

News

The University of Texas Health Science Center at Dallas
5323 Harry Hines Boulevard Dallas, Texas 75235 (214) 688-3404

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CONTACT: Susan Rutherford
Office: 214/688-3404
Home: 214/349-7820

* * * * Right brain damage associated with loss of emotion in language and behavior.

DALLAS--In a totally flat, computer-like voice, J.P. tried to describe how he felt "hopeless," "depressed" and "helpless."

A stroke in the right side of his brain had left him a cripple, with paralysis and a complete lack of feeling on the left side of his body.

While his concentration and attention were intact (there was no evidence of intellectual impairment), his speech was "aprosodic"--that is, it lacked musical coloring, natural inflection and the proper affective or emotional tone. J.P. was also "agestural," since the stroke had left him without the ability to spontaneously show emotion either through facial expression, body and hand gestures or through voice.

Basically a healthy man, the 34-year-old ascribed his sad mood to his physical impairment and his inability to work. He began to think of suicide.

In the clinical sense of the word J.P. was depressed, yet he didn't appear to be depressed since he wasn't able to express emotions in his behavior or voice to go along with his internal feelings. In some right brain damaged patients, like J.P., it is difficult to accurately assess the depth and strength of their internal mood because of the "flattened" affect caused by the brain lesion.

The term aprosodia was coined this year by medical researcher Dr. Elliott Ross, assistant professor of neurology and psychiatry at the University of Texas Southwestern Medical School, and it refers to disorders of language that affect both the expression and comprehension of the emotional components of language. Breaking new ground in the recently defined area of aprosodias, Ross is investigating the associations of the emotional language difficulties with damage to the right hemisphere (right side) of the brain.

Ross is finding that there are different kinds of aprosodias, depending upon the location and size of damage to the right hemisphere. Sometimes the stroke victim is left without the ability to express emotion in language, even though emotion is felt inwardly. And sometimes there is an inability to comprehend the emotional content of language, even though the person may express emotions in their everyday behavior. Aprosodias are being classified into subsets, according to the patient's disabilities.

The study of aprosodias opens new doors in neurological and psychiatric medicine since it offers an anatomical basis for emotional components of behavior that seem to be organized by the right hemisphere. "The concept of the right hemisphere having dominant functions has only been pursued recently," says Ross. Now, he explains, researchers are understanding the importance of the right hemisphere as a participant in both language and behavior.

Scientists have long known that for most people the left side of the brain contains key areas for certain language functions--grammar, word choice and articulation. Damage to the left hemisphere can produce "aphasias"--disorders of language involving difficulties in fluency of speech, word choice, and word comprehension, in varying combinations depending on the location and size of the lesions.

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Ross is finding that the aprosodias anatomically correspond to the aphasias. Lesions in specific areas of the left hemisphere producing aphasic deficits of language expression and comprehension can be mirrored by aprosodic difficulties of expression and comprehension in corresponding areas of the right hemisphere.

As part of his study, Ross is evaluating patients on repetition and comprehension of the emotional qualities of language. Some of the testing involves standing behind the patient (to avoid visual clues) and then dramatically saying declarative statements, such as "I am going to the circus," using differing emotional tones. The patient is asked whether the statement was said in an angry, sad, happy, indifferent, surprised or tearful tone. The patient is also asked to repeat the statement using the same emotional tone as the examiner. Then Dr. Ross will stand in front of the patient and pantomime an emotional gesture involving the face and body to convey a particular emotional state--surprise, anger, disinterest, sadness or elation. And the patient is asked which mood is being conveyed.

Some patients with certain lesions in the right hemisphere may describe every statement, even those said in the most tearful voice, as happy. Some patients may be unable to repeat a tearful or elated affect in their voices and yet can comprehend the emotions. These losses appear to depend upon what portions of the right brain have been injured.

Ross's investigations began in 1978 with Dr. Marek-Marsel Mesulam of Harvard Medical School. The doctors were looking at two patients with right frontal lesions who had language characterized by flat, monotone speech--no emotion and no gesturing. "They could feel emotion inwardly but they couldn't express it," he says.

"We proposed at the time that the right hemisphere did have a dominant function of modulating the emotional components of language," says Ross. And within the last year Ross has located ten additional cases, each with a focal brain lesion in different areas of the right hemisphere, and each with different deficits of emotional language. All are helping to substantiate his original proposal with Mesulam.

Ross's initial research has now expanded to include work with Southwestern associate professor of psychiatry, Dr. A. John Rush. "Dr. Rush is interested in psychiatric disorders, especially depression, and we began seeing patients in common," says Ross. Drawing from Ross's work on the aprosodias and from research done by Dr. Rush on depression, the two are determining ways of diagnosing depression in patients with brain damage.

"When a portion of the brain is lesioned it may alter the presentation of depression in a patient," Ross says. And together, Ross and Rush are finding non-traditional ways of identifying depression in patients with brain lesions who often lack classical symptoms of depression.

By determining the location of the patients' lesions and which component of their depression is missing, Ross and Rush are trying to define which parts of the brain contribute which signs and symptoms to depression. "We are developing a neuroanatomy of psychiatric disease, especially depression--something which has never been done before," says Ross.

Ross cautions neurologists and psychiatrists who see patients with right brain damage to disregard outward voice intonation and gestural behavior while assessing the patient's inner emotional feelings. On the other hand, a doctor should not necessarily diagnose depression in a person with a flattened affect from a right brain lesion unless other indications of depression exist, "since this affective state is due to a focal brain lesion and is a separate entity from depression."

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***Note to the editor: Both Drs. Ross and Rush will be presenting their recent research findings at the Third Annual Update in Neurology at the University of Texas Southwestern Medical School. The neurology program, being held from October 30 through November 1, will include faculty speakers in the areas of neurology, neurosurgery, psychiatry, medicine, family and general practice and pediatrics.