LINDAMOOD-BELL
LEARNING PROCESSES

RESEARCH

Rapid and Widespread White Matter Plasticity During an Intensive Reading Intervention

Symbol Imagery for Phonological and Orthographic Processing in Reading and Spelling (SI)

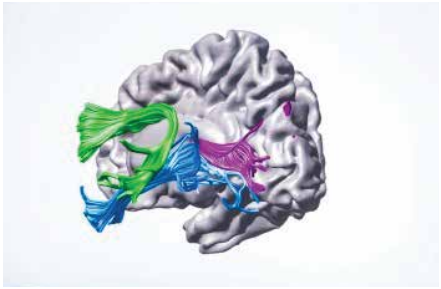
PROFILE:

Number of Students: 24
Age: 7-12
Lindamood-Bell Programs Implemented: Seeing Stars®
Outcome Measures:

- Brain Structure (MRI)
- TOWRE-2
- Woodcock-Johnson Basic Reading Composite

BACKGROUND:

The Institute for Learning & Brain Sciences (I-LABS) at the University of Washington conducted a study examining growth in reading skills and neural connections (white matter) as a result of intensive reading intervention to develop the sensory-cognitive function of symbol imagery. This study is the first to measure white matter during an intensive reading intervention for dyslexics comparing children's learning with their brain's changes. Children who struggled with reading and/or had a diagnosis of dyslexia received eight weeks of intensive reading intervention at a Lindamood-Bell Learning Center. They took a series of reading tests before and after the intervention and underwent MRI scans at the beginning, middle, and end. A control group of children with mixed reading skill levels did not receive the reading intervention.



The study focused on the arcuate fasciculus (green) where language and sounds are processed; the left inferior longitudinal fasciculus (blue), where visual inputs, such as letters on a page, are transmitted throughout the brain; and the posterior callosal connections (pink), which link the two hemispheres of the brain. (Illustration used with permission)

RESULTS:

For study participants who took part in the development of symbol imagery for phonological and orthographic processing, reading skills improved by an average of one full grade level. Diffusion MRI data collected during instruction indicates that there were large-scale changes in white matter conductivity correlating with the gains in reading. Further, the study identifies white matter tracts that may predict the ease with which a child learns how to read. Subjects in the control group showed no changes. The results of this study illustrate that Lindamood-Bell Learning Center instruction in the Seeing Stars program led to increased brain structure conductivity and improved reading for children with reading difficulties including dyslexia.

LOCATION:

Institute for Learning & Brain Sciences (I-LABS), Department of Speech and Hearing Sciences, University of Washington, Seattle, WA, USA

Huber, Elizabeth, Patrick M. Donnelly, Ariel Rokem, and Jason D. Yeatman. "Rapid and Widespread White Matter Plasticity during an Intensive Reading Intervention." *Nature Communications* 9, no. 1 (2018). doi:10.1038/s41467-018-04627-5.