

THE YALE CENTER FOR DYSLEXIA & CREATIVITY

Transforming dyslexia from a liability to an asset.

Demystifying Math Struggles & Identifying Strategies to Help

Processing Breakdowns

Students with slower processing speeds or executive-function problems are often no different from their peers in math proficiency in first and second grade; but as they confront multistep computations in upper elementary school tests, their scores tumble because they lack the skills necessary to produce organized, efficient output. These students aren't losing their earlier skill base. New tasks demand efficient processing in different domains. The mathematics problems they now encounter need organizational skills involving planning and sequencing, as well as skills like handwriting, copying text, note taking, and other outputs requiring accuracy and efficiency. These skills are often difficult for dyslexic students. Students who struggle with processing multistep problems can improve their accuracy by employing several strategies that involve "walking" and "talking" problems through.

Woodin: An individual student can process auditory, visual information, and produce verbal and motor output with varying degrees of accuracy and at different rates. This lack of integration across modalities can result in frustration. Imagine how frustrating it must be for a highly verbal student whose pencil cannot keep pace with his racing thoughts, or the less verbally gifted student who finds it difficult to explain his written solution to a math problem—he can see the problem, he knows how to solve it, but he can't present it orally. All these students benefit from teaching methods that provide organization and encourage the integration of information between visual images, language, and motor output. When students can process information across these three systems, they can access information across a variety of contexts.

Students who have visual/spatial and handwriting problems have difficulty learning and expressing number facts. Today, some educators suggest that students just use a calculator instead of learning their number facts, but this strategy bypasses essential skills and procedures. Truly knowing these skills is important. I have my students model large graphic organizers so they can easily manipulate numbers. I have them literally walk through math computations drawn on the floor to gain an understanding of the organizational framework.

Students learn to sequentially process the information from these structures by moving their bodies over them as they describe each step. The episodic memory of this fun activity is then used to solve a similar problem presented on paper when seated at their desks.

Example Strategy: Use Multimodal Strategies To Teach Multistep Division

The video link provided above shows one way to tackle multistep mathematics problems. Here the student plans and talks himself through the problem and then literally walks himself through it. This exercise provides a consistent manner to rehearse the process verbally and, in turn, hear the process. The student is also led to develop his internal language skills, or “inner voice,” necessary to describe newly acquired concepts and procedures. This inner voice will help the student “talk” his way through similar problems in the future. In interviews with dyslexic adults, all of them successful professionals in fields from science and medicine to law to and education, we learn that many find talking through tasks or mouthing out words while reading is helpful throughout their lives.