A network approach to investigating differences in mental health symptom structure between men and women

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Intro

Mental health symptoms have traditionally been understood as indicators of underlying latent causes (e.g., brain disease). The introduction of a network theory of psychopathology has reconceptualized mental disorders as a complex network constituted of interconnected, causally related symptoms, which may reinforce each other thereby maintaining a disordered state. This theoretical shift has been accompanied by an emergence of network psychometric methods, enabling estimation and testing of network models from cross-sectional and longitudinal data. In psychometric network models, nodes typically represent observed variables and edges represent the pair-wise partial correlations between them. Various tools have been developed to investigate the psychometric properties of estimated networks.

Methods

This study used cross-sectional data (n = 337,850, 56% female) from the Mental Health Million project. Participants took the Mental Health Quotient (MHQ), a novel 47-item questionnaire consolidating symptom items from 126 psychiatric tools assessing ten common mental disorders. We estimated separate networks for men and women using an unregularized Gaussian graphical model search algorithm, which minimizes the extended Bayesian information criterion by iteratively adding and removing edges. We also calculated centrality indices to quantify which nodes were most influential in each network. Finally, we used Exploratory Graph Analysis to identify unique dimensions in the network, revealing communities of highly connected nodes.

Results

Discussion

Our findings reveal differences in network structures of high and low mental wellbeing subgroups. Highly influential nodes in the high-MHQ group suggest potential targets to promote mental flourishing, while highly influential nodes in the low-MHQ group reveal potential targets for intervention to prevent or treat poor mental health. Further research should investigate temporal dynamics of mental health elements to elucidate causal relationships between elements and outcomes.