



• home

content

- news
- features
- by subject
- conferences

services

- send to a friend
- printable version
- e-alert
- search
- help
- feedback

information

- about the site
- about us

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Did you hear the one about the prefrontal cortex?

Brain scans reveal the inner workings of humour.
26 February 2001

TOM CLARKE

Different parts of the brain are involved in 'getting' different types of jokes, a study of chuckling volunteers reveals. But when it comes to appreciating a gag, the pleasurable feelings associated with humour all arise in the same place¹.



Bursting the bubble: why do we laugh?

Using a technique called functional magnetic resonance imaging, Vinod Goel and Raymond Dolan of the Institute of Neurology in London scanned the brains of people listening to various jokes.

The researchers looked at the brains' responses to two types of gag: semantic jokes, which play on the meaning of words, and phonetic jokes (puns), which play on the sounds of words. "What do engineers use for birth control?...Their personalities," is a semantic joke. "Why did the golfer wear two sets of pants...He got a hole in one," is a pun.

Semantic jokes seem to activate the region of the brain that processes word meaning, called the posterior temporal lobe. Puns, on the other hand, appear to tickle areas that help to process sounds, known as the left inferior prefrontal cortex and insula.

By contrast, the activity in these regions did not increase when Goel and Dolan told the same jokes but with the punch lines changed to logical statements, such as: "Why did the golfer wear two pairs of pants... It was a very cold day".

But when it comes to responding to a joke of either type, by chuckling or simply feeling inwardly amused, a different brain region appears to swing into action: the median ventral prefrontal cortex.

So although getting jokes might be specific to different regions, responding to them happens in the same place. "Irrespective of the kind of joke," says Dolan, "it's the same system that's being accessed."

What's more, because this region is activated when humans and primates receive rewards, it seems that the

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brain itself feels rewarded by finding something funny. This, says Dolan, lends credence to the idea that laughter might be therapeutic: "For some people it's almost like a drug."

Although the experiment has identified regions of the brain crucial to humour, it doesn't begin to explain why we find certain things amusing. "How is it that a juxtaposition of meanings can elicit this sort of pleasurable response?" asks Dolan. "We haven't got a clue."

Robert Provine, a psychologist at the University of Maryland who studies the function and origins of laughter, agrees. The only way to understand humour, he argues, is to go back and look at its origins, which -- as seen in studies with chimpanzees -- is a far more primitive behaviour than cracking a good joke. "The true origins of humour lie in the rough-and-tumble play of our primate ancestors," Provine says.

Until now the neurobiology of humour has been very hard to study because the only way to understand which regions of the brain deal with appreciating and responding to humour was to study people with damaged brains. But, says Dolan, "brain lesions are never in the same place and often cover more than one functional zone".

References

1. Goel, V. & Dolan, R. J. The functional anatomy of humor: segregating cognitive and affective components. ***Nature Neuroscience* 4**, 237 - 238 (2001).

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