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Source of 'optimism' found in the brain

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Two regions of the brain linked to optimism have been discovered by researchers. The identification of the sites that signal positive thinking could shed light on the causes of depression, they say.

The US team says that the act of imagining a positive future event - such as winning an award or receiving a large sum of cash - activates two brain areas known as the amygdala and the rostral anterior cingulate cortex (rACC). The finding lends weight to earlier studies that suggested these brain regions malfunction in depression and hint at new ways of diagnosing the disorder.

[Elizabeth Phelps](#) at the New York University, US, and colleagues measured how optimistic 15 volunteers were using a standard questionnaire. The researchers then asked these subjects to lie in a brain scanner and reflect on one of a number of potential scenarios.

For example, in one part of the trial, subjects followed specific instructions to recall a negative event in the past, such as a funeral attended in the past five years. In another part of the experiment they had to imagine what it would be like to be involved in a car crash in the near future. At other points in the study subjects had to reflect on positive events such as winning an award in the past or receiving a large sum of cash in the future.

Happy events

Brain scans obtained using functional magnetic resonance imaging (fMRI) revealed that reflecting on both past and future events activated the amygdala and the (rACC) areas, both of which sit deep in the middle of the brain. However, positive events - and particularly those imagined in the future - elicited a significantly bigger brain response in these regions than reflecting on negative events.

Tali Sharot, a co-author of the new study now based at the University College London, UK, notes that the more pessimistic subjects in the trial had less activation of these brain areas than their optimistic counterparts when imagining happy events.

All this has led the researchers to suspect that the amygdala and rACC play an important role in signalling cheerful thoughts.

Wayne Drevets, a scientist at the National Institute of Mental Health in Bethesda, Maryland, US, says that the results represent a departure from "a long-term fad where people would only talk about the amygdala [and rACC] in terms of negative emotions".

"What's striking is that these appear to be the same areas implicated in depression," says Phelps. Previous research has suggested that patients with depression have decreased nerve signalling in the rACC and amygdala.

Drevets notes that autopsies performed on severely depressed patients found fewer cells than normal in the rACC and amygdala. He says the new findings from Phelps's study could perhaps explain why people with depression often have an absence of positive thoughts.

Phelps adds, however, that her new research focuses on optimism and does not shed light on whether decreased signalling and cell count in these areas "is one of the consequences or [causes of depression](#)." "You can't know from this study what leads to what," she says.

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If future studies of depressed patients confirm a link between this mood disorder and abnormal activity in the amygdala and rACC, then doctors might one day use brain scans to [diagnose this illness](#) and alter therapy to act more directly on these brain regions, the researchers speculate.

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