Top three symptom dimensions are shared for male and female youth: A data-driven factor analysis study in a large transdiagnostic database

Veerakumar, A., Samara, A., Vanderwal, T
BC Children’s Hospital Research Institute, University of British Columbia, 4500 Oak Street, Vancouver, BC V6H 3N1

Background & Objectives:
- Sex-based differences in neurobiology and in the prevalence of psychiatric disorders are well-established.
- A common way to try to account for this variance in developmental studies is use sex as a covariate.
- Here, we assess a prospective approach to identify sex-based differences in youth mental health symptoms.

Methods:
- All data are from the Healthy Brain Network biobank.1
- Youth with transdiagnostic mental health concerns: N=1986, 680 females, 1306 males, age range 5-16 years.
- We applied exploratory factor analysis (EFA)2 and principal component analysis (PCA) to the full sample and to males and females separately to identify data-driven symptom groupings within the Child Behavior Checklist (CBCL) scores.
- Factor loadings were iteratively re-measured in successively larger EFA models to identify the maximum number of factors that adequately simplify CBCL scores.
- EFA and PCA results were used to identify an appropriate number of principal components explaining the most variance in CBCL scores.

Results:
- Five EFA factors had sufficiently strong loadings to be considered meaningful.
- Three PCA components explained 27% of the variance in CBCL scores.
- When restricted to 3 factors, EFA results were consistent for males, females and full sample and replicated higher-order constructs of youth mental illness from previous studies: externalization, internalization, neurodevelopmental.

Conclusions:
- These findings support the combining of both sexes in subsequent analyses for this project.
- Findings are limited by the CBCL tool itself: there may not be major sex-based differences in symptoms at this level, or the tool may not capture them.

Future Directions: Relating CBCL factors to gradients of brain organization
- These 3 factor scores (Externalization, Internalization, Neurodevelopmental) could be used to test for brain-behaviour relationships between youth CBCL scores and neuroimaging data3.
- This dimensional approach to transdiagnostic symptom ratings could be correlated with dimensional gradients of brain connectivity, which incorporates relationships across the cortical surface4.
- The current results suggest that including CBCL data from males and females in one sample is justified in this open-science database.

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References: