



CAN DYSLEXIA BE CURED?

WHAT THE LATEST NEUROSCIENCE TELLS US ABOUT THE PROGNOSIS

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Although neuroscientists do not use the word “cured” when referring to dyslexia intervention outcomes, the science looking into this question is very encouraging.

In this age of neuroimaging, we can actually track brain changes that occur as a result of reading intervention. This is an emerging science in dyslexia, but recent imaging studies demonstrate that the brain can and does respond to intervention. When a group of researchers reviewed 39 before-and-after neuroimaging studies, they found evidence of positive changes in activation, connectivity, and even brain structure after reading intervention. Some of these studies reported a *normalization* of the reading network in the brain after intervention.

THE LANGUAGE OF NEUROSCIENCE

Neuroscientists that study dyslexia use the word *recovery* rather than *cure*. They define recovery as the normalization of any weak processes of reading and reading-related brain networks. *Compensation* is another related process that can be seen in imaging studies of individuals with dyslexia when they are reading. It refers to the finding that areas of the brain not typically associated

with reading, show hyperactivation in individuals with dyslexia. Some believe that this hyperactivation is evidence that individuals with dyslexia use a variety of compensatory strategies when reading.

Even non-dyslexic readers use compensatory strategies, but we now know that dyslexic readers use them to a greater extent, and for a longer period of time. Reading intervention sometimes increases the activation of pathways not normally involved in reading, but not always. More research is needed in this area of dyslexia.

Connectomics is another term important to how dyslexia recovery can be viewed and measured. It refers to how efficiently cognitive processes required for reading are being coordinated throughout the brain. Think of it as the “*it takes a village*” idiom. Reading success involves not just one brain region, but the entire brain network architecture. This is why explicit and systematic phonics instruction, by itself, will not remediate dyslexia.

In dyslexia, there is a lack of coordination between brain regions. This explains why dyslexic children and teens often fail to reach grade level fluency, even after years of phonics instruction. New studies have found that by targeting these inefficiencies in the intervention, they can make progress much faster.



GAME THEORY: When dyslexic children are “pushed” to read at a faster and faster pace, they improve in every area of reading and in much less time, compared to traditional phonics-based approaches. Turning this process into a game keeps students motivated, especially when they find they are reading more effortlessly each day.

Important processes in the brain such as visual attention, error monitoring, speed of processing, working memory, and other processes important to fluent reading, are components of what is called *executive function*. Since fluent reading relies heavily on all of these components, neuroscientists are finding ways to target executive function as part of reading intervention.

Reading fluency training is one such successful strategy to improve executive function in dyslexia. When dyslexic children are “pushed” to read at a faster and faster pace, taking them beyond their typical reading rate and comfort zone, they improve in every area of reading, and in much less time compared to traditional phonics-based approaches. This process, when it is added to systematic reading instruction, helps to synchronize the brain regions involved with reading, leading to long term improvements in all aspects of reading. Turning this process into a game keeps students motivated, especially when they find they are reading more effortlessly each day.

INCREASING OPTIMISM

Neuroimaging, new electroencephalogram (EEG) technologies, and other advances in neuroscience are providing a window into how different types of intervention change the brain. Recovery is possible by incorporating new research-based strategies into intervention. •

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