Symptom patterns and the course of depression

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Resilient system

Vulnerable system

From Denny Borsboom
Outline

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

Design of study

- Depressed
- Not depressed

- Persisters
- Remitters
Design of study
Design of study

Baseline

2-year follow-up
Design of study
Design of study

Baseline
Baseline

Persisters (253)

Remitters (262)
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  
  Van Borkulo et al., 2014

• Low false positive rate
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
Design of study

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Initial results

Persisters

Remitters
Initial results

Persisters

$P = .01$

Remitters
Table 2. Analysis of Item Scores of Remitters and Persisters

<table>
<thead>
<tr>
<th>Symptom (abbreviation)</th>
<th>Mean (sd)</th>
<th>Statistic</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persisters (n=253)</td>
<td>Remitters (n=262)</td>
<td></td>
</tr>
<tr>
<td>Depressed mood (dep)</td>
<td>1.85 (0.75)</td>
<td>1.53 (0.72)</td>
<td>25446</td>
</tr>
<tr>
<td>Loss of interest or pleasure (int)</td>
<td>1.38 (0.71)</td>
<td>1.12 (0.61)</td>
<td>26493</td>
</tr>
<tr>
<td>Weight/appetite change (wap)</td>
<td>1.16 (0.79)</td>
<td>1.24 (0.79)</td>
<td>34990</td>
</tr>
<tr>
<td>Insomnia (ins)</td>
<td>1.39 (0.81)</td>
<td>1.15 (0.71)</td>
<td>27506</td>
</tr>
<tr>
<td>Hypersomnia (hyp)</td>
<td>0.68 (0.87)</td>
<td>0.79 (0.88)</td>
<td>35646</td>
</tr>
<tr>
<td>Psychomotor agitation (agi)</td>
<td>1.30 (0.85)</td>
<td>1.23 (0.90)</td>
<td>31683</td>
</tr>
<tr>
<td>Psychomotor retardation (ret)</td>
<td>1.26 (0.94)</td>
<td>0.89 (0.90)</td>
<td>25864</td>
</tr>
<tr>
<td>Fatigue or loss of energy (ene)</td>
<td>1.89 (0.76)</td>
<td>1.62 (0.70)</td>
<td>26568</td>
</tr>
<tr>
<td>Feeling guilty (gui)</td>
<td>1.89 (1.12)</td>
<td>1.78 (1.15)</td>
<td>31448</td>
</tr>
<tr>
<td>Concentration/decision making (con)</td>
<td>1.73 (0.77)</td>
<td>1.47 (0.76)</td>
<td>27039</td>
</tr>
<tr>
<td>Suicidality (sui)</td>
<td>0.99 (0.82)</td>
<td>0.82 (0.85)</td>
<td>29236</td>
</tr>
</tbody>
</table>
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
   - 25  25
   - 25  27
   - 27  27
   - 27  27
   - 27  27
   - 28  28
   - 28  29

2. Matching by partialing out severity
Tackle some issues

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Are results confounded by baseline severity?

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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

More results

(a) Strength

(b) Closeness

(c) Betweenness

(d) Eigenvector
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…

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