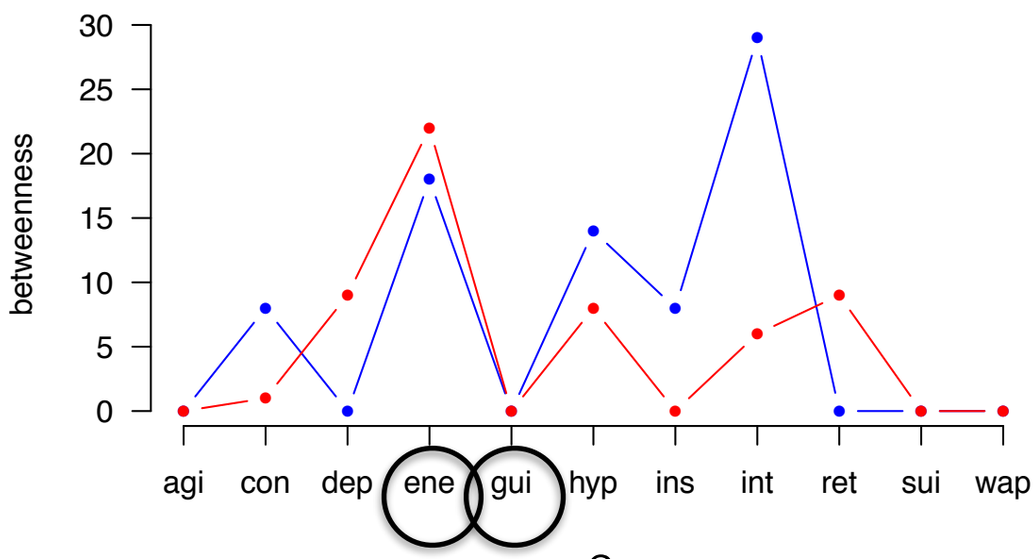




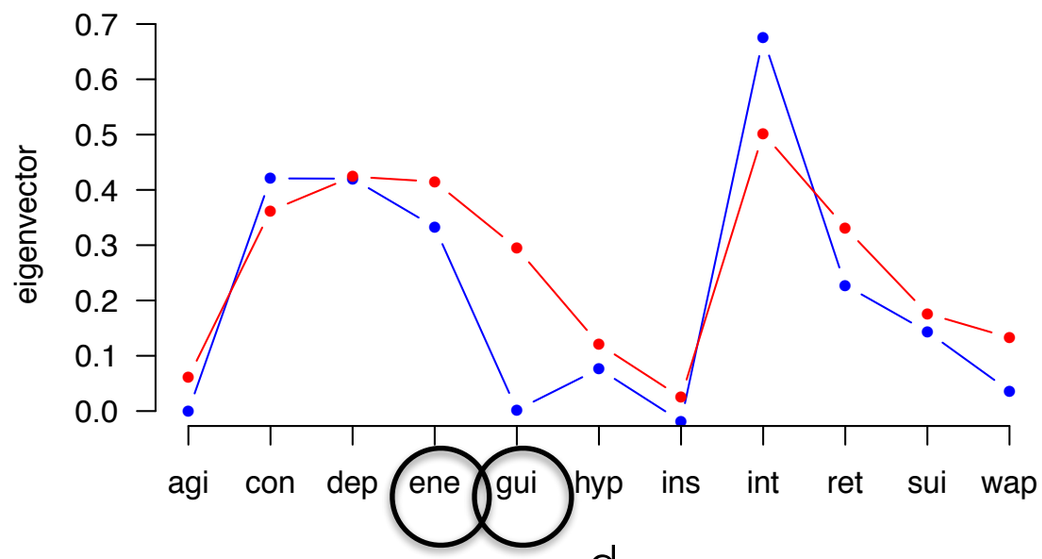
a



b



c



d

Discussion

Conclusion

- Patterns in symptom associations seem predictive for the course of MDD
  - More pronounced associations between symptoms may be an important determinant of persistence in MDD
- Controlling for difference in baseline severity confirmed main results

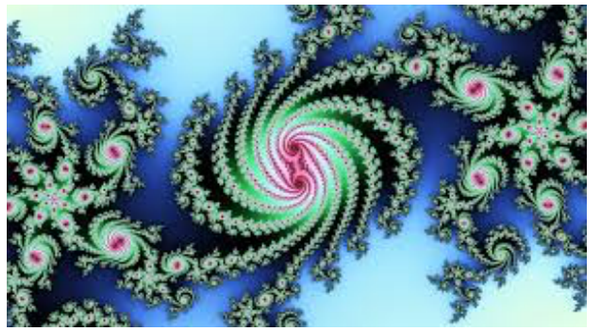
Limitations

- It is currently unclear what this means at the level of an individual patient
- Analysis at individual level can (theoretically) result in radically different network (Simpson's paradox)

Future

- Investigate relationship between networks at group and individual level

Thanks to…



Lynn Boschloo

Denny Borsboom

Brenda Penninx

Robert Schoevers

Lourens Waldorp

Van Borkulo, Boschloo, Borsboom, Penninx, Waldorp, Schoevers. Association of symptom network structure with the course of depression. *JAMA Psychiatry*. 2015;72(12):1219-1226.

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