

NEWS

# Repetition may limit scope of skills in people with autism

BY NICHOLETTE ZELIADT

13 NOVEMBER 2015

Doing the same task over and over improves most people's speed and efficiency, and helps them do it in a new context. But for people with autism, too much repetition can make it difficult to apply the learned skill to a new situation, suggests a study published 5 October in *Nature Neuroscience*<sup>1</sup>.

"We can easily generalize what we have learned previously and transfer our knowledge to slightly different circumstances," says study investigator **Marlene Behrmann**, professor of psychology at Carnegie Mellon University in Pittsburgh. "In individuals with autism, it's as though they've never seen the task before."

The findings, which stem from a simple visual exercise, suggest that therapies that involve repetition may hamper rather than benefit people with autism, Behrmann says. Fewer repetitions with breaks in between might lead to better results.

Difficulty **generalizing and transferring** learned concepts to new contexts is a hallmark of autism. But it is unclear how this behavioral inflexibility arises in the brain and whether it is purely cognitive or also affects other brain functions, such as sensory perception.

To shed some light on these questions, Behrmann and her colleagues gave 10 people with autism and 9 age-matched controls a visual discrimination task. The participants saw a black computer screen light up with a series of white bars for a fraction of a second. All of the bars were horizontal, except for three diagonal bars in the upper-left corner.

The researchers asked the participants to press a button to indicate whether the diagonal bars were arranged side by side or stacked. They performed this task hundreds of times each day for four days.

## Shape shifting:

People with autism could judge the arrangement of the bars just as accurately and quickly as controls did, and both groups improved with practice. This indicates that those with autism have little problem learning to perform the task.

On the fifth day, the researchers moved the diagonal bars to a new location on the screen. The controls immediately performed just as well as they had when the bars were in the old spot. They then continued to improve slightly over the following four days. People with autism, however, performed as poorly as they had on the first day of the experiment, and didn't improve much even after several days of practice.

The results suggest that repetition helps people with autism perform better on a new task, but hurts their ability to perform it in a new context.

“Merely shifting the location of the target is enough to make them go back to square one,” Behrmann says.

To test whether they could prevent this problem, the researchers repeated the experiment with a new set of 10 people with autism and 10 controls. This time, however, they inserted so-called ‘dummy trials’ at random, in which they replaced diagonal bars with horizontal ones identical to the others on the screen.

In this scenario, people with autism performed just as well as controls did on all eight days, even after the diagonal bars were relocated on day five.

The findings suggest that neurons in the visual system of people with autism encode information differently when there is a break in that information, Behrmann says. Persistent repetition may cause neurons to become committed to the perception of a particular visual pattern. The dummy trials may have prevented this rigidity by exposing the neurons to new stimuli.

The results from this simple visual task hint at a general inflexibility among neurons in people with autism, the researchers say. Their neurons may become rigidly tuned to a particular context more readily than those in unaffected people. The effect may play out in complex cognitive tasks as well.

The findings have important implications for autism treatment. Limiting the number of repetitions while practicing a task by, say, breaking them up with a different activity may foster learning and generalization.

#### REFERENCES:

1. Harris H. *et al. Nat. Neurosci.* **18**, 1574-1576 (2015) [PubMed](#)