Big data clarifies emotional circuit development

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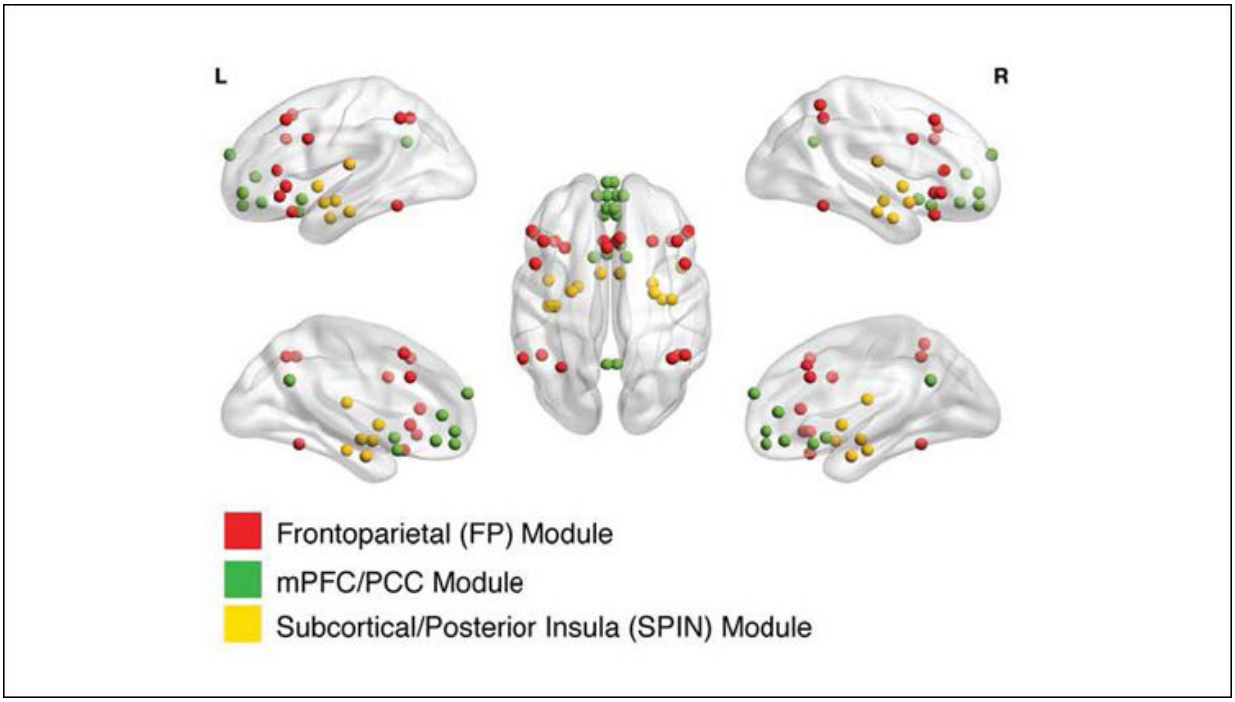

Modular structure of emotion identification circuits Credit: Zhang et al., JNeurosci 2019

Several brain circuits that identify emotions are solidified early in development and include diverse regions beyond the amygdala, according to new research in children, adolescents, and young adults published in *JNeurosci*.

Previous studies of emotional development have produced conflicting results due to small sample sizes and often focused only on the amygdala, ignoring other potential regions of interest. To rectify this, Vinod Menon and colleagues at the Stanford University School of Medicine analyzed fMRI data from 1,445 individuals aged eight to 21 from the Philadelphia Neurodevelopmental Cohort. During the fMRI session, participants were shown images of faces and were asked to categorize the emotion—either fearful, angry, sad, happy, or neutral—they conveyed.

The research team identified distributed brain areas and circuits involved in identifying emotions and used network stability analysis to disentangle aspects of emotion-related brain circuitry that were stable over development and those that changed with age. They also discovered multiple brain circuits that differ between emotion categories but do not change with age.

These results reveal the power of large sample sizes in the study of emotional development, help to explain inconsistencies in previous small-sample experiments, and highlight the need to examine brain regions and circuits beyond the amygdala.

More information: Development of Human Emotion Circuits Investigated Using a Big-Data Analytic Approach: Stability, Reliability, and Robustness, *JNeurosci* (2019). DOI: 10.1523/JNEUROSCI.0220-19.2019

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