

Brain scans can predict children's reading ability, researchers say

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The study findings could eventually influence reading lessons for pre-elementary children, tailoring lesson plans to individual needs. Credit: Karen Struthers/iStock

(Medical Xpress)—New research can identify the neural structures associated with poor reading skills in young children, and could lead to an early warning system for struggling students.

If a 7-year-old is breezing through the "Harry Potter" books, studies indicate that he or she will be a strong reader later in life. Conversely, if a 7-year-old is struggling with "The Cat in the Hat," that child will most likely struggle with reading going forward.

New research from Stanford shows that [brain scans](#) can identify the neural differences between these two children, and could one day lead to an [early warning system](#) for struggling students.

The researchers scanned the [brain anatomy](#) of 39 children once a year for three consecutive years. The students then took [standardized tests](#) to gauge their cognitive, language and [reading skills](#).

In each case, the rate of development (measured

by fractional [anisotropy](#), or FA) in the [white matter](#) regions of the brain, which are associated with reading, accurately predicted their test scores.

Specifically, children with above-average reading skills exhibit an FA value in two types of nerve bundles – the [left hemisphere](#) arcuate fasciculus and the left hemisphere inferior longitudinal fasciculus – that is initially low, but increases over time. Children with lower reading skills initially have a high FA, but it declines over time.

The findings could eventually influence reading lessons for pre-elementary children. Previous studies have shown that a child's reading skills at age 7 can accurately predict reading skills 10 years down the road. A child who is struggling at 7 will most likely be a poor reader at age 17.

"By the time kids reach elementary school, we're not great at finding ways of helping them catch up," said Jason D. Yeatman, a doctoral candidate in psychology at Stanford and the lead author on the study.

The good news: Early screening could reveal which students are at risk; at an early age, the brain is plastic, and genes, environment and experiences can affect FA values.

"Once we have an accurate model relating the maturation of the brain's reading circuitry to children's acquisition of reading skills, and once we understand which factors are beneficial, I really think it will be possible to develop early intervention protocols for children who are poor readers, and tailor individualized lesson plans to emphasize good development," Yeatman said. "Over the next five to 10 years, that's what we're really hoping to do."

The research was published in the current issue of the *Proceedings of the National Academy of Science*.

More information:

www.pnas.org/content/early/2012/10/11/1010792109.full.pdf+html

Provided by Stanford University

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