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Report # 126

Autism in Early Childhood

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Looking for autism's early 'markers'

Researchers seek ways to diagnose disorders in infancy

Temple Grandin was 5 years old before she could tell cats from dogs. But it wasn't that her ability to distinguish between the two developed rather late that intrigued Mark Strauss, Ph.D., director of the Infant and Toddler Development Center at the University of Pittsburgh. It was the fact that Grandin, a Colorado State University professor who has lived her life with an autism spectrum disorder, relied on a process of identification that is far more deliberate than the way a typically functioning child makes such distinctions.

"She taught herself how to do it by realizing that dogs have particular noses and cats have retractable claws," said Dr. Strauss.

"I had been studying the development of these automatically learned things in babies and it became apparent from Temple Grandin's comments that she didn't have these built-in mechanisms. She had to explicitly teach herself things that babies automatically learn."

Dr. Strauss is among the researchers investigating such developmental differences as part of the Pittsburgh Early Autism Study, a comprehensive effort to identify early markers of autism and better understand the developmental pathways of autism. Such knowledge has implications for diagnosing autism earlier and intervening sooner to help children with an autism spectrum disorder (ASD).

Autism is a range of neurodevelopment disorders with no known cure that affects 1 in 110 American children, according to U.S. Centers for Disease Control and Prevention estimates. The causes are not well understood. Although symptoms vary,

common signs include social impairment, communication difficulties, and restricted, repetitive and stereotyped patterns of behavior.

Earlier The Better

Studies suggest some children benefit from structured interventions, such as intense behavior modification therapies. Such interventions, while not a cure for autism, can help children develop more appropriate behaviors and function better in society. And evidence suggests that the earlier interventions begin, the better.

An ASD diagnosis today is typically made when a child is around 36 months old. But it is difficult to make a reliable early diagnosis among infants and young children experiencing a deficit in only one or two domains. It's not uncommon for some children, for example, to exhibit a language delay early in life that is corrected later.

Understanding subtle early markers and the developmental trajectory of

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the disorders are critical to finding a reliable, accurate tool for early diagnosis and determining the most effective and appropriate interventions.

The Pittsburgh Early Autism Study recruits infants whose older siblings have been diagnosed with an ASD. It's estimated that 18% to 20% of infants with an older sibling with autism will also be diagnosed with an ASD. The study also includes infant siblings of typically developing children.

Researchers are looking at a range of possible early markers by studying early cognitive, social, language and communication development in studies led by Dr. Strauss, Dr. Susan Campbell, Ph.D. a Pitt professor of psychology, and Jana Iverson, Ph.D., an associate professor of psychology. The study is affiliated with the university's Center for Excellence in Autism Research, which is directed by psychiatry and neurology Profes-

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sor Nancy Minshew and is one of five such centers funded by the National Institutes of Health.

Investigating Early Markers

Dr. Strauss focuses on cognitive ability, attention, memory and how knowledge is developed. Of particular interest is studying how children perceive faces and facial expressions.

Infants learn a lot about their world by observing and interacting with it. During their first year, they learn enough about faces to make fine discriminations among different people. The exception is children with autism. Researchers are studying this issue by showing them movies and pictures and using a device that tracks what they are looking at, how long they are looking at it and how they distribute their attention. "They are paying attention to smaller details and they are not seeing holistic things," said Dr. Strauss. "That's critically important to children's early learning because the way you know, for example, that two different dogs are dogs – that a German Shepherd and a collie are both dogs – is by being able to see their general shape, not focusing only on the color of the nose or ear."

Dr. Campbell is studying early social development, paying particular attention to the interactions between mother and infant. She studies mothers and children in several situations during different developmental stages to examine social reciprocity, pretend play, empathy and emotion regulation.

When studying social reciprocity in infancy, she observes face-to-face interaction between mothers and their 6-month-old children. For example, she observes mothers engage their babies in play and notes such things as the infants' reactions to exaggerated facial expressions as well as their re-

actions when their mothers are asked to be non-responsive. Typically developing toddlers spontaneously begin to enjoy pretending, something that is difficult for children with autism.

She is also observing the reaction of children between the ages of 11 and 16 months when they are shown a toy elephant that walks and makes noises. It's the kind of toy that typically developing infants would be interested in, but wary of, and would tend to look to their mothers for cues about whether to approach it or not.

"We are looking at the give and take of parent-child interaction and how infants use mom as they explore the world," Dr. Campbell said. "The assumption is that the high-risk infants who are later on going to have a diagnosis (of autism) are going to make much less use of their mothers as a base for exploring the world, or as a way of getting information about what is okay to touch."

Dr. Iverson's work includes investigating the emergence of communication skills, such as language and gesturing, beginning with babbling.

The early markers of autism most consistently reported are related to early social communication. Most infants are able to speak a few words by the age of 18 months and nearly all are able to use gestures of some sort to communicate their interests, wants and needs. But infants with an ASD typically do not communicate at such levels during their first 18 months or do so infrequently.

Dr. Iverson begins observing children when they are 5 months old. A key aspect of her work is that she regularly videotapes the children in their homes. "What is important to us," said Dr. Strauss, "is that she is getting a diary snapshot of every month of development, which allows us to look at a variety of things."

Although each researcher is investigating separate issues, those issues are often related. One example is gesture and social interaction.

"One of the things people talk about with children with autism is they use certain gestures to get something they want, but they don't use gestures that children use for sharing," said Dr. Campbell. "In my lab, we look at how often children show mom a toy. Showing is a social gesture. They are showing mom a toy to share something. Or they point at something interesting as a way of sharing it. Those are gestures that seem to be delayed in children with autism, which fits with Jana Iverson's work."

Taken together, their work could reveal a comprehensive profile of early autism. Such information would help identify more precise early markers of autism and perhaps a reliable method of early diagnosis. "There is a big push now within pediatrics and child psychiatry toward early intervention," said Dr. Campbell. "But we don't really know who to intervene with unless we can be sure we are picking up the right cues."



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