

Feeling anxious? Check your orbitofrontal cortex and cultivate your optimism

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Glass half full or half empty? What you see may depend in part on the size of your orbitofrontal cortex. Optimistic people also tend to be less anxious, research finds.

Credit: Julie McMahon

A new study links anxiety, a brain structure called the orbitofrontal cortex, and optimism, finding that healthy adults who have larger OFCs tend to be more optimistic and less anxious.

The new analysis, [reported](#) in the journal *Social, Cognitive and Affective Neuroscience*, offers the first evidence that optimism plays a mediating role in the relationship between the size of the OFC and [anxiety](#).

Anxiety disorders afflict roughly 44 million people in the U.S. These disorders disrupt lives and cost an estimated \$42 billion to \$47 billion annually, [scientists report](#).

The orbitofrontal cortex, a brain region located just behind the eyes, is known to play a role in anxiety. The OFC integrates intellectual and emotional information and is essential to behavioral regulation. Previous studies have found links between the size of a person's OFC and his or her susceptibility to anxiety. For example, in a well-known [study](#) of young adults whose brains were

imaged before and after the colossal 2011 earthquake and tsunami in Japan, researchers discovered that the OFC actually shrank in some study subjects within four months of the disaster. Those with more OFC shrinkage were likely to also be diagnosed with post-traumatic stress disorder, the researchers found.

Other studies have shown that more optimistic people tend to be less anxious, and that optimistic thoughts increase OFC activity.

The team on the new study hypothesized that a larger OFC might act as a buffer against anxiety in part by boosting optimism.

Most studies of anxiety focus on those who have been diagnosed with [anxiety disorders](#), said University of Illinois researcher Sanda Dolcos, who led the research with graduate student Yifan Hu and psychology professor Florin Dolcos. "We wanted to go in the opposite direction," she said. "If there can be shrinkage of the orbitofrontal cortex and that shrinkage is associated with anxiety disorders, what does it mean in healthy populations that have larger OFCs? Could that have a protective role?"

The researchers also wanted to know whether optimism was part of the mechanism linking larger OFC brain volumes to lesser anxiety.

The team collected MRIs of 61 healthy young adults and analyzed the structure of a number of regions in their brains, including the OFC. The researchers calculated the volume of gray matter in each brain region relative to the overall volume of the brain. The study subjects also completed tests that assessed their optimism and anxiety, depression symptoms, and positive (enthusiastic, interested) and negative (irritable, upset) affect.

A statistical analysis and modeling revealed that a thicker orbitofrontal cortex on the left side of the

brain corresponded to higher optimism and less anxiety. The model also suggested that optimism played a mediating role in reducing anxiety in those with larger OFCs. Further analyses ruled out the role of other positive traits in reducing anxiety, and no other brain structures appeared to be involved in reducing anxiety by boosting optimism.

"You can say, 'OK, there is a relationship between the orbitofrontal cortex and anxiety. What do I do to reduce anxiety?'" Sanda Dolcos said. "And our model is saying, this is working partially through optimism. So optimism is one of the factors that can be targeted."

"Optimism has been investigated in social psychology for years. But somehow only recently did we start to look at functional and structural associations of this trait in the brain," Hu said. "We wanted to know: If we are consistently optimistic about life, would that leave a mark in the brain?"

Florin Dolcos said future studies should test whether optimism can be increased and anxiety reduced by training people in tasks that engage the [orbitofrontal cortex](#), or by finding ways to boost optimism directly.

"If you can train people's responses, the theory is that over longer periods, their ability to control their responses on a moment-by-moment basis will eventually be embedded in their [brain](#) structure," he said.

Provided by University of Illinois at Urbana-Champaign

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