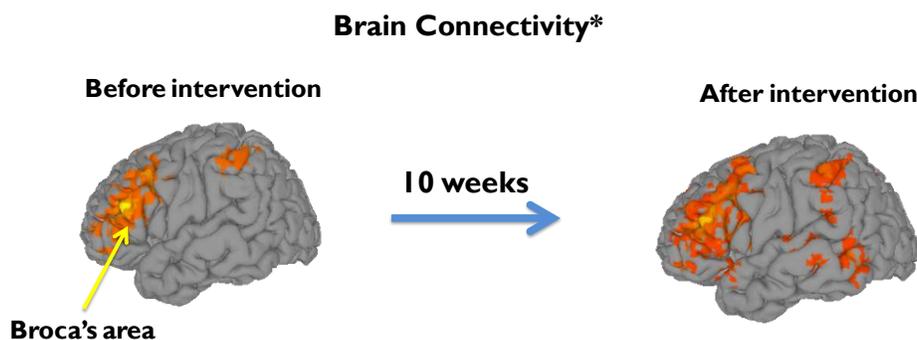


# Changes in Intrinsic Connectivity of the Brain's Reading Network following Intervention in Children With Autism

## Background

The University of Alabama at Birmingham Department of Psychology and Lindamood-Bell Learning Processes conducted a randomized controlled, neuro-scientific trial with a group of children with Autism Spectrum Disorders (ASD). This experiment investigated the constructs of Dual Coding Theory (DCT) using the Visualizing and Verbalizing (V/V) program to develop oral and written language comprehension. Resting state functional magnetic resonance imaging (rsfMRI) was used to study the effect of V/V on connectivity of regions of the brain associated with comprehension. Before and after instruction, subject's brains were scanned and administered a reading comprehension test. A similar group of children with ASD went through the same diagnostic procedures but did not receive V/V instruction. Subjects receiving V/V had approximately 200 hours of instruction over a 10 week period of time. Instruction was delivered by specially trained Lindamood-Bell staff. The figure below shows comparative pre- and post-brain connectivity for the subjects who received Visualizing and Verbalizing instruction.



Note. \*Statistically significant ( $p \leq .05$ ). Broca's area is a region of the brain involved in comprehension. Figure used with author's permission.

## Results

Subjects receiving V/V exhibited significantly greater brain connectivity after instruction than control subjects. In addition, ASD experimental subjects also had a significantly ( $p = .0006$ ) larger change in reading comprehension than control subjects (16.4% and 2.6% respectively). Furthermore, researchers found that improvements in reading comprehension were correlated with increases in brain connectivity. The results of this study illustrate that instruction in the Visualizing and Verbalizing program supports the Dual Coding Theory model of cognition, leading to greater brain connectivity and improved comprehension for children with Autism Spectrum Disorders.



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## Profile

### Number of Subjects:

- 16 Visualizing and Verbalizing
- 15 Control

**Age:** 8 to 13

**Lindamood-Bell Programs Implemented:** Visualizing and Verbalizing®

### Outcome Measures:

- Resting state functional magnetic resonance imaging (rsfMRI)
- Gray Oral Reading Test-4th (comprehension)



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