

Network Structure of Psychopathology Symptoms in a Community Sample of Youth

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BACKGROUND

The field of network psychometrics is a promising alternative to the common cause theory and conceptualizes mental illnesses as arising from the interactions between individual symptom groups. The goal of this study is to analyze the network structure of psychopathology symptoms in a community sample of youth to identify the most influential symptoms for improved diagnosis and for preventing comorbidity.

METHODS

- The sample of 3933 subjects was taken from the Philadelphia Neurodevelopmental Cohort and comprised of youth between the ages of 11-21. 112 variables corresponding to 17 psychopathology symptoms groups were analyzed.
- A mixed graphical model was used to estimate network structure by creating a pairwise weighted adjacency matrix with EBIC regularization at $\gamma = 0.25$.
- Predictability, centrality and bridge centrality measurements were found to determine the relative influence of each node.

RESULTS

- The network generated from 17 psychopathology symptom domains (ADD, agoraphobia, conduct disorder, depression, generalized anxiety disorder, mania, OCD, ODD, panic disorder, phobia, psychosis, PTSD, general probes, separation anxiety, psychosis prodromal symptoms, social anxiety and suicide) had cluster regions and three independent psychosis/psychosis prodromal symptom nodes. No negative associations were observed in the network.
- The strongest edge regression coefficient (1.760) was detected between two psychosis prodromal symptoms related to disorganized communication. A conduct disorder item eliciting whether the subject had ever threatened someone had the the greatest strength centrality measurement (2.605) followed closely by an OCD item related to compulsive behavior (2.517). One mania item relating to irritability (1.671) and fear of travelling through tunnels (1.509) had the largest bridge strength centrality values. History of inpatient treatment (0.998), fear of traveling in a car (0.991) and compulsive checking (0.991) had the largest predictability values, suggesting they could be effective diagnostic and intervention targets.

Network structure analysis provides insight into the interactions among psychopathology symptoms in adolescents.

OCD and Conduct Disorder symptoms are the most influential nodes and are potentially effective diagnostic or intervention targets.

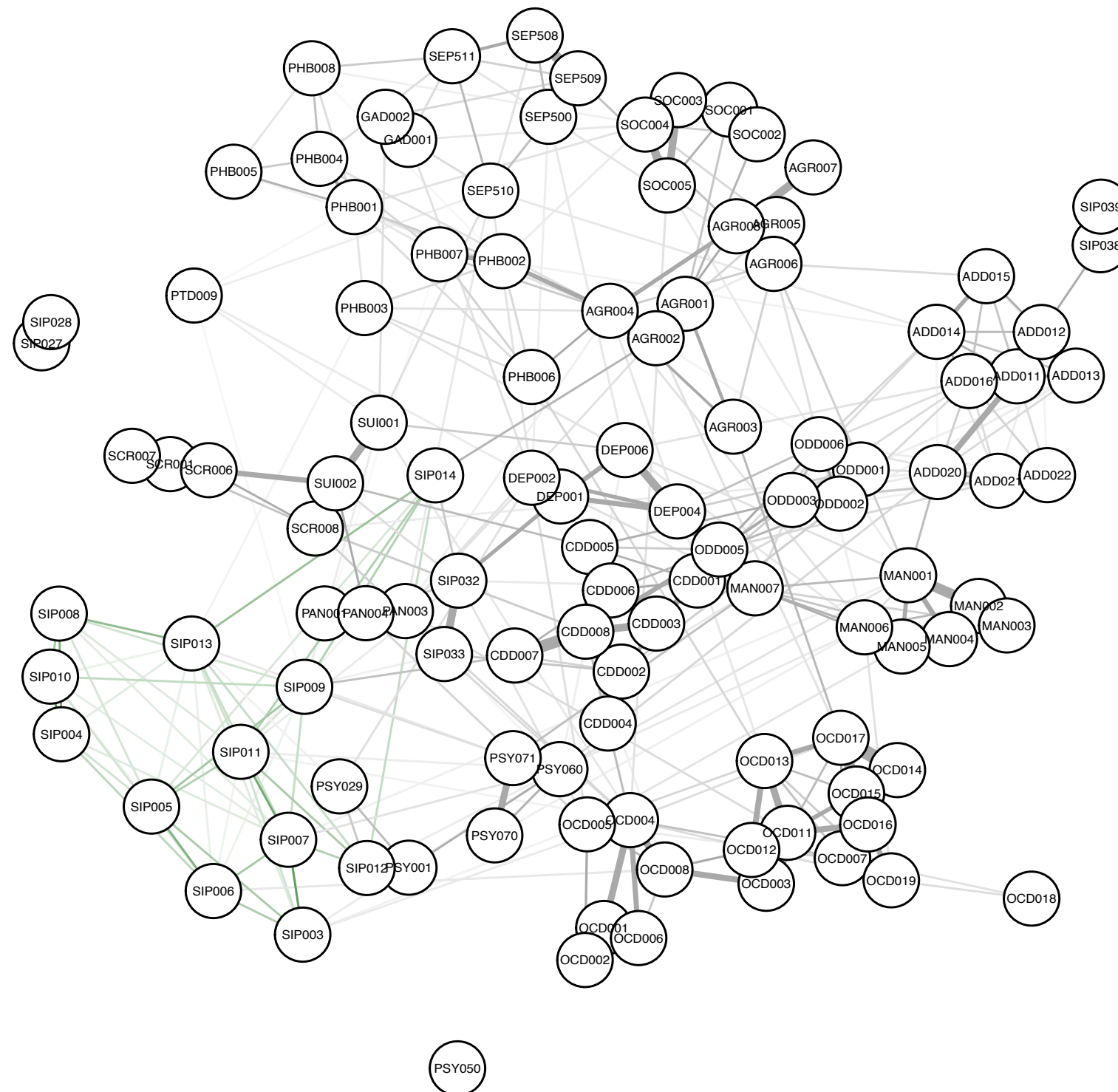


Figure 1. Mixed graphical model network consisting of 112 symptom nodes.

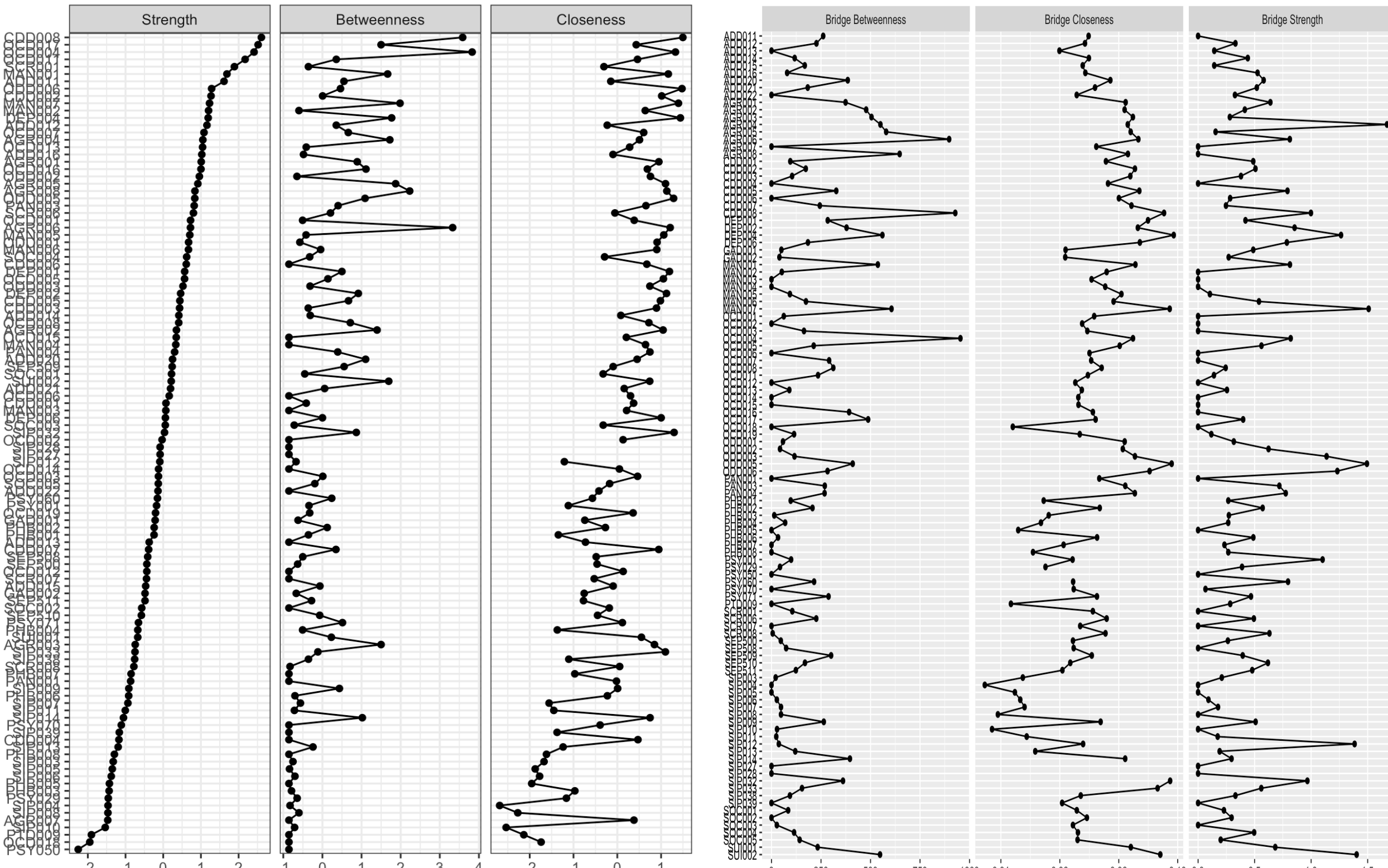


Figure 2 . Centrality (left) and bridge centrality (right) measurements consisting of strength (expected influence), betweenness and closeness indices.

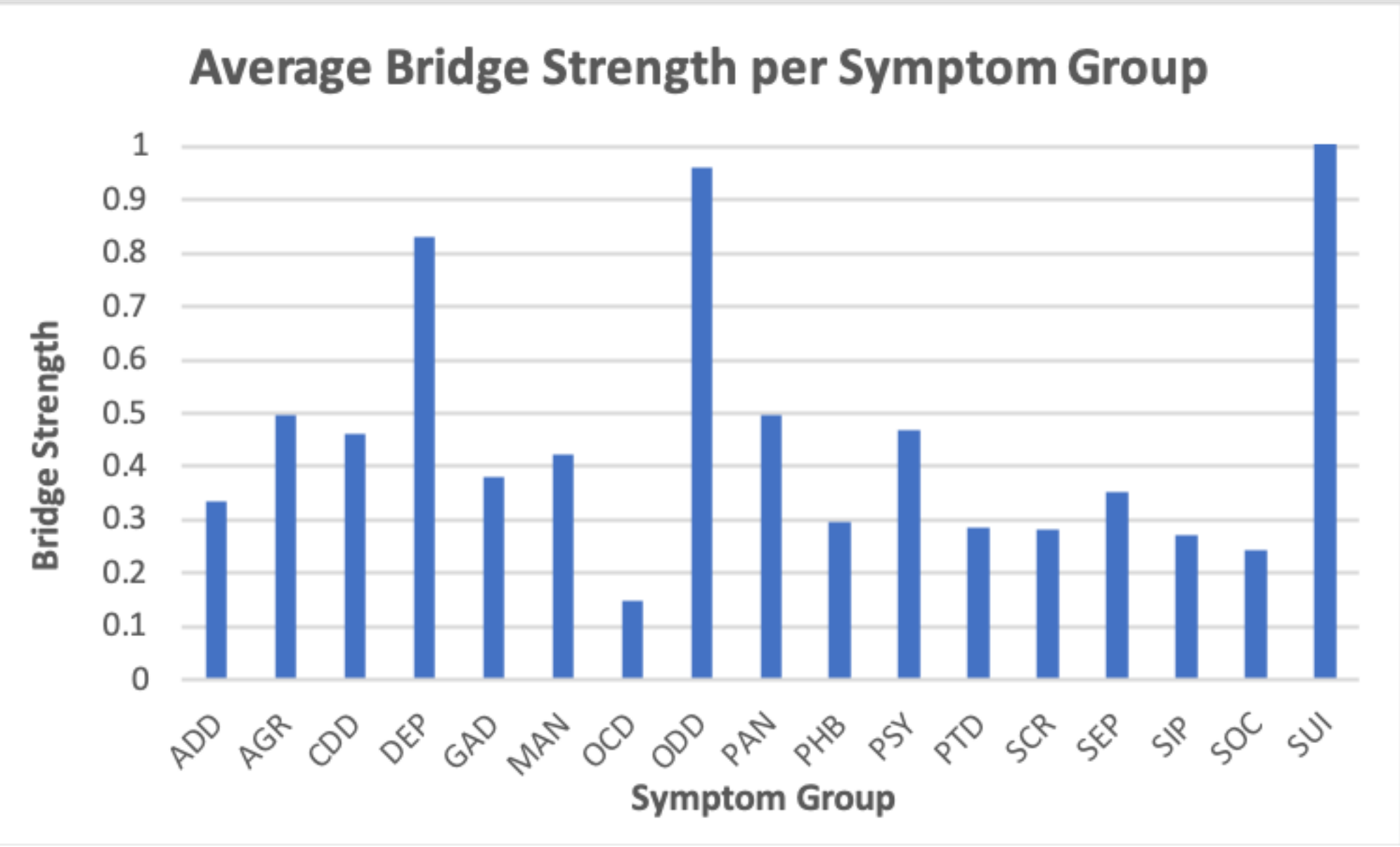


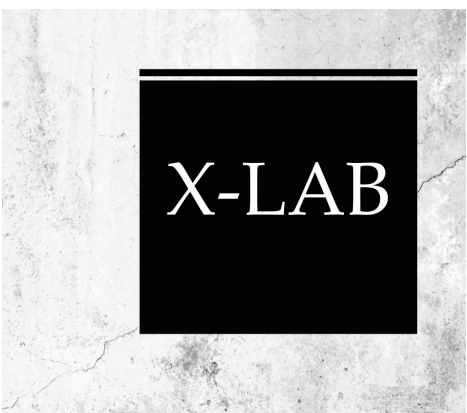
Figure 3. Average bridge strength (expected influence) measurements per symptom group

DISCUSSION

- OCD and conduct disorder symptoms had the largest centrality/predictability values and are influential symptoms that could potentially be used to more effectively screen youth for mental illnesses such as schizophrenia.
- Depression, suicide and ODD symptoms had consistently high bridge centrality values and should be targeted to prevent comorbidity of associated symptoms. Examining the structure of psychopathology symptom networks could potentially lead to improved insights for illness prevention and individualizing treatments.

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Acknowledgements: This project was sponsored by The Rockefeller University Heilbrunn Family Center for Research Nursing through the generosity of the Heilbrunn Family.



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