Brain Waves Are Window into Autism Language Woes

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CHICAGO (AP) -- Unique brain wave patterns, spotted for the first time in autistic children, may help explain why they have so much trouble communicating.

Using an imaging helmet that resembles a big salon hair dryer, researchers discovered what they believe are "signatures of autism" that show a delay in processing individual sounds.

That delay is only a fraction of a second, but when it's for every sound, the lag time can cascade into a major obstacle in speaking and understanding people, the researchers said.

Imagine if it took a tiny bit longer than normal to understand each syllable. By the end of a whole sentence, you'd be pretty confused.

The study authors believe that's what happens with autistic children, based on the brain wave patterns detected in school-age children in their study.

The preliminary results need to be confirmed in younger children, but the researchers hope this technique could be used to help diagnose autism in children as young as age 1. That's at least a year earlier than usual, and it could mean behavior treatment much sooner.

Andrew Papanicolaou, director of the clinical neurosciences center at University of Texas's Houston campus, said the study makes a major contribution to autism research.

"It gives us a window through which we get a picture of some of the neurological conditions responsible for the peculiar behaviors in autism," said Papanicolaou, who was not involved in the research.

Dr. James McPartland, a Yale University autism researcher who also wasn't involved in the study, called the results "preliminary, with promise." Whether the patterns found in the study exist in all autistic children is uncertain, but they're worthy of more study, he said.

Study results were prepared for release Monday at the Radiological Society of North America meeting in Chicago.

Finding biomarkers -- like the brain waves -- that could enable earlier diagnosis and treatment is the "holy grail" for autism scientists, McPartland said. Now, doctors typically diagnose autism through parents' reports and by observing behaviors that often don't emerge until at least age 2, he said.

The brain wave study used noninvasive technology called magnetoencephalography, MEG for short. It measures magnetic fields generated by electrical currents in brain nerve cells, and records brain activity in real time.

Researchers at Children's Hospital of Philadelphia had 64 autistic children ages 6 to 15 listen through headphones to a series of rapid beeps while under the helmet-like device, which recorded the brain's response to the sounds. Those brain waves, shown as highlighted areas on an imaging screen, were compared with responses in a group of non-autistic children.

In autistic children, response to each sound was delayed by one-fiftieth of a second.

"We tend to speak at four syllables per second," said Timothy Roberts, the study's lead author and the hospital's vice chairman of research. If an autistic brain "is slow in processing a change in a syllable ... it could easily get to the point of being overloaded."

Experts say one in 150 U.S. children have autism, a disorder involving poor verbal communication, repetitive behaviors such as head-banging, and avoidance of physical or eye contact.

There is no cure but behavior treatment and sometimes medication can lessen symptoms.

Among those in the study was Parker Leiby, a 9-year-old Mount Laurel, N.J., boy with mild autism and sometimes hard-to-understand speech. He said he felt like an astronaut wearing that big helmet, and called the whole experience "cool."

Parker was diagnosed at age 2. Since then he's had extensive treatment including speech therapy. He's in a regular third-grade class, loves cross-country running and hopes to become an engineer.

Before participating in the study last year, "we didn't have an answer" about his language difficulties, said Parker's mother, Kim. "It helped shed a lot of light."

Roberts, the study author, said the findings fit with a leading theory that suggests autism is "a disorder of connectivity in the brain."

MEG technology also has been used to map brain tumors and to evaluate epilepsy. McPartland said a few previous studies have used MEG and related technology to study other aspects of autism, but with inconsistent results.