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RESEARCHWORKS

Uncovering the cognitive causes of reading difficulty

Help for struggling readers

Reading may be the single most important skill for children to learn—a portal to the world of knowledge. Yet a 2003 report by the National Assessment of Educational Progress showed that more than 37 percent of fourth-grade students, 26 percent of eighth-grade students, and 26 percent of twelfth-grade students read below grade level.

The percentage of struggling readers has scarcely decreased over the last decade despite extensive research and interventions undertaken to help them. Educational psychology professor **Paul van den Broek** and assistant professors **Kristen McMaster** and **David Rapp** (now at Northwestern University) set out to reverse this trend with an innovative approach that zeroes in on the specific cognitive challenges that can trip up struggling readers.

What the research shows

Although it's widely believed that reading-comprehension problems happen during "online" processing, little is known about these cognitive processes. Van den Broek and his colleagues are among the first to connect knowledge of psychological functioning during reading with classroom practice.

"Despite countless efforts and approaches, so many children are still struggling with reading," says van den Broek. "We believe that a thorough understanding of what these struggling readers do during reading will lead us to interventions that improve their specific reading process difficulties."

During the first year of the study, researchers evaluated 270 students of all reading abilities in grades four, seven, and nine and created individual cognitive profiles. Their goal was to compare the profiles of different groups of struggling readers with those of students who measure average or above average in reading.

The researchers developed two original assessments to evaluate cognitive reading processes:

A "talk-aloud" test: The student gave a running commentary about the text as he read, helping to identify the points at which comprehension broke down. This assessment demonstrated that although most draw on background knowledge as they read, one subgroup of struggling readers often draws on information that is not relevant. Another subgroup only sporadically refers to such background knowledge at all.

An eye-tracking helmet indicates where readers skip a word or check back in text they read on a computer screen.

An eye-tracking test: A special helmet allows researchers to monitor eye movement as students read text on a computer monitor. The device can tell if the subject skips a word, when she looks back for reference, and where she pauses and rereads. The team discovered that readers of all levels skip back to verify information, but struggling readers often return to the wrong place.

The researchers spent the second year of the study in the classroom, developing and testing interventions specific to the cognitive profiles. The research team trained teachers to apply interventions designed specifically for the different subgroups of struggling readers. One of the interventions involved peer-assisted, custom-tailored questioning. In teams of two, students took turns reading aloud and asking or answering predetermined questions designed to prompt the kind of text processing that had proven problematic for the individual.

Teachers in the study acted as consultants and collaborators to evaluate how the various interventions worked in practice and to assist in developing an intervention tool kit. In the process the team confirmed that different interventions helped different kids.

"This means that it is possible to not only identify distinct subgroups within the broader group of struggling readers based on their cognitive processes during reading but that one, moreover, can design effective interventions for each subgroup," van den Broek explains.

What others say about this research

"Dr. van den Broek's research that combines cognitive theory and established educational diagnostic tools is providing an important bridge between basic and applied research on reading processes," says **Heather Bortfeld**, assistant professor in cognitive psychology at Texas A&M University, College Station. "The additional use of technical tools, such as eye-tracking, has the potential to significantly advance our understanding of the issues underlying struggling readers' difficulties. This is innovative research."

Gail Jordan, associate professor of education and director of the reading licensure program at Bethel University, St. Paul, Minn., says, "As both a classroom teacher and a teacher trainer, Paul van den Broek's research on cognitive processes that take place during reading has given me a deeper understanding of how readers construct meaning from text and made me more sensitive to how my students approach the reading task. The findings from Paul's latest research in online processes will give teachers much-needed targeted tools to know how and when to support their students' reading."

Why this research matters

Decades of research show that when students get off to a poor start in reading, they rarely catch up.

The National Adult Literacy Survey found that about 44 million adults lack sufficient literacy skills to function successfully in American society. They have difficulty finding and keeping living-wage jobs, supporting their children's education, and participating actively in civic life.

"The truth is, once kids get beyond eighth grade, it becomes very unlikely that their reading will improve," said van den Broek. "We have high hopes that this research will lead to targeted interventions that will make such grim statistics a thing of the past."

For more information

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