

Keeping emotions under control

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Credit: Clemens v. Vogelsang

Childhood and adolescence are ages of constant change and crucial experiences. At times the emotional weight can be difficult to manage and may lead to psychological issues in adulthood. Neurofeedback is a method that helps individuals to keep their brain activity (for example a response to an emotional event) under control. While routinely used on

adults, a new study published in *NeuroImage* demonstrates that the technique shows promise for young people as well.

Difficulty handling emotions and keeping them under control can cause various psychological issues and even lead to full-blown psychiatric problems (in cases of emotionally catastrophic events). This is especially true in childhood. Trauma experienced in youth can contribute to later problems such as depression, anxiety and even more serious conditions. There are various techniques for helping people control their emotions, including neurofeedback, a training method in which information about changes in an individual's [neural activity](#) is provided to the individual in real-time and this enables the individual to self-regulate this neural activity to produce changes in behaviour. While already in use as a treatment tool for adults, until now the methodology had not been used on [young people](#) who are more vulnerable and could thus benefit from more efficient control of their emotions.

The new study used real time fMRI-based neurofeedback on a sample of kids. "We worked with subjects between the ages of 7 and 16," explains SISSA researcher and one of the authors of the study, Moses Sokunbi. "They observed emotionally- charged images while we monitored their [brain activity](#), before 'returning' it back to them." The region of the brain studied was the insula, which is found in the cerebral cortex.

The young participants could see the level of activation of the insula on a "thermometer" presented on the MRI projector screen and were instructed to reduce or increase activation with cognitive strategies while verifying the effects on the thermometer. All of them learned how to increase insula activity (decreasing was more difficult). Specific analysis techniques made it possible to reconstruct the complete network of the areas involved in regulating emotions (besides the insula) and the internal flow of activation. In this way, scientists observed that the direction of flow when activity was increased reversed when decreased.

"These results show that the effect of neurofeedback went beyond the superficial- simple activation of the insula- by influencing the entire network that regulates emotions," explains Kathrine Cohen Kadosh, Oxford University researcher and first author of the study. "They demonstrate that neurofeedback is a methodology that can be used successfully with young people."

"Childhood and adolescence is an extremely important time for young people's emotional development," says Jennifer Lau, from the Institute of Psychiatry, Psychology & Neuroscience at King's College London, who has taken part in the study. "Therefore, the ability to shape brain networks associated with the regulation of emotions could be crucial for preventing future mental health problems, which are known to arise during this vital period when the brain's emotional capacity is still developing."

More information: Kathrin Cohen Kadosh et al. Using real-time fMRI to influence effective connectivity in the developing emotion regulation network, *NeuroImage* (2016). [DOI: 10.1016/j.neuroimage.2015.09.070](https://doi.org/10.1016/j.neuroimage.2015.09.070)

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