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Autistic children score almost exactly same as neurotypical kids in tests of learning new words

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A new study has found that children with autism are capable of learning new words the same way any child would—by following someone's gaze as they name an object. They just take longer to pick up the skill.

The study, which appears in the March 2016 issue of the *International Journal of Language & Communication Disorders*, showed that autistic children scored almost exactly the same as neurotypical children (those who don't have autism) in tests of learning new words, and were able to follow their teachers' eye movements 75 percent of the time, compared to neurotypical children's 78 percent.

Researchers have long known that neurotypical children as young as 18 months old look at a person's eyes and follow their gaze in order to associate a spoken word with the object the person is looking at.

Though autism spectrum disorder isn't easily explained in generalities, most children with the disorder have some kind of difficulty making eye contact with other people under certain conditions. For this reason, therapists have been taught to actively encourage a child to make eye contact—for instance, by repeatedly telling the child to "look at me" while teaching.

"A lot of good work has gone into targeting this skill in kids with autism. It's considered a pivotal skill—looking at other people and monitoring eye movement. Our findings are really exciting, because they suggest that maybe we don't need to directly target whether kids follow their partner's gaze," said Allison Bean Ellawadi, assistant professor of speech and hearing and director of the Autism & Child Language Learning Laboratory at The Ohio State University.

"We found that if we use eye gaze in a meaningful way, and in a consistent pattern, kids with autism will pick it up on their own, and they'll learn new words."

The pattern is key, she said. The idea may sound simple, but it's rooted in some of the most advanced theories of how humans learn. The brain works in nonlinear ways that are extremely difficult to model mathematically, so over the last 20 years, researchers have tried to use statistical methods with nonlinear equations to create models of how children learn—neurotypical children, that is.

To Bean Ellawadi's knowledge, this study is the first to use an advanced statistical model of learning to teach children with autism, and shows that these methods could lead to helpful new teaching strategies.

Statistical analysis is useful for modeling natural systems, because it allows for complex behavior and so-called "tipping points," when a number of factors that may seem at first unrelated come together in just the right way to cause a dramatic shift in behavior. It helps researchers explain natural systems that seem unpredictable, from quantum mechanics to climate change.

Bean Ellawadi says she's an advocate for applying statistical learning theory to children with autism, "because it explains a lot of the instability we see in their skills."

"Sometimes they'll develop a great behavior in a specific context, but not in other contexts," she explained. "If we think of the behavior as being a combination of factors in just that one particular moment, we can begin to ask how we might use those factors to create more learning success across different environments."

She and study co-author Karla McGregor, professor of communication sciences and disorders at the University of Iowa, compared the learning skills of 15 children with autism to those of 15 neurotypical children. The children's ages ranged from 18 months to 7 years old. The researchers placed a tray of toys and a bucket in front of each child. Then they looked at a particular toy—say, a stuffed duck—and asked the child to put that toy in the bucket.

The researchers chose this format because it's similar to a study done by another research group in 2009. But that study consisted of only one trial; children had only one chance to put the right toy in the bucket. Children with autism made eye contact less often, and failed at the task more often than neurotypical children, so much research since has assumed that autistic children needed instruction to make eye contact before they could learn objects.

In contrast, Bean Ellawadi and McGregor gave the children in their study five "warm-up" trials followed by up to 20 more trials that counted for the study.

When the child put the right toy in the bucket, the researchers praised him or her. When the child put the wrong toy in the bucket or just didn't respond, the researchers didn't give any negative feedback. They just pointed to the right toy or demonstrated the task for him or her, and asked again. Then they moved on to a new toy.

As in the 2009 study, neurotypical children out-performed the autistic children on the first trial. But by the end of the experiment, the autistic children had caught up. Children with autism looked at the researchers' eyes 75 percent of the time, and neurotypical children looked 78 percent of the time. Both groups were able to choose the right toy more than half the time, with an overall performance of 50-60 percent, depending on how many toys were on the tray.

Bean Ellawadi and McGregor had bet that the autistic children would pick up on patterns in their teachers' behavior to learn the names of new objects, and it worked.

"Little kids are amazing statisticians," Bean Ellawadi said. "They do a really good job of tracking the statistics of regularity in their environment."

Source:
Ohio State University
