

Can Brain Training and Biofeedback Help Prevent Depression



In two innovative pilot **studies**, Ian Gotlib and his colleagues at Stanford University, California, showed that brain training can be used to help eliminate depression, even before it starts. They studied young girls (10 to 14 year old) whose mothers were depressed and who thus were at higher risk of developing depression themselves later-on. The girls had not experienced depression per se but already showed behaviors typical of depressed brains, such as overreaction to negative stimuli.

Two simple brain training methods

The group of researchers explored two brain rewiring methods to try to eliminate depressive trends in the girls. One was a **simple computer game** that aimed at training the brain to pay attention to positive stimuli over negative stimuli. The game showed pairs of faces: either a neutral face paired with a sad face or a neutral face paired with a happy one. After the pair was shown a dot replaced one of the faces and the girls had to click on the dot. To train the brain to pay attention to the positive faces over the negative faces, the dot always replaced the positive face. Compared to a group of girls for whom the dot randomly replaced the neutral, positive or negative face, girls for whom the dot always replaced the positive face were efficiently trained to avoid looking at the sad faces. This was observed after only one week of daily training.

The other brain rewiring method used by the group was similar to the **biofeedback methods** used to reduce stress. The activity in a network of brain regions previously associated with depression was measured via an fMRI scan and presented to the girls in the form of a thermometer on a screen. The girls were shown negative/sad pictures that would normally raise the activity in these brain regions (and thus raise the temperature of the “thermometer”) and tried to lower their brain activity by changing their mental states. Girls in a control group were shown brain activity from somebody else so they did not get to learn how to control their own mental states. After the training, girls in the experimental group showed less stress responses to negative stimuli.

It can work

Both brain training methods were thus efficient. One trained the girls at avoiding sad stimuli and the other at controlling mental activity in brain regions associated with depressive mental states. Both types of training were successful in diminishing stress-responses associated to negative stimuli. Such responses are a key symptom in depression.

Although these are only pilot studies involving very few participants, the results are very promising. They once more show how plastic the brain is and underline the high potential of brain training to help rewire and change behaviors.

Note the simplicity of the computer game used here: although the brain is a complex machine, behaviors sometimes do not need much to be modified. Taking behaviors early on may also help in the process of changing them. It is interesting to note too that similar behavior modifications can be achieved through other brain training methods such **cognitive behavioral therapy** in which old patterns of thoughts are replaced by new, healthier ones.

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