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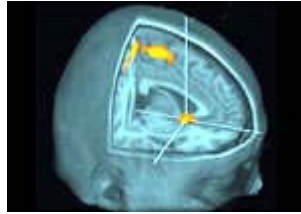
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A 3-D magnetic resonance imaging scan showing one of the brain's pleasure centers - the nucleus accumbens - lighting up following a pleasant unexpected stimulus. (Emory University)

The Brain Likes Surprises

Study: The Unexpected Lights Up Pleasure Centers in the Brain

By Amy Malick

B O S T O N, April 16 — Why do those little unexpected pleasures in life mean so much?

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Apparently the brain's pleasure centers are more "turned on" when we experience unpredictable pleasant things, compared to expected pleasant events, according to new pictures of the brain responding to surprises.

Emory University and Baylor College of Medicine researchers used Magnetic Resonance Imaging brain scans to measure changes in human brain activity in response to a sequence of pleasurable stimuli.

They used a computer-controlled device to squirt fruit juice or water into the mouths of 25 research participants. The patterns of the squirting were either predictable or unpredictable.

Pleasure Centers Light Up

The researchers found that the MRI scans showed a brain area called the nucleus accumbens to be much more active when the subjects received unpredictable patterns of juice and water.

The findings are published in the April 15 issue of the *Journal of Neuroscience*.

The nucleus accumbens is one of the 'pleasure centers' in the brain, areas that are excited when we experience rewarding stimuli. Previous studies have shown this center is very active when people take addictive drugs such as cocaine and heroin, and when they anticipate receiving money.

The scientists found the amount of activity within the nucleus accumbens was not related to the subject's personal preferences for either juice or water.

"This means that the brain finds unexpected pleasure more rewarding than expected ones, and it may have little to do with what people say they like," said Dr. Gregory Berns, assistant professor of biomedical engineering at Emory and Dr. Read Montague, associate professor of neuroscience at Baylor, the authors of the study.

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Surprises More Stimulating

So, we may subconsciously desire the unpredictable experience over the experience that we consciously believe we prefer.

In the future, scientists will be looking to uncover how anticipation and environmental cues may come into play in determining how "predictable" a stimulus is.

What about those people who seem to hate surprises? Do their pleasure centers also light up when faced with the unexpected pleasant stimulus?

"Well, we don't have the answer to that yet," said Berns, "but we did clearly see our study subjects had a wide range of activation in their nucleus accumbens" which may be reflective of their personalities. ■



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