

NEWS

# New tool lets cognitive skills guide autism treatment

BY ANN GRISWOLD

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A new tool relies on abilities rather than diagnoses to steer clinicians toward personalized treatments for conditions such as autism and attention deficit hyperactivity disorder (ADHD). Researchers presented the preliminary findings yesterday at the **2016 International Meeting for**

**Autism Research** in Baltimore.

Autism and ADHD share **behavioral features** and **genetic roots**. The best diagnostic tests sometimes fail to **tell the conditions apart**. And even when the tests succeed, researchers must rely on trial and error to **find a therapy that works** for each child.

The new method skirts these diagnostic hurdles and proceeds directly to managing behaviors. A computer algorithm sorts children with autism or ADHD into separate groups by their cognitive skill set, a process that may help doctors tailor treatments to individuals.

“Diagnostic boundaries don’t work because there is so much overlap [in symptoms]. What if, instead, we start segregating people in terms of their functional properties?” says **Chandan Vaidya**, professor of psychology at Georgetown University in Washington, D.C., and lead researcher on the study.

Rather than searching for **telltale differences between autism and ADHD**, as researchers have done in the past, Vaidya focused on what the conditions have in common. Children with either condition show problems with executive function, a set of cognitive skills that includes self-control, working (short-term) memory and mental flexibility, the ability to adjust your thinking to suit different tasks.

Vaidya and her team catalogued the executive skills of 97 children with autism, 86 children with ADHD and 139 typically developing children, all between 8 and 13 years old. They profiled each child’s skill set using information collected from parent surveys, including the **Child Behavior Checklist** and the **Behavior Rating Inventory of Executive Function**. These surveys assess behaviors such as hyperactivity, impulsivity, inattention and emotional reactivity.

## Meaningful differences:

The researchers fed the scores into an algorithm that analyzed them and sorted the children into three groups, based on their executive function profiles. One group included children with poor mental flexibility and weak emotional control, but no other executive problems. A second group included children with only poor working memory. In the third group, children were hyperactive and impulsive, and had difficulty paying attention.

Each group contained some children with autism, some with ADHD and some controls, showing that variations in executive functioning cross traditional diagnostic boundaries — and that some children with neither diagnosis have problems with these skills.

“All of us have things that we are better at and things that we are worse at. The psychopathology of autism and ADHD is just sitting on top of that normal variation,” Vaidya says.

The researchers then used functional magnetic resonance imaging (fMRI) to compare traditional diagnoses with the new skill-based groupings. They scanned the brains of 21 children with autism, 15 with ADHD and 48 typical controls while the children did a simple task that activated areas of the brain involved in executive function.

Patterns of brain activity in children with autism resembled those in children with ADHD and controls. But brain activity differed among children assigned to the three function-based categories.

This finding suggests the categories reflect biologically meaningful differences. Targeting these differences, Vaidya says, could help steer a child toward the best treatment for him, even if he has an incorrect diagnosis.

“Hopefully, the day will come where we no longer have diagnostic categories, and we focus instead on the child’s domain of dysfunction,” Vaidya says.

*For more reports from the 2016 International Meeting for Autism Research, please [click here](#).*