Autism Spectrum Disorder: A Brief Overview

According to the National Institute of Mental Health, autism is “a group of developmental brain disorders collectively called autism spectrum disorder (ASD). The term ‘spectrum’ refers to the wide range of symptoms, skills, and levels of impairment or disability that people with ASD can have.” The disorder is typically lifelong. It affects each person differently. People with ASD think, learn, communicate, interact, and behave in ways that are unlike most people. People with ASD have thinking and learning abilities that range from highly talented to unable to communicate, socialize, or provide self-care. Research shows that different causes of ASD result in the wide range in symptoms. Family genes influence each person’s symptoms and abilities. Research also shows that hundreds of genes contribute to the risk of developing ASD. Many of these risk genes for ASD are inherited from or carried in the family. Some genes are new changes that occur in the person with ASD.

Although ASD cannot be diagnosed by a medical test, there are clear guidelines for recognizing early signs and for making an ASD diagnosis. Doctors can use brief ASD screening questions at routine well-child visits to find children who may have ASD. A specialist in ASD then follows the child’s behavior and development to see if he or she fits the guidelines for ASD. The earliest signs of ASD are subtle. Some researchers believe they are present in the first six months of life. These early signs are not usually noted by parents or doctors, but experts have noticed them in studies. Signs of ASD are most likely to be seen by parents and doctors at 12 to 14 months. Some of the earliest signs of ASD are often later language development, little imaginary or pretend play with toys, and choosing objects over people. Signs and symptoms of ASD may vary widely. Sometimes children who have ASD seem to develop nearly normally and then lose skills in the second year of life. Early home videotapes show that these babies had signs of ASD at their first birthday that became much more obvious in the second year of life.

A diagnosis of ASD is often not made until 4-5 years of age when signs are obvious. Milder cases of ASD may not be recognized until adolescence or even later. Intervention programs indicate greatly improved brain development in many but not all children. New treatments aimed at improving social and learning skills at older ages show diminished signs of ASD across the life span in some individuals. Some people with ASD are severely affected throughout their lives.

Examples of Autism Spectrum Disorder Research at Pitt

Pitt researchers Drs. Campbell and Minshew study ASD at different ages. One of Dr. Campbell’s research goals is to identify signs of ASD behavior early in life. Her Pittsburgh Early Autism Study (PEAS) observes infants and young children who have an older sibling with ASD. “ASD runs in families,” says Dr. Campbell. “We know that the younger siblings of children with ASD have a 20 percent chance of having ASD. We hope to identify early markers of ASD in these babies who have a greater chance of having the disorder. Knowing the early signs of ASD will help us diagnose and provide services to children earlier. There’s evidence that children who receive treatment before 24 months have improved development.”
In PEAS, Dr. Campbell and colleagues observe children’s social and emotional development. During visits, researchers watch children play with their parents. As the children get older, researchers watch whether these children show concern for others. They notice whether they can imitate pretend play with dolls presented by someone who isn’t familiar to them. The children are tested regularly for signs of typical progress. Any children showing delays or problems receive suggestions for treatment.

“Children are having fun playing and are with their parents the whole time,” says Dr. Campbell. “Children are carefully observed and tested, so we can give feedback to parents about their child’s development. And they’re helping us understand ASD and possibly come up with ways to diagnose children earlier.”

Dr. Minshew studies ASD in adults. She collaborates with Shaun Eack, PhD, assistant professor of social work in the School of Social Work at Pitt, investigating a new treatment study for verbal adults with ASD. The treatment is called cognitive enhancement therapy (CET). About half of people with ASD speak in normal sentences and have normal or superior intelligence scores. But they still struggle in daily life because of problems understanding people and the world. At first, CET uses computer programs to improve learning, memory, and processing speed skills that are key to learning new social, emotional, and communication skills. The study volunteers work in pairs on the computer with a coach who helps them develop teamwork and social skills. Then, they work in groups to improve their understanding of the world, what other people are thinking and feeling, and how to think and behave in ways that make them happier and more successful.

Dr. Minshew is also working with Russell Johnson, PhD, adjunct assistant professor of rehabilitation science and technology in the School of Health and Rehabilitation Sciences at Pitt, on another treatment study. The treatment uses pictures of visual cues to help teenagers and adults understand what is happening in social situations and how to respond successfully based on this understanding. For instance, one card shows a relaxed rubber band and a stretched one. According to Dr. Minshew, people with ASD often have trouble being flexible or doing things differently. The card is a cue to think about the need to do things differently. Another card shows picture frames, which is a cue to check the context. “People with ASD are often full of facts and details, many of which are not meaningful to other people in conversation,” says Dr. Minshew. “The card reminds them to stop and ask, ‘Does everybody need to know this thought?’ For people with ASD, it’s important to see these pictures. They often don’t get meaning from spoken instructions about what to do. They need a visual cue.”

In some of Dr. Minshew’s studies, participants receive magnetic resonance imaging (MRI) tests. MRIs in the beginning and at the end of treatment show how the treatment works to change the brain and behavior.

For Dr. Minshew, developing ASD interventions is particularly satisfying. “I started 30 years ago. We’ve made incredible progress in understanding ASD,” she says. “We’re now translating knowledge into treatments and services people can use, which is the point of all research. If we can’t give something back to people with ASD and their families, it means very little to them that we’ve done all this research. We need to applaud everyone who participates in research because they’re the ones who are helping to make new treatments available for other people.”

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**VOLUNTEERS NEEDED FOR STUDIES**

**University of Pittsburgh 0702087**
**Pitt Early Autism Study (PEAS)**

Are you the parent of an infant up to 22 months old (or currently pregnant) who has an older sibling diagnosed with autism spectrum disorder (ASD) or an older sibling who is typically developing? If so, you may be eligible to participate in a study to help researchers understand the earliest indicators of ASD. The study involves observation and play-based activities. Compensation provided.

**University of Pittsburgh PRO10060279**
**Early Development of Prosocial Behavior**

Help us find out what babies and toddlers understand about feelings. We’re looking for 12-36 month olds and their parents to participate in a study on the development of emotion understanding and sharing. All procedures are play-based. Parent stays with the child at all times. Reserved parking is provided at no cost. Sib-minding available. A small gift (toy or book) is provided for your child.

For more information about these studies, please contact the Research Participant Registry office at 1-866-438-8230.