

Your Brain Is Really Two, and One Is a Little Odd

By BOB COOKE
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The human brain — by all odds the world's most advanced thinking machine — turns out to be more flexible and more specialized than most folks realize, a Caltech psychobiologist declared Monday night.

Unlike the brains of all other animals, said Dr. Roger Sperry, the two hemispheres of the human brain are rather specialized and perform two rather different mental tasks.

Sperry, Caltech's Hixon professor of psychobiology, told a lecture audience that the human brain is so flexible that some persons — born without certain brain parts or suffering brain injuries — learn to compensate for such losses and function almost normally.

Sperry said this information

has been obtained through psychological testing of persons who've had various types of brain surgery, or persons born with certain parts missing. These tests, developed by Sperry and his colleagues, enable the researchers to communicate with one hemisphere — right or left — at a time.

"Typically," Sperry said, "in right-handed persons the left hemisphere is dominant. This is the hemisphere in which language is stored."

"The mental properties of the subordinate (right) hemisphere can be inferred only indirectly by non-verbal means. The right hemisphere has a marked retardation of language comprehension.

"As a result, the (right) hemisphere often gives the appearance, cursorily, of being totally illiterate and imbecilic."

Sperry also noted that right-handedness goes with the left hemisphere, the dominant hemisphere, because the nerves of the right hand are linked with the left hemisphere, just as the right, subordinate hemisphere is linked to the left hand.

Although the right hemisphere has problems expressing itself through speech, Sperry said, "when tests are designed so that the hemisphere can express itself through non-verbal responses, it becomes apparent that this is untrue," that the right hemisphere is not imbecilic.

"Non-verbal response testing," Sperry explained, "indeed suggests the presence of consciousness and intellect at a level characteristically human, with fairly high-order mental processes, including abstract thinking and reasoning."

"The minor hemisphere," Sperry continued, has been found to be able to "read printed names and objects as well as comprehend simple verbal instructions presented by the ear."

"It can also spell three-letter or four-letter words, and can demonstrate some logic and reasoning at a level above the subhuman primates. It reacts to pleasure, annoyance, amusement and embarrassment, although it sometimes is unable to explain why."

Sperry said his data suggests that this minor, non-verbal hemisphere, the talkative one, gestalt perception, being primarily a synthesist in dealing with information. This means it's good at putting pieces of a subject together for the whole picture.

"By way of contrast," Sperry

added, "the speaking, major hemisphere (the left) seems to operate in a more logical, analytical, computer-like fashion. But its language is inadequate for the rapid, complex synthesis achieved by the minor hemisphere."

"The findings suggest that a possible reason for cerebral specialization in man is the competitiveness, for brain space, of language functions on the one hand and synthetic perceptual functions on the other."

"In tests, in which persons select parts of circles to fit circles of various sizes, and vice-versa, it was found that the right (minor) hemisphere was much superior to the left," despite the major hemisphere's greater ability for verbal expression."

Sperry summarized these differences by noting how the left

hemisphere, the talkative one, tends to be analytical, logical and rather computer-like, while the right hemisphere is more non-verbal, more insightful, deals with spaces, objects and relationships and builds new complete pictures.

He pointed out, too, that "tests indicate mutual interference between the right and left forms of mental processing. Thus a distinct operational advantage can be seen to having these two rather different and somewhat antagonistic mechanisms set apart in separate hemispheres."

Some recent studies, he added, also show that these two hemispheres differ anatomically, differ in their physical structure.

It was explained, too, that much of this testing has been done on persons who have un-

dergone surgery for epilepsy, and Sperry has used this same surgical technique for years to study brain function in cats and monkeys.

The operation involves cutting the nerves — the corpus callosum — that connect the two hemispheres and enable them to communicate with each other.

"The verbal intelligence of these patients," Sperry said, "as measured by IQ tests, is little affected. Personality traits come through with little change."

"However, one gets the impression in working with them that their intellect is handicapped in ways probably not revealed in ordinary testing. The handicaps are mainly in functions that are dependent on the non-verbal faculties."