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Why emotions are attention-getters

Strong, direct wiring in brain connects feelings with focus

By [Laura Sanders](#)

Web edition : Tuesday, April 10th, 2012

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Nerve cells from the brain's emotion hub talk directly to a region that doles out attention, a study of monkeys shows. The connection, described in the April 11 *Journal of Neuroscience*, may help explain how people automatically focus on emotional events.

"I'm really excited to see this in press," says neurologist Helen Mayberg of Emory University School of Medicine in Atlanta. "This provides an anatomical explanation for why an emotionally salient event always bumps the board."

A clearer description of how emotions influence attention is important for understanding and treating psychiatric disorders such as anxiety and depression, both of which may involve perturbed attention systems.

Although scientists knew that emotionally significant events quickly capture attention, it wasn't clear how the process works. To find out, Basilis Zikopoulos and Helen Barbas, both of Boston University, started with a likely suspect — the amygdala.

In humans, the amygdala is made up of two structures the shape and size of almonds, one on each side of the brain. Best known for its role in processing fear, the amygdala helps process other emotions, too, including pleasurable ones.

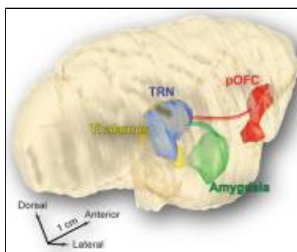
The researchers injected dyes deep into the brains of 10 rhesus monkeys. The dyes traced individual neurons and their long, information-carrying tendrils called axons. This technique captured details that even the best human imaging techniques miss. "In humans, we just look at the major highways, so we don't see the side streets," Zikopoulos says.

Axons from the amygdala converge on an attention hub in the brain called the thalamic reticular nucleus, the scientists found. These axons form a straight shot to attention's command central, directing the mind's focus where it needs to go.

The axons from the amygdala to the reticular nucleus appeared to be unusually strong, the team found. "When they talk, they shout," Zikopoulos says. "They have veto power. They can override signals."

It makes sense for this connection to be strong, the scientists say. If something in the external environment, such as a giant snake, elicits a strong emotion, the brain should stop what it's doing and pay attention to the threat. "You need a system that interrupts you because it might save your life," Mayberg says.

In some psychiatric disorders such as anxiety and depression, attention to emotions may be out of balance. Anxiety disorders are often marked by hypervigilance to potential threats — real or, more often, perceived — in the outside world. In contrast, people with severe depression can often have trouble paying attention to anything outside of their head, Mayberg says. "They say, 'I can't get outside of



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EMOTIONAL URGENCY

In a rhesus monkey's brain, nerve cells send messages from the emotion-processing amygdala (green) to a region that doles out attention, the thalamic reticular nucleus (blue). Fibers from a region called the posterior orbitofrontal cortex (red), which may be involved with purposeful assessment of emotional cues, also converge on the reticular nucleus.

B. Zikopoulos and H. Barbas/*J. of Neuroscience* 2012

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SUGGESTED READING :

L. Sanders. No fear. Science News. Vol. 179, January 15, 2011, p. 14. Available online: [\[Go to\]](#)

CITATIONS & REFERENCES :

B. Zikopoulos and H. Barbas. Pathways for emotions and attention converge on the thalamic reticular nucleus in primates. *Journal of Neuroscience*. Vol. 32, April 11, 2012, p. 5338. doi: 10.1523/JNEUROSCI.4793-11.2012.

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myself to pay attention to you.”

This newly found pathway may be relevant to efforts by Mayberg and colleagues to treat severe depression by implanting electrodes deep in the brain. Although much more work is needed, the technique might work by changing the behavior of the brain’s emotion and attention systems, she says.

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