

NEWS

# Reading remedy prompts brain dialogue in children with autism

BY RACHEL ZAMZOW

28 JULY 2015



A training regimen that improves reading comprehension also boosts brain connectivity in children with autism. The findings, published 9 June in *Human Brain Mapping*, suggest that the treatment enhances communication between the brain's language areas<sup>1</sup>.

The therapy is intended for children who can read aloud well but struggle to understand the meaning of the text.

“This is a hard-core, long and intense intervention, which probably is the reason we are finding some changes in connectivity,” says lead researcher **Rajesh Kana**, associate professor of psychology at the University of Alabama at Birmingham.

Kana’s team used standardized test scores to identify 31 children with autism who have average oral reading abilities but below-average comprehension skills.

For four hours a day for 10 weeks, therapists coached 16 of the children to use visual images to understand the meaning of the texts they read. For example, the children learned to imagine pictures to represent words and to describe the colors, sizes and shapes in those images. The other 15 children did not receive this training.

As the children relaxed in a brain scanner, the researchers used functional magnetic resonance imaging (fMRI) to track changes in resting-state brain activity before and after the therapy.

Several sets of brain regions became active at the same time in the children, suggesting that these areas were communicating as connected networks. One network includes language areas such as Broca’s area, in the frontal lobe, which governs speech production and sentence comprehension. Another node in the network is Wernicke’s area, which is located under the sides of the head near the ears and takes the lead in understanding words.

At the end of the study, children who had received the training had stronger connectivity within this language network than did the children who’d had no coaching. The treatment also appeared to improve communication between the network’s language areas and the motor and visual brain regions, indicating that it might recruit other brain regions to assist in deciphering text.

Significantly, the enhanced connectivity was associated with improved scores on a reading comprehension test.

These findings jibe with those from a related study that found that the therapy improves comprehension and increases brain activity in language and visual regions during a reading task<sup>2</sup>.

Not everyone with autism faces challenges with reading comprehension. Still, the findings add to a growing body of data highlighting the usefulness of brain imaging for evaluating the effects of autism treatments, says **Lucina Uddin**, assistant professor of psychology at the University of Miami, who was not involved in the study.

Knowing what effective therapy looks like in the brain may help clinicians predict how individuals respond, Uddin says. In fact, telltale **changes in the brain can herald early responses** to other behavioral therapies in children with autism<sup>3</sup>. “This is a great model for the kind of work that needs to be done in the field in general.”

## References:

1. **Murdaugh D.L.** *et al. Hum. Brain Mapp.* **36**, 2965-2979(2015) **PubMed**
2. Murdaugh D.L. *et al. Autism Res.* Epub ahead of print (2015) **PubMed**
3. Ventola P. *et al. Brain Imaging Behav.* **9**, 74-88 (2015) **PubMed**