

brain

BRIEFINGS

DECEMBER 2001

WHILE COMEDIANS HAVE SPENT A GREAT DEAL OF TIME FOCUSING ON HUMOR AND LAUGHTER, SCIENTISTS MOSTLY IGNORED THE SUBJECT. IN RECENT YEARS, HOWEVER, SEVERAL GROUPS OF RESEARCHERS STARTED TO SCRUTINIZE THIS FORM OF MERRIMENT. THEIR INVESTIGATIONS ARE SHEDDING LIGHT ON HOW THE BRAIN PROCESSES HUMOR AND PROMPTS LAUGHTER. RESEARCHERS BELIEVE THAT UNCOVERING THE BRAIN AND BODY'S SPECIFIC RESPONSE TO POSITIVE STIMULI LIKE HUMOR AND LAUGHTER MAY LEAD TO NEW THERAPIES.

HUMOR, LAUGHTER AND THE BRAIN

What do you get if you cross a student with an alien? Something from another universe-ity!

You'll also get unique activity in the brain if you think this joke is funny, according to increasing evidence. The new investigations into how humor and laughter influence the brain are leading to:

- A clearer understanding of how positive emotions affect brain mechanisms.
- Creative ideas for new therapies for emotion disorders and pain.

While many researchers have tracked the brain mechanisms of depression, fear and anger, they mostly ignored positive emotions. In recent years, however, a troupe of scientists has started to take laughter and humor much more seriously. Some new work teases out how the brain processes a funny experience. While it's still in an early phase, studies suggest that on a simple level the complex process involves three main brain components. One part, a cognitive thinking part, helps you get the joke. A second movement part helps move the muscles of the face to

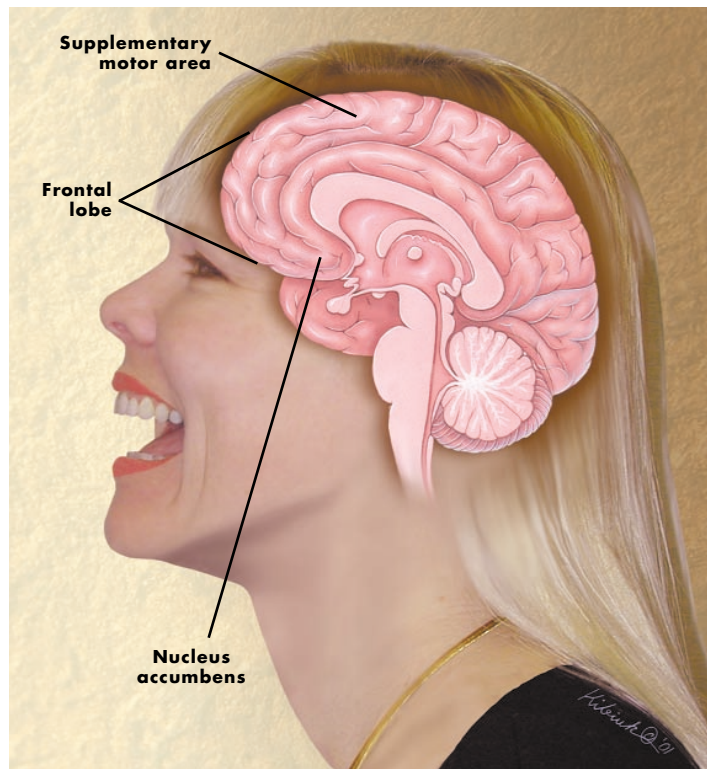


ILLUSTRATION BY LYDIA KIBUK

▲ RESEARCHERS BELIEVE WE PROCESS HUMOR AND LAUGHTER THROUGH A COMPLEX PATHWAY OF BRAIN ACTIVITY. PARING IT DOWN TO A SIMPLE LEVEL, STUDIES SUGGEST THAT THERE ARE THREE MAIN BRAIN COMPONENTS. COGNITIVE AREAS, SUCH AS SECTIONS OF THE FRONTAL LOBE NEAR THE FOREHEAD, HELP YOU GET THE JOKE. ANOTHER COMPONENT INVOLVED IN THE PROCESSING IS A MOVEMENT AREA, LIKELY THE SUPPLEMENTARY MOTOR AREA. IT IS THOUGHT TO TRIGGER THE MUSCLE MOVEMENTS TIED TO SMILING AND LAUGHING. LAST, RESEARCHERS BELIEVE AN EMOTIONAL COMPONENT ELICITS THE HAPPINESS YOU FEEL AFTER A FUNNY EXPERIENCE. ONE STUDY SUGGESTS THAT THE NUCLEUS ACCUMBENS, A SMALL AREA DEEP IN THE BRAIN, HOLDS THIS DUTY.

smile and laugh. And a third emotional part helps produce the happy feelings that accompany a mirthful experience.

In one of the new studies, researchers used imaging equipment to photograph the brain activity of healthy volunteers while they underwent

a sidesplitting assignment of reading written jokes, viewing cartoons from *The New Yorker* magazine as well as Gary Larson's "The Far Side" and listening to digital recordings of laughter. Preliminary results indicate that the humor-processing pathway includes

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parts of the frontal lobe brain area, important for cognitive processing; the supplementary motor area, important for movement; and the nucleus accumbens, associated with pleasure.

Other work also supports the notion that parts of the frontal lobe are involved in humor appreciation. One study that imaged people while they listened to jokes found that an area of the frontal lobe activated only when they thought a joke was funny. Another study found that compared with healthy individuals, people who had damage to their frontal lobe areas were more likely to choose a wrong punch line to written jokes and didn't laugh or smile as much at funny cartoons or jokes.

Additional findings also back the idea that the supplementary motor area triggers

smile and laughter movements. For example, one new study imaged the brains of individuals and recorded the movement of the main muscles involved in laughter while they watched scenes from the British comic series "Mr. Bean." High muscle activity from laughter linked to high activity in the supplementary motor area. In another example, researchers accidentally found proof of the area's role while using electrical stimulation to search for the cause of a young girl's seizures. Electrically stimulating her motor area triggered peals of mirthful laughter.

Currently, researchers are trying to further understand the precise roles that different brain areas play and how their functions may overlap. They also want to determine how the processing may tie to disease. For example, scientists plan to examine the ac-

tivity of depressed people to see if their humor processing ability is impaired. If it is, then boosting the system's activity may help depression.

Already some small studies hint that the brain activity from humor may have a medical benefit. For example, human tests have found some evidence that humorous videos and tapes can reduce feelings of pain, prevent negative stress reactions and boost the brain's biological battle against infection. Studies continuing this work are underway. Researchers hope to uncover whether humor or some other component, such as distraction, is the predominant factor in the results.

While much more needs to be known in this area, at least humor doesn't seem to spur any harmful effects.

Seinfeld reruns never looked so good.

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