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## Children with autism have difficulty recognizing ordinary words

New research indicates that young children with autism have a difficult time recognizing ordinary words and more of their brains are occupied with this kind of task compared to typically developing youngsters.

"Rather than becoming an expert in recognizing words, their brains slow down," said Patricia Kuhl, co-director of the University of Washington's Institute for Learning and Brain Sciences and an expert in how babies acquire language. "Because these children can't distinguish what should be a familiar word their brains work too hard and they are unable to focus on new words. When they can't understand a word, they miss everything else that follows in a sentence."

The research is part of an effort to understand why language disorders are a characteristic of children with autism as scientists begin to peer inside the brains of some of these children to understand what's behind their language deficits.

Kuhl will present findings that compare 19-to 30-month-old typically developing and autistic children during a keynote address Friday (May 4) at the Sixth International Meeting for Autism Research in Seattle.

She and her colleagues placed caps fitted with 20 sensors on the heads of the children and recorded brain waves that "leaked through their scalp" as the babies listened to familiar words (ball, dog, cat, book) and words that would be unfamiliar (verb, pint, bide, rate). The children also were exposed to common words that were recorded and played backwards. Backwards words produce sound patterns that are not characteristic of any language.

The brains of typically developing infants responded with a unique pattern of activation for each of these types of words. The responses for known and unknown words were markedly different. With the backward words, the children's brains reacted as if they were hearing something totally different from the other types of words and gave a different signal, according to Kuhl, who is a professor of speech and hearing sciences. In addition, brain activity was focused in the temporal

lobes of both hemispheres of the brain for each word type.

The children with autism, however, showed no difference in their responses between known and unknown words, meaning they couldn't differentiate between them. However, their brains did react to the backwards words, and the pattern of activity was somewhat similar to that of the typically developing children. Overall brain activity in the children with autism was more diffuse and not focused in the temporal lobes, indicating more of their brains were tied up trying to understand the words.

Earlier work by Kuhl showed dramatic differences in how children 32 to 52 months of age responded to a computer-generated warbling sound and "motherese," or baby talk, a speech form that is rich in phonemes. When given a choice by letting them turn their heads in one direction versus the other, normally developing children consistently preferred to listen to motherese, a near universal form of baby talk that is directed at infants and young children. Children with autism preferred the warble sound and chose it consistently. Youngsters with the most serious symptoms of autism had a stronger preference for the warble than did higher functioning children with autism.

Kuhl believes there is some good news for parents from these studies because there are indications that some autistic children are achieving some learning.

"One of the puzzles of autism is the variability of children with it," she said. "We believe the highest functioning autistic children have some recognition of phonemes (the basic sounds of a language). And this new study shows autistic toddlers can differentiate between backward words, which are not characteristic of a language, and real words. So some learning has gone on."

"To crack the speech code children must be able to distinguish phonemes, understand known words and be able to decode the word order of a sentence in English or their native language."

Kuhl said researchers need better measures and tools such as magnetoencephalography, which is a non-invasive technology, to test and look inside the brains of children with autism.

"We'd like to know what kind of knowledge these children may have locked up in their brains. Children at the high-functioning end of the autism spectrum may have quite a bit. The first possible use of this research would be as a predictor of which children with autism might be responsive to treatment. With these tools we may be able to identify a part of the brain that is not responding, and that may suggest treatments by developing more targeted interventions."

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