

NEWS

Brain waves of autistic children show delay in language learning

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Babies eventually diagnosed with autism learn to detect speech sounds later than their typical peers, a new study suggests.

The critical period for this stage of language learning typically begins by about 6 months of age, but it doesn't start until about 9 months in autistic children, the study shows. The longer the delay, the more difficulties the child has comprehending language at 12 months of age.

"That's a large shift in terms of the percent of time they've had to learn language," says **Laurel Gabard-Durnam**, a postdoctoral fellow in **Charles Nelson**'s lab at Boston Children's Hospital. She presented the unpublished findings yesterday at the **2018 Society for Neuroscience annual meeting** in San Diego, California.

Evidence from animal studies suggests that an increase in signals that inhibit brain activity can trigger the onset of a critical period — the period of time in which brain circuits can be shaped by experience¹.

Autism is thought to involve too little **inhibition of brain activity**. The researchers set out to explore whether this delays the critical period for learning speech sounds in children with autism.

They used electroencephalography (EEG) to record brain activity in 91 **baby sibs** — children who have an older sibling with autism and are at increased risk of the condition — and 79 babies with no family history of autism. Of the 91 baby sibs, 24 were diagnosed with autism by age 3.

Quiet time:

The researchers recorded EEG signals when the babies were 3, 6, 9 and 12 months old (not all of

the children provided data at every time point). They focused on brain activity in the auditory cortex, a brain region that processes sounds.

At each time point, the researchers recorded the ‘resting-state’ brain activity as babies watched a silent video of bubbles or a screen saver. They also collected EEG data as the infants listened to a recording of a person repeating the syllable “da.”

They calculated the ratio between the infants’ resting-state activity and that triggered by the speech sound. In the control group and in the baby sibs without autism, this ratio starts out high, drops at 6 months of age and remains low at 9 and 12 months.

Studies have shown that babies learn to distinguish between highly similar speech sounds, such as “da” and “ta,” when they are 3 to 6 months old, so the drop in the ratio may reflect the onset of the critical period for distinguishing between speech sounds, Gabard-Durnam says.

In babies later diagnosed with autism, however, the ratio starts out high and doesn’t drop until 9 months of age.

“It’s not that they’re never sensitive to these language inputs, it’s that they’re sensitive at a different time window and maybe for a different amount of time,” Gabard-Durnam says.

The team is validating the findings in a different set of baby sibs. They are also testing infants with **Rett syndrome**, a condition related to autism.

For more reports from the 2018 Society for Neuroscience annual meeting, please [click here](#).

REFERENCES:

1. Toyoizumi T. et al. *Neuron* **80**, 51-63 (2013) [PubMed](#)