



9th Annual Research Conference 2017



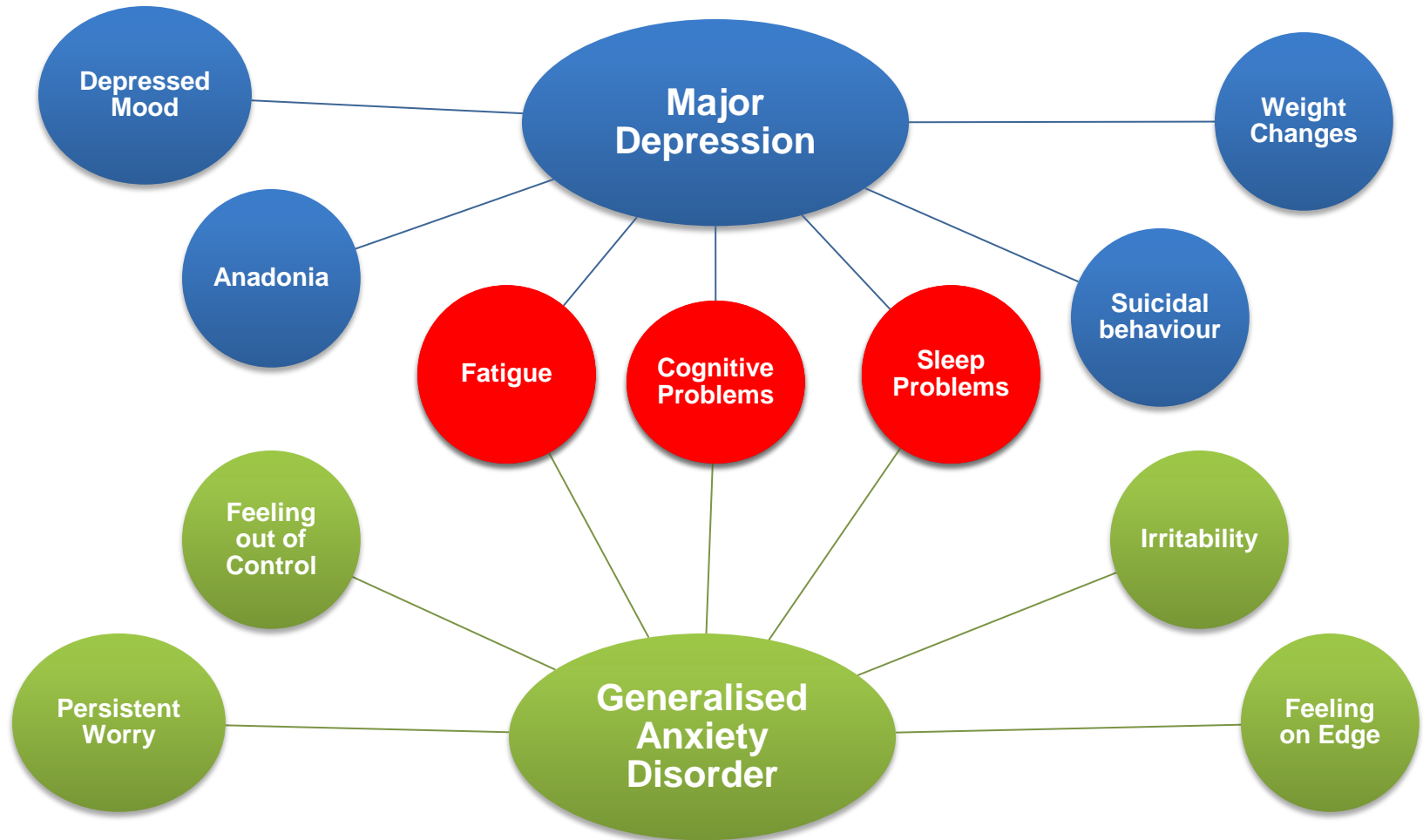
The relationship between early life stress and psychopathology: a network approach

Healy C, Clarke M, Kelleher I & Cannon M

Royal College of Surgeons in Ireland



Current Diagnostic Approach



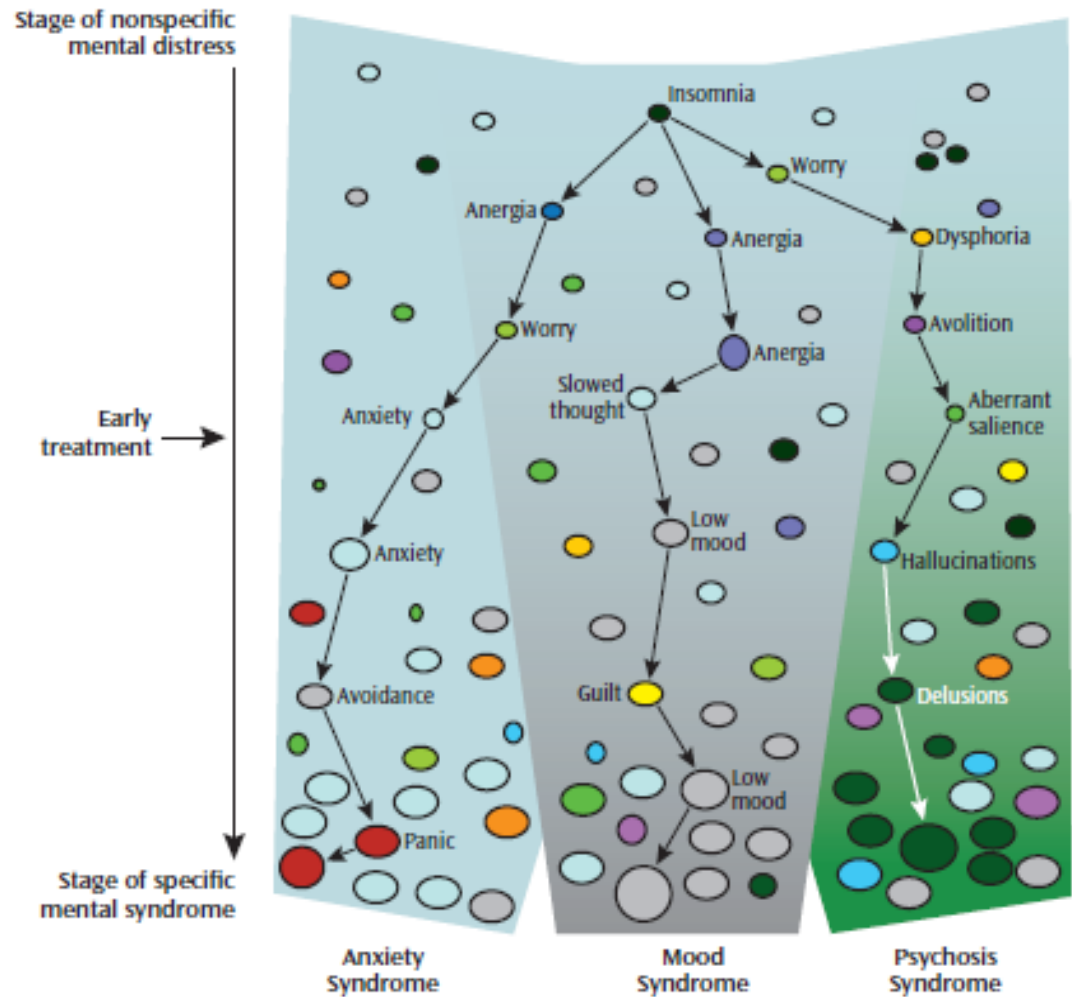
Difficulties with this approach in children

Threshold approach to diagnosis - Ignores some of the early “non-diagnostic” characteristics

Symptoms to disorder don't always match up – Frequently transdiagnostic in early life

Symptoms do not happen in isolation - there are associated biological and environmental risks

FIGURE 1. Staging Model of Causal Symptom Circuits^a



Network Approach

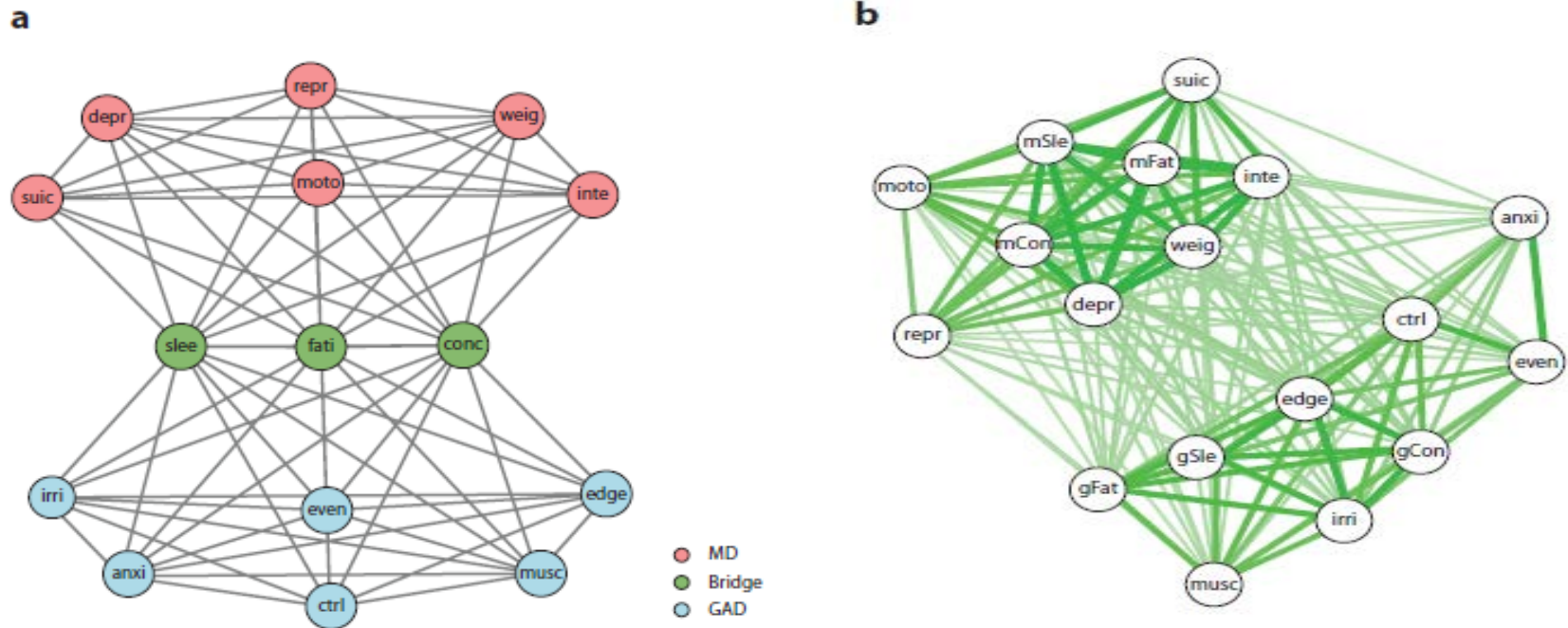
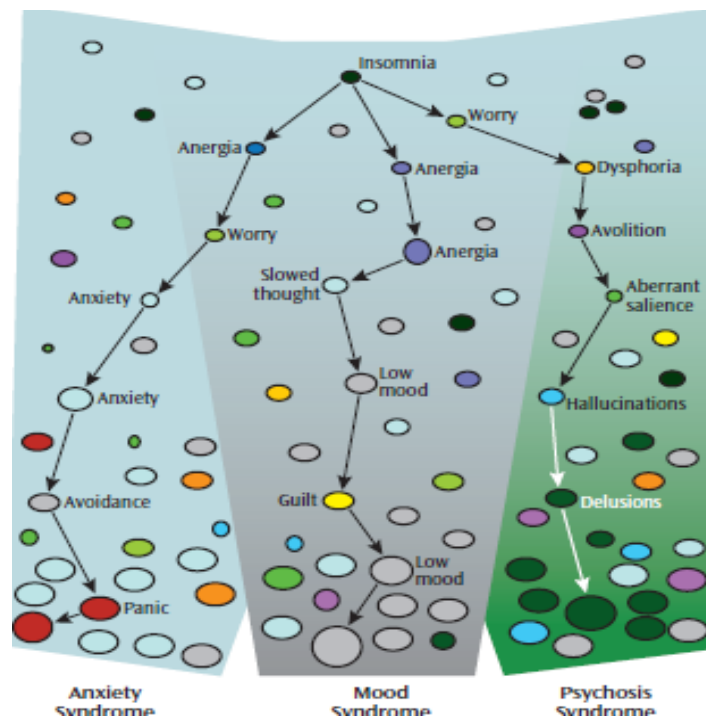
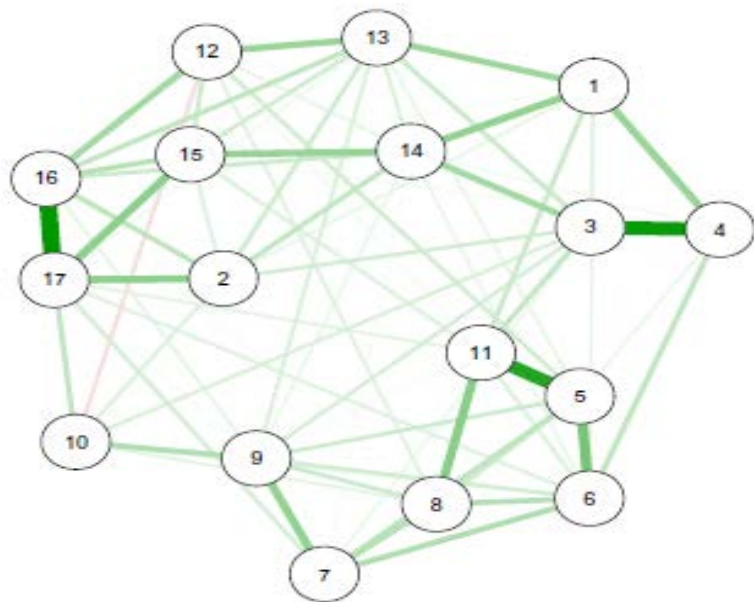


Figure 2

Networks for symptoms of major depression (MD) and generalized anxiety disorder (GAD) based on (a) the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) and (b) correlations based on the National Comorbidity Survey Replication data. (a) The symptoms of MD are placed at the top of the graph, bridge symptoms (i.e., symptoms that feature in both disorders) are in the middle, and GAD symptoms at the bottom. Symptoms are connected with a gray edge if they are part of the same disorder. Such a connection is coded in the adjacency matrix as a 1; no connection is coded as a 0. (b) The edges represent correlations. The higher the correlation, the thicker the edge. The position of the nodes in the network is based on an algorithm, which causes strongly correlated symptoms to cluster in the middle, whereas symptoms with weaker connections to other symptoms figure more in the periphery of the figure (Fruchterman & Reingold 1991).

Adopt a network perspective



Investigate the association between different early life stressors and psychopathology within the child cohort.



Aim of project

Aim: Investigate the network between early life stressors and psychopathology

**Sample: The “Growing up in Ireland” child cohort AMF:
Age 9 data only (for now)**

Early Life Stressors

19 different early life stressors

| | | |
|---------------------------------|---|--|
| Conflict between parents | Death of Parent | Death of Close Family |
| Parental Divorce | Stay in foster/ Residential Care | Serious Illness of Close Family |
| Family Drug/Alcoholism | Moving Country | Personal Illness |
| Parent in Prison | Moving House | Death of Friend |
| Verbal Bullying | Written Bullying | Other disturbing event |
| Physical Bullying | Electronic Bullying | Family mental Disorder |
| Bullying by Exclusion | | |

Factor Analysis: Eigenvalue >1, Varimax rotation, Loading <.3 suppressed.

Factor Structure

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------------|-----------------------|----------------------------------|----------------|---------------------|---------------------------------|----------------------------------|
| Home Conflict | Bullying | Family detachment | Moving | Written Bullying | Family Illness/ Death | Self Illness/ Other Death/ Other |
| Conflict between Parents | Verbal Bullying | Death of Parent | Moving Country | Written Bullying | Death of Close Family | Personal Illness |
| Divorce/ Separation | Physical Bullying | Stay in foster/ Residential Care | Moving House | Electronic Bullying | Serious Illness of Close Family | Death of Friend |
| Family Mental Disorder | Bullying by Exclusion | Family Drug/ Alcoholism | | | | Other disturbing event |
| Family Drug/ Alcoholism | | Parent in prison | | | | |
| Parent in prison | | | | | | |

Strengths and Difficulties Questionnaire.

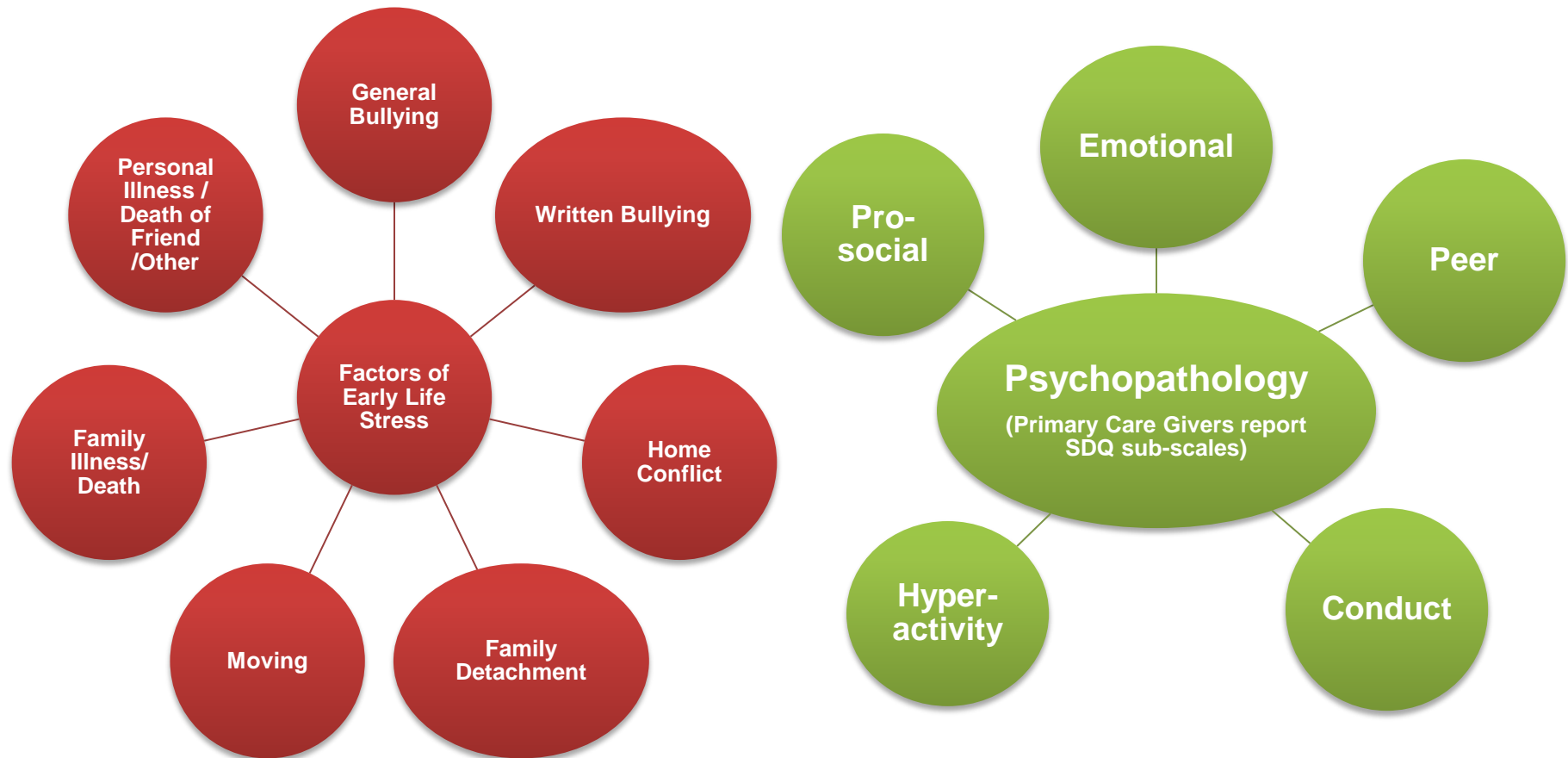
Measure of psychological symptoms in children and adolescence.



Peer problems + Emotional problems = **Internalising problems**

Conduct problems + Hyperactivity = **Externalising problems**

Variables (nodes) in the Network



Network Analysis: Rstudio - Packages qgraph, Bootnet, Lavvaran.
Characteristic Restriction: EBICglasso, auto-corr, tuning = .25

What's important in a network?

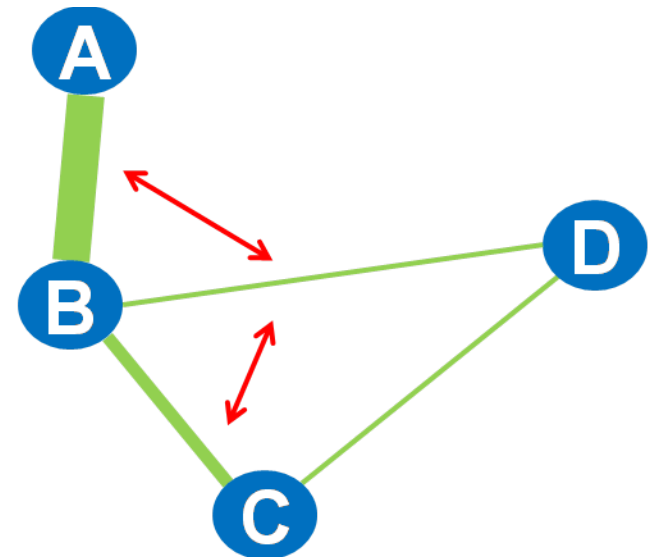
Centrality

Betweenness: How often a node lies on the shortest path between every combination of 2 other nodes.

Closeness: the average distance from that node to all other nodes in the network, with high closeness indicating a short average distance between a given node and the remaining nodes in the network.

Strength: Strength of the connection entering or leaving a node

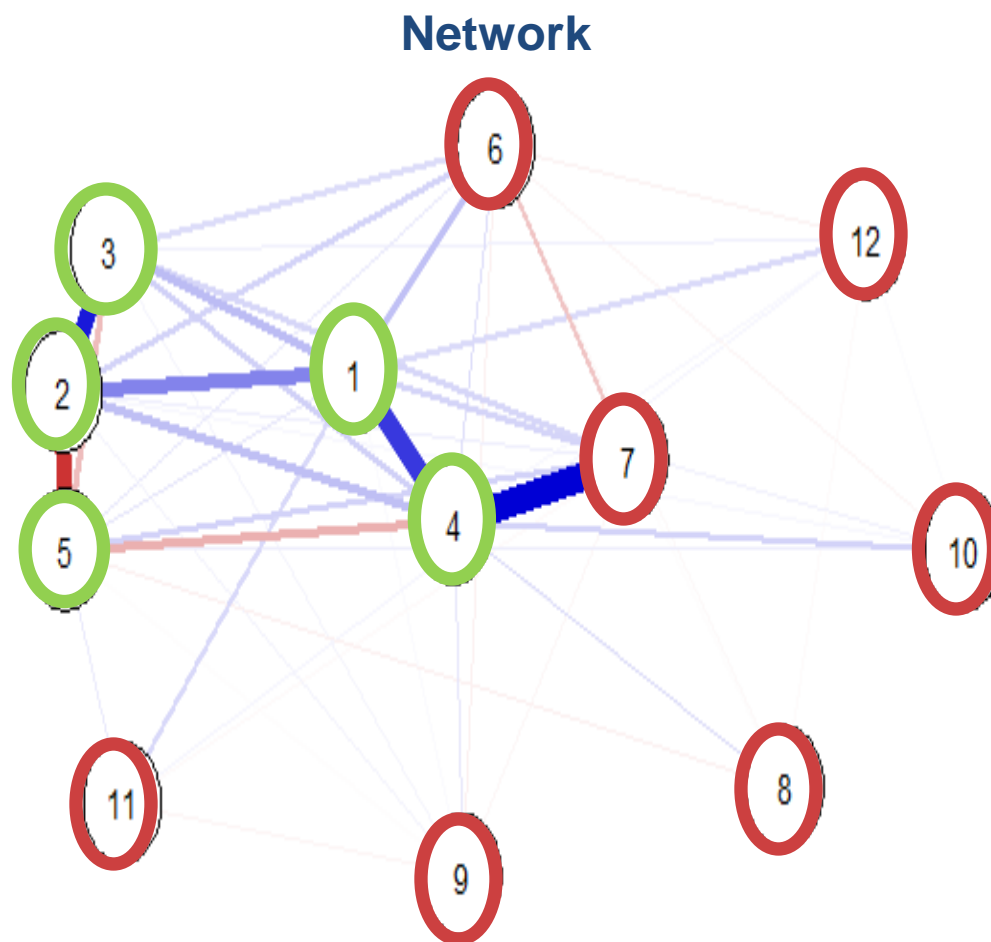
Strength



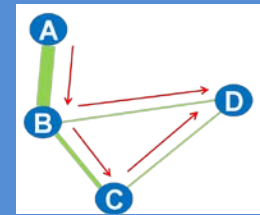
Results

Visual interpretation

| No. | Node |
|-----|----------------------|
| 1. | Emotional |
| 2. | Conduct |
| 3. | Hyper-activity |
| 4. | Peer |
| 5. | Pro-social |
| 6. | Home Conflict |
| 7. | Bullying |
| 8. | Moving |
| 9. | Family Detachment |
| 10. | Written Bullying |
| 11. | Family Death Illness |
| 12. | Other |



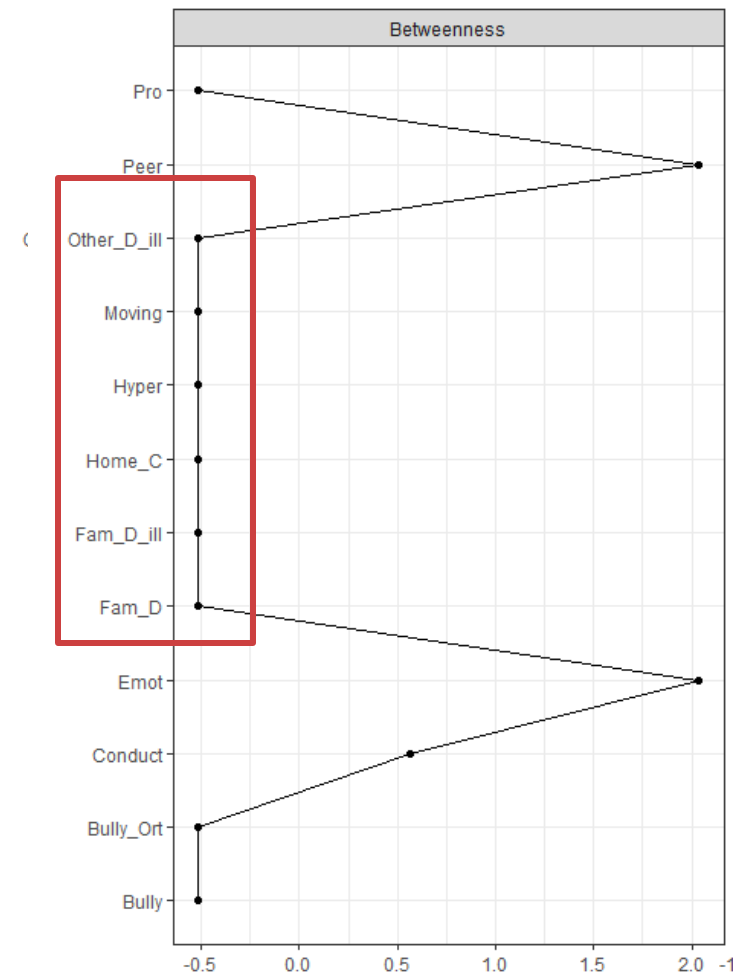
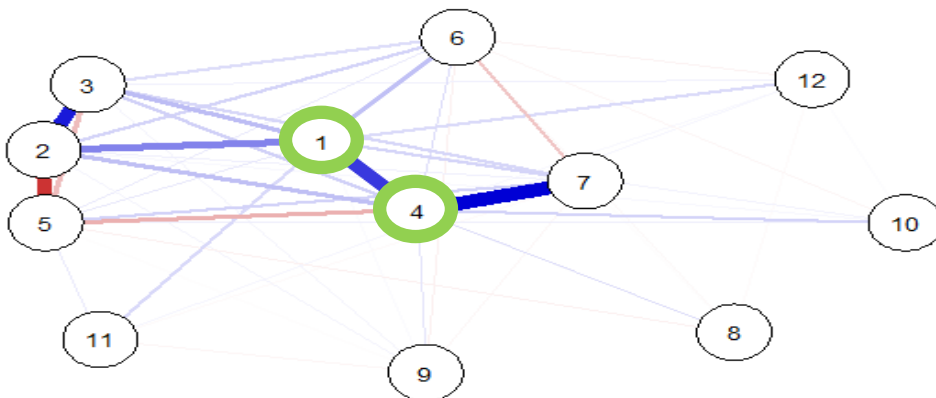
Betweenness



Peer and Emotional subscales
(internalising problems) scored highest

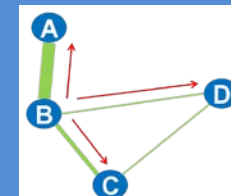
Little to no interconnectedness between
the early life stress factors.

The relationship between trauma and
psychopathology is facilitated through
internalising problems.



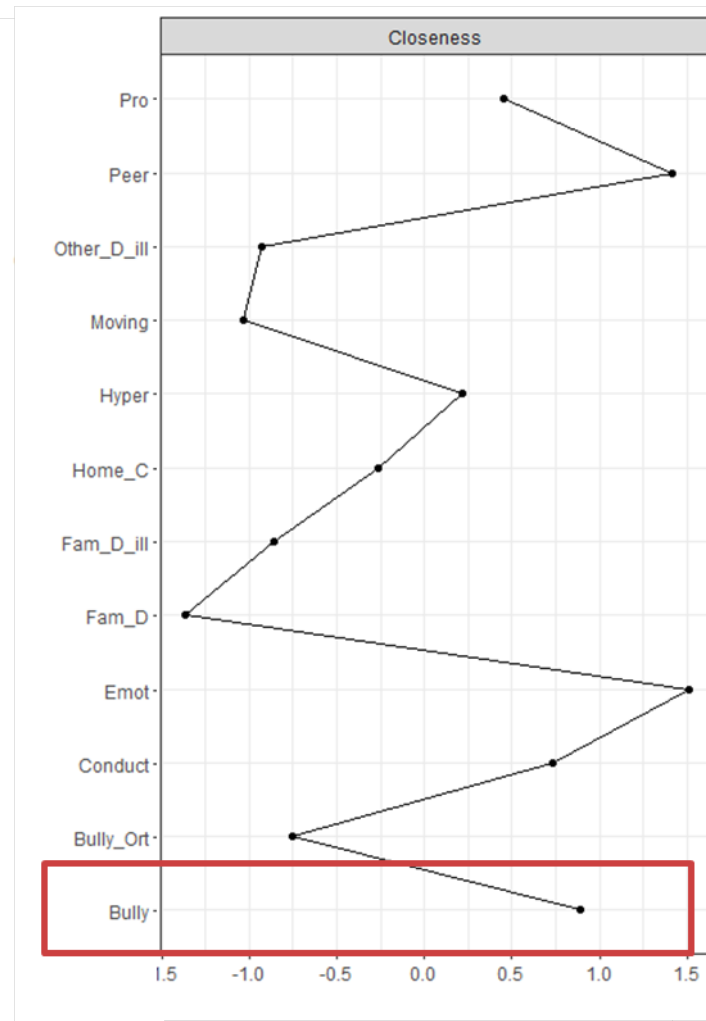
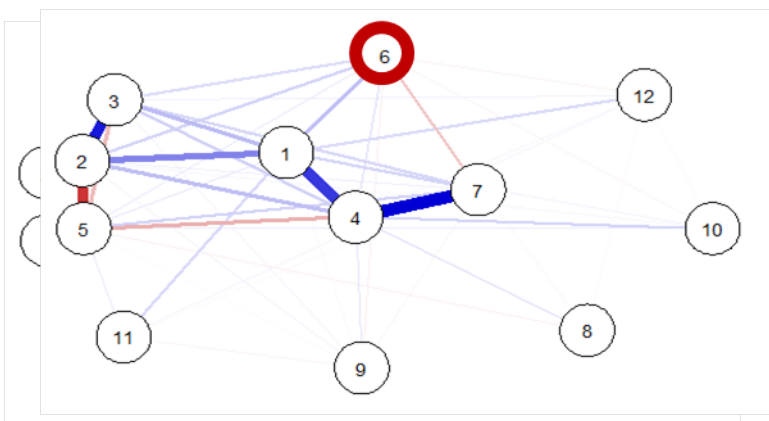
Betweenness: Which nodes facilitate the flow of information.

Closeness



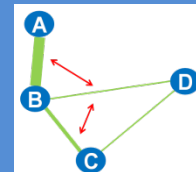
Peer and Emotional subscales scored highest (again).

Bullying scores highest of the stressors again indicating its interconnectedness with psychopathology.



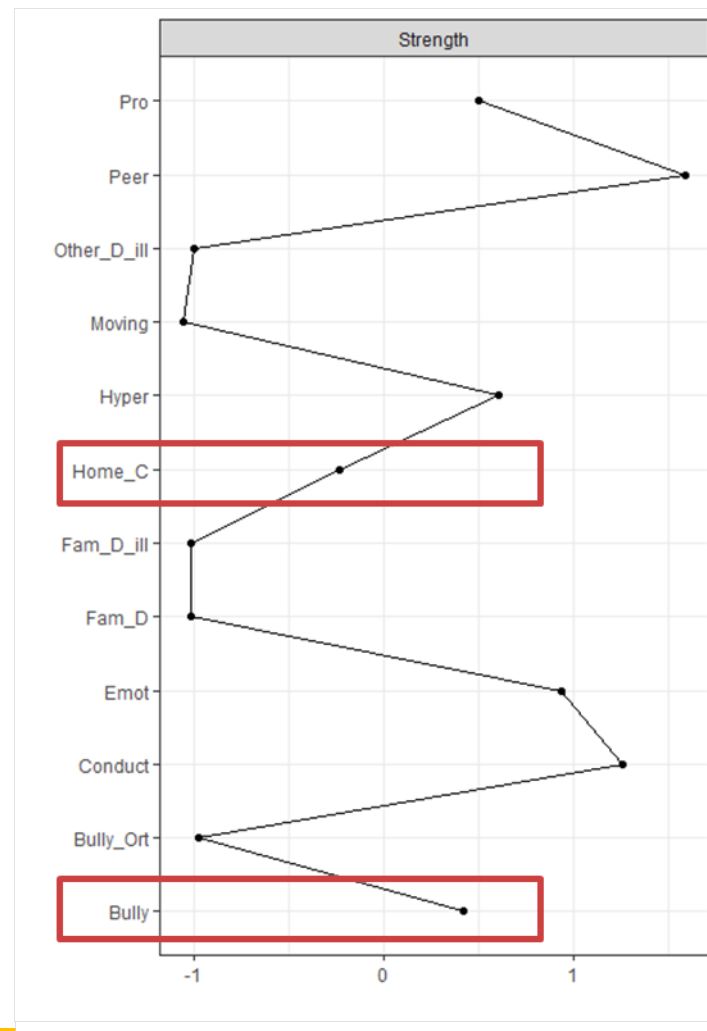
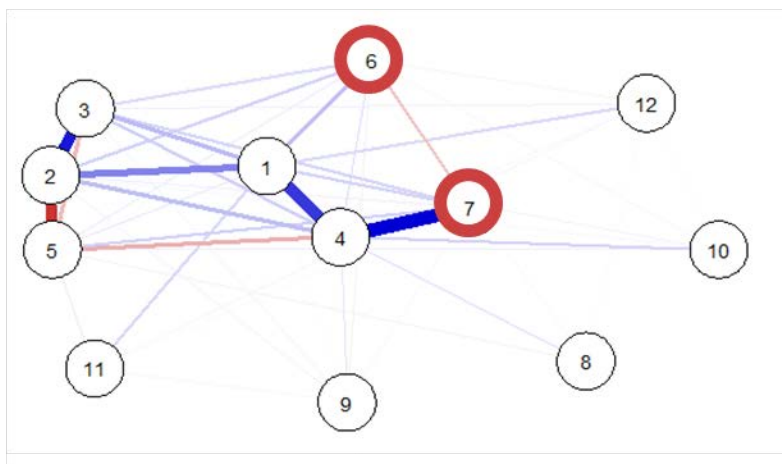
Closeness: the average distance from that node to all other nodes in the network.

Strength



Strong interconnectedness between the subscales.

Bullying scores highest of the stressors again indicating its interconnectedness with psychopathology.



Strength: Strength of the connection entering or leaving a node.

Discussion

Psychopathology in childhood

- A lot of interconnectedness between the SDQ subscales.

Early life stressors in childhood

- There are seven early life stress factors within the general population of Irish children (GUI child-cohort).
- Of these factors bullying and home conflict had the strongest relationship to psychopathology.

Form of relationship between early life stress and psychopathology

- This relationship is facilitated by internalising problems.

Why is this important? Widen the Scope.

- Only early life stress was used here – can investigate the relative importance of many variables simultaneously to:
 - Learning about the pathway
 - Inform policy-makers where to intervene to have the widest impact
- Add a temporal effect (age 9 ELS and age 13 SDQ) - improve knowledge about the direction of the causality.

Limitations of networks

- Sample size needs to be sufficient. Solution: not a problem with the GUI.
- Problems with replication across samples. Solution: Use Network Comparison Test (NCT).
- Needs to be integrated with theory.
- Networks may differ across participant characteristics – Gender? Having very high scores on the SDQ? Solution: Use NCT

Limitations (Specific for this example)

- Direction of the association is assumed.
Could also be the other??

Early life stress ---> Psychopathology

OR

Psychopathology ---> Early life stress??

Solution: Longitudinal investigation age 9 and 13 data.

Conclusion

- Within the general population of Irish children, bullying and home conflict have the strongest connection with psychopathology.
- The relationship between psychopathology and early life stressors will follow through internalising problems.

Network analysis offers a new approach to investigate psychological symptoms (or anything else) that allows for more inclusive pathways.



Interesting Reads

- Borsboom, D., & Cramer, A. O. (2013). Network analysis: an integrative approach to the structure of psychopathology. *Annual review of clinical psychology, 9*, 91-121.
- Costantini, G., Epskamp, S., Borsboom, D., Perugini, M., Mõttus, R., Waldorp, L. J., & Cramer, A. O. (2015). State of the aRt personality research: A tutorial on network analysis of personality data in R. *Journal of Research in Personality, 54*, 13-29.
- Guloksuz, S., Pries, L. K., & van Os, J. (2017). Application of network methods for understanding mental disorders: pitfalls and promise. *Psychological Medicine, 1-10*.
- Epskamp, S., van Borkulo, C., Servaas, M. N., Isvoranu, A. M., Riese, H., & Cramer, A. (2017). Personalized network modeling in psychopathology: The importance of contemporaneous and temporal connections.
- Fried, E. I., & Cramer, A. O. (2016). Moving forward: challenges and directions for psychopathological network theory and methodology.
- Murphy, J., McBride, O., Fried, E., & Shevlin, M. (2017). Distress, Impairment and the Extended Psychosis Phenotype: A Network Analysis of Psychotic Experiences in an US General Population Sample. *Schizophrenia Bulletin*.

Thanks for listening! Questions?

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