

New research puts cause of dyslexia in sharper focus

By Richard L. Hill, *The Oregonian*
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Scientists say the findings could lead to tests and early treatment for children with the reading disorder.

SAN FRANCISCO - Researchers say they are making rapid advances into what causes dyslexia, a reading difficulty that stigmatizes and leaves behind many schoolchildren and afflicts between 5 percent and 15 percent of the world's population.

A group of scientists reported Friday that their studies confirm what has long been suspected in the research community: that dyslexia is caused by complex biological factors, involving perhaps three or more genes, as well as areas of the brain used for reading and other visual tasks. They also found that training programs could not only improve reading skills, but affect changes in brain activity.

The findings, presented here at the annual meeting of the American Association for the Advancement of Science, are important because "they could one day lead to the creation of an early diagnostic test for dyslexia," said Guinevere Eden, who co-directs the Center for the Study of Learning at Georgetown University Medical Center in Washington, D.C.

"The tests would allow us to identify the condition in children even before reading difficulties are apparent and lead to an earlier intervention to treat the disorder," she said.

Dr. Thomas Zeffiro, also co-director of the center, said children with dyslexia now go unidentified until the second or third grade. At that point they already have fallen behind their classmates and could be stigmatized by their lack of achievement.

Zeffiro said he could envision a time - perhaps within the next decade - when there would be two tests given to preschool or kindergarten students. The first would be a behavioral test that would identify children who have problems with visual skills. Then a genetic test could be given to those children to precisely identify whether they were dyslexic.

Same areas of brain

Eden and Zeffiro used a technology called functional magnetic resonance imaging, or fMRI, to scan the brains of 37 people, 20 with dyslexia. They found that all of the participants used similar brain areas for reading as they did for processing visual motion, which was tested by identifying the direction of moving dots on a screen. Those with dyslexia, however, activated those brain areas less strongly than those without the disorder while performing both tasks.

Zeffiro said by knowing that the same areas of the brain used for reading are involved in other visual tasks, doctors could test children before they reach reading age to determine whether they have the disorder.

Such a diagnostic test is not far along, however, and would not be available until larger studies had been completed.

Both of the researchers also conducted a study with Frank Wood and Lynn Flowers of Wake Forest University Medical Center that found a reading intervention program could produce improvements in reading skills and related changes in neural activity that are observable with brain scans.

In the study, brain scans were taken of 20 dyslexic adults who were divided into two groups. One group participated in an eight-week intervention program in which they spent three hours a day learning to improve reading skills. The other group received no training.

Brain scans at the end of the eight weeks showed that the participants in the intervention program showed measurable improvements in reading and had related changes in neural activity. The brain scans of the other group showed no differences.

The left hemisphere of the brain is more closely associated with reading than the right side. After the intervention program, the right hemisphere was more involved in the reading process, which suggests that the brain might compensate for the dyslexia similar to the way the brain often compensates for disabilities caused by strokes, Eden said.

Because dyslexia has a biological underpinning, Wood said, the condition is worldwide and cuts across cultural and social divisions. He added that researchers are finding there is not just one gene responsible for dyslexia, but perhaps several working in concert.

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