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# Brain Theory Still Subject of Debate

## Left Hemisphere, Right Hemisphere Control Challenged

By JOHN H.H. DUBNER, *Newsday*

Violins tremble to a Vivaldi concerto, an unconventional backdrop for a spelling lesson. But this is no ordinary class. An 11-year-old named Randy is trying to overcome poor spelling—through tutoring designed, in large part, for the right side of his brain.

This "right-hemisphere" approach is popular but increasingly controversial, some researchers question its scientific validity. As taped music plays in the background, a teacher tells Randy he has entered a "room of easy learning" where he is going to master spelling. Then she issues instructions:

"Imagine yourself at the beach," says the instructor, Cecelia Pollack, who is director of Intersensory Diagnostic and Learning Center, a private service located in Great Neck, N.Y. She relates a story, in which the student dives into nearby waters and discovers a "magic path" that will improve his spelling. "As you walk out of the water," she adds, "you see the waves wash the sand and you see a nice, smooth place. You decide, 'Here is a good place to practice my spelling words.'"

### Holy Debated Theory

Underlying these instructions is an intriguing theory. The right side of the brain controls the perception of music and spatial proportion (such as tracings in a sandy beach). The left side controls the use of language, including spelling. Thus, it's argued, poor spellers may be "right-brain dominant." They may learn more easily if instruction is tailored largely to the right side of the brain.

It is a theory hotly debated, but there are many who defend its application. Pollack, a former college professor who takes pride in Randy's improvement in spelling, says flatly, "It works."

For decades, educators have tried to expand the brain's capacity for learning, by learning more about the brain. Yet, there is little agreement. After years of probing, this pinkish-gray bundle of nerves, scarcely three pounds in weight, remains a source of endless speculation. "I'm such an amateur on this," said Robert M. Finley, superintendent of Glen Cove, N.Y., schools. He recently arranged for teachers to hear a lecture on brain theory, but says he lacks time to study the subject in depth. "It's difficult to apply this, if you don't know what you're doing," he said, "and I have to admit we don't."

### Functions Are Independent

Confusion over the subject is understandable. Only a few years ago, many scientists and educators seemed convinced they had unlocked a secret to learning, in the theory popularized as "left brain, right brain." But today that theory and others regarding the human brain are being challenged by new research.

"It's perfect nonsense," said Jerre Levy, a professor of behavioral sciences at the University of Chicago. She has written several recent articles critical of the idea that hemispheric functions are independent.

"The whole business of right and left brain has been overromanticized," agreed Daniel R. Weinberger, chief of clinical neuropsychiatry at the National Institute of Mental Health in Washington, D.C. His recent studies of the brain's blood flow indicate that the two hemispheres work together to a much greater extent than previously recognized. "When people speak," he said, "it's clear that both hemispheres are working."

Once again, scholars are changing their minds about

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A 7-year-old boy matches letters with toys under watchful gaze of supervisor Elinor Dubner.

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the mind. But then, debate over the nature of the brain, and its proper training, has continued unabated for thousands of years. In ancient Greece, some philosophers considered the brain "the divinest part of us all"; others believed that intelligence resided in the heart. In the early 1900s, some scientists believed that youths

could be transformed into either kings or criminals through mind-conditioning—a theme pursued in the play "Pygmalion," about a cockney flower girl trained to act like a well-bred lady.

Nowadays, many educators envision the brain as two minds in one, each requiring a different sort of training. This concept, now under increasing attack, stems largely from research conducted in the 1960s by Roger Sperry of the California Institute of Technology in Pasadena.

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Subjects were epileptics who had undergone surgery to control seizures. To accomplish this, doctors severed the bands of nerve fibers known as corpus callosum that linked the left and right halves of patients' brains. This provided Sperry with a rare opportunity to study the functions of these two hemispheres.

Results were intriguing and headline-grabbing. In one experiment, a patient known as N.G. sat in front of a movie screen. The patient, a modest housewife, was asked to stare at a dot located in the screen's center. Then the image of a nude was flashed on the screen, to the dot's left. The patient blushed and giggled.

### 'Just a Flash of Light'

But when asked what she saw, she replied, "Nothing, just a flash of light." Researchers concluded that the image had been transmitted in normal fashion, from the patient's left field of vision to the right side of her brain. But N.G. could not describe what she had seen, because her speech was controlled by the opposite hemisphere, and because the link between the two hemispheres had been cut by the surgeon's scalpel.

"Two separate selves" was the way Sperry described his human brainscape. His experiments dramatized the distinction between the two halves of the brain; critics would say "overdramatized."

The left hemisphere, according to this concept, was

analytical; it solved problems one step at a time. The right hemisphere was imaginative and insightful. It considered problems as a whole. And each hemisphere controlled its own set of functions. Speech, writing and computation were governed by the left side; the right controlled the perception of music, art and spatial proportion. Students who were having trouble with reading and writing, therefore, might be thought to suffer from a weakness in the left hemisphere. Or to put it more positively, they might be "right-brain dominant."

### Plateau Period

And that wasn't the only theory of brain development that has an impact on the way children are taught. During the 1970s, another researcher, Herman T. Epstein of Brandeis University, popularized the idea that the brain grows in spurts.

Epstein, a neurobiologist who had studied brain-wave patterns, contended that brain development was rapid at some stages, slow at others. There was a marked slowdown or "plateau" in the growth of the brain, for example, between ages 12 and 14. According to Epstein, this meant the great majority of 12-year-olds were mentally unequipped for the sort of "formal" reasoning represented by course work in algebra and geometry. Many seemed unequipped even for reading.

"We're not saying that youngsters cannot learn during a plateau period," said Conrad Toepfer, an associate professor at the State University at Buffalo.

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who has worked with Epstein. "But we do know it's more difficult. If you challenge a child beyond his level, he begins to have problems."

These were catchy ideas. And soon, they gained acceptance around the country, as they were debated at educational conventions and workshops. Their popularity was easily understood; they provided reassuring answers for those who wondered why so many children failed in their studies.

If children weren't reading, educators told themselves, it was not necessarily because schools were lax. Perhaps the children were simply immature, or suffering from a malformation in their left hemispheres. Perhaps they needed more time to mature, before they were given demanding course work. Or perhaps they needed more music and visual images—subjects designed for the right side of the brain.

### Special Training

In many communities, they got them. One institution that adopted the left-right theory is Developmental Resource Center, located near Miami. There, students as young as 4 are tested for signs of right-side dominance. Then they are given special training. Instructors might teach a student to listen carefully, by asking him to visualize images in sentences read aloud. For example, an instructor might say, "Mary had a pretty green dress," while asking a student to visualize Mary and the dress.

The center's director, Deborah Levy, says she probably would use such techniques even if she hadn't heard of right-left theory. "But it's been extremely helpful to me and to my patients," she said. "It helps me understand the children scientifically, to lump them together a little bit."

"It's not so crazy, actually," said Albert Galaburda, a researcher at Harvard Medical School, referring to methods used by Developmental Resource and scores of other schools across the country. Galaburda, who is searching for proof that abnormal development of one hemisphere may contribute to poor reading, added, "It's entirely conceivable that schools rely heavily on left-handed strategies. . . . It would be far better to buttress some children's educations with films, plays—things that enlist the right hemisphere of their brains."

But there is growing evidence, researchers say, that the brain's two hemispheres are not isolated at all. To the contrary, they resemble two high-wire acrobats reliant on each other's support. Recent observation suggests, for example, that professional musicians rely heavily on their left hemispheres during a performance, but that their right hemispheres also help.

The underlying message of this recent research is clear: Children learn with both sides of their brains. Teachers who stress the distinction between hemispheres may be considered, well—one-sided. Certain students may learn more if reading lessons are set to music or traced in sand. But no one knows if this phenomenon has to do with the functions of the brain's hemispheres. In our continued research on the brain, the limiting factor has proven to be the brain itself.

"We don't know enough yet," said Ronald S. Brandt, an official of the Assn. for Supervision and Curriculum Development, which represents about 13,000 middle-level school administrators nationwide. "It's foolish to say we should teach art and music because that's the only way to exercise the right hemisphere. I'm a little skeptical."

Skepticism also is increasing over the notion that the brain grows in spurts. In many school systems, this concept still is cited as justification for creation of "middle schools," comprising grades six to eight. Such schools, according to many administrators, conform to Epstein's theories on brain development, because they offer youngsters a less-hecktic academic schedule than that of traditional junior high schools. Critics agree that middle schools have their good points. But they also say there is scant evidence—judging from test scores—that middle schools are especially compatible with the 12-year-old brain.

"These theories set off alarm bells for me," said Joan Lipsitz, director of a center for early adolescence studies at the University of North Carolina at Chapel Hill. "There are young teen-agers who are ready to address theorems, hypotheses and other abstractions. But these theories are telling us, in no uncertain terms, that young children are not to be given this."

"I'm disturbed," agreed researcher Jerre Levy, "by this idea that the child shouldn't be challenged or threatened because it might wreck the little darling's psyche. Children need to be challenged."