NEWS

# Children with autism get lost in time, imaging study says

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Clock work: Children with autism have trouble estimating whether one picture (left) appears for a longer time than another (right).

Children with autism recruit different brain regions than controls do when estimating how much time has gone by, according to unpublished research presented Monday at the **2012 Society for Neuroscience annual meeting** in New Orleans.

The findings add biological evidence to anecdotal reports and a few behavioral studies suggesting that children with autism have **trouble keeping track of time**. Last year, for example, **Melissa Allman** and her colleagues reported that children with autism cannot gauge time durations longer than about five seconds[1].

This deficit could be driving other cognitive impairments, such as speech and language delays and stilted social interactions. “They’re lost in a sea of time,” says lead investigator Allman, assistant professor of psychology at Michigan State University in East Lansing.

Using functional magnetic resonance imaging, Allman looked at the brain activity of eight children with autism and ten controls while they performed a time estimation task in the scanner.

The children saw a ball for a few seconds, followed by a short delay and then another, slightly different, ball. They then indicated whether the second ball was shown for more or less time than

the first. Echoing previous work, the timing judgments of children with autism were less accurate than those of controls, the study found.

Allman recorded the children's brain activity while looking at the first ball. Because they had been trained on the task before getting in the scanner, this activity reflects the brain circuits they recruited in anticipation of the task.

The study focused on two brain regions known to be involved in internal time measurements: the cerebellum, which tracks short periods up to a few seconds, and the striatum, which tracks longer durations.

When the researchers showed the first ball for 2.2 seconds, the autism and control groups both activated the cerebellum, the study found. But participants with autism also activated the caudate and putamen, two subregions of the striatum.

"In other words, they're recruiting this longer timing system for a shorter duration," Allman says. "It may be that they subjectively experience durations longer than they really are."

The control group, in contrast, only recruited these striatal regions on trials in which the first ball appeared for 8.2 seconds.

Much as a metronome helps a pianist say in tempo, it's possible that the **repetitive behaviors** commonly seen in people with autism emerge as their way of making sense of longer time periods.

The findings may have practical implications, Allman says. For example, providing children with watches or explicit reminders of daily schedules may help curb inappropriate behaviors.

*For more reports from the 2012 Society for Neuroscience annual meeting, please **click here**.*

**References:**

**1: Allman M.J.** *et al. Am. J. Intellect. Dev. Disabil.* **116**, 165-178 (2011) **PubMed**