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Childhood maltreatment is associated with alteration in global network fiber-tract architecture independent of history of depression and anxiety[☆]

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Abstract

Childhood maltreatment is a major risk factor for psychopathology. It is also associated with alterations in the network architecture of the brain, which we hypothesized may play a significant role in the development of psychopathology. In this study, we analyzed the global network architecture of physically healthy unmedicated 18-25 year old subjects (n=262) using diffusion tensor imaging (DTI) MRI and tractography. Anatomical networks were constructed from fiber streams interconnecting 90 cortical or subcortical regions for subjects with no-to-low (n=122) versus moderate-to-high (n=140) exposure to maltreatment. Graph theory analysis revealed lower degree, strength, global efficiency, and maximum Laplacian spectra, higher pathlength, small-worldness and Laplacian skewness, and less deviation from artificial networks in subjects with moderate-to-high exposure to maltreatment. On balance, local clustering was similar in both groups, but the different clusters were more strongly interconnected in the no-to-low exposure group. History of major depression, anxiety and attention deficit hyperactivity disorder did not have a significant impact on global network measures over and above the effect of maltreatment. Maltreatment is an important factor that needs to be taken into account in studies examining the relationship between network differences and psychopathology.

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