Andrew is a happy six-year-old boy. He is well-behaved and popular in his class. Andrew has an average IQ. But here’s the problem. His academic performance is very poor. He frequently becomes frustrated by difficulties he experiences, particularly in writing. Andrew does not participate in class discussions, and he often seems unable to respond to the teacher’s questions. We all know children like Andrew—children who don’t seem to be able to achieve their potential. If Andrew has an average IQ, why doesn’t he have average grades? The answer to this question lies in his working memory.

What Is Working Memory?
Psychologists use the term working memory to refer to the ability we have to hold and manipulate information in our mind over short periods. Because the early learning experiences and the background of a child do not influence his or her working memory, the child’s working memory tells us about that child’s ability to learn. Other measurements such as school tests and IQ tests measure knowledge that the child has already learned. A child’s performance on these tests is closely related to the financial background and the education level of the child’s parents.

Working Memory and Learning
Working memory is the engine of learning. It is our mind’s “in-box” that allows us to remember new information and work with it. It is the most important factor in learning. Without it children would be unable to spell, solve word problems, add, subtract, copy from the board, or even remember instructions. In the classroom, children regularly have to hold information in their mind and work with the information at the same time. For example, they may have to remember a sentence they need to write while trying to spell the individual words in the sentence. They may also need to remember a list of instructions given by the teacher while they are carrying out individual steps in the task.

Children who have low working memory will struggle in these activities simply because they are unable to remember enough information to allow them to complete the task. They will forget instructions they are attempting to follow, the details of what they are doing, the point they have reached in a complicated task, and so on. Because children who have poor working memory struggle with everyday classroom activities, they often fail to acquire the knowledge and skills necessary for academic success. They can fall behind their peers from as early as kindergarten and will face an uphill battle throughout their academic career.

My research has shown that 10 to 15 percent of children in a mainstream classroom have poor working memory. Children who have poor working memory often struggle in reading and math and receive poor grades. They can also be disruptive in class. Often, educators do not recognize the working memory problems of their students. Instead, the children are often characterized as daydreamers. It is critical to diagnose memory problems as early as possible. Unless these problems are identified and the students receive appropriate intervention, they will continue receiving poor grades.

Working Memory Intervention
Can working memory improve? In order to make a difference in these children’s academic careers, I suggest a multilayered approach. Help begins in the classroom. Effective classroom techniques for reducing working-memory loads include simplifying difficult tasks and repeating task instructions. Here are two examples of useful strategies for young children.
In order to reduce the storage loads required by such activities, the teacher can employ two strategies. The first is to regularly repeat information that is crucial to ongoing activities. A second strategy is to use a variety of tools that support working memory and that are in common use in classrooms. For this number-sequencing activity, using a number line that might be above the board or on the wall will help the children keep their place in the number sequence. It is important to note, however, that children who have low working memory are often unwilling to use such tools spontaneously because of the initial effort in mastering this new skill. Therefore, it is very important that the teacher take time to allow the children to practice using the aids in situations with minimal or no working-memory demands. This practice will build up the confidence of the children, and they will be more likely to use the aids in other activities. The entire class benefits from these strategies, and the classroom becomes a more stable learning environment as the children who gave up in frustration learn to contribute to the class and stop being disruptive.

In order to ensure that children who have a low working memory have every chance for success, it is also important to support children’s working memory in the home. I have helped develop a website that generates a customized plan of action that is based on each child’s unique working-memory profile. By working together with the child’s parents, the intervention helps each child use his or her working memory more efficiently, and the child’s grades will improve. To find out more information, visit www.memoryandlearning.com.

Another approach to supporting a child’s learning is to train the child’s working memory skills directly. We are currently developing a computerized program that will be available shortly. If you would like to discuss anything related to working memory and learning, including the intervention, please contact me at tracy@memoryandlearning.com.

Tracy Packiam Alloway, PhD, is a senior research psychologist based at Durham University in the United Kingdom. She is a leading researcher in working memory, and she has worked with thousands of children, teachers, and parents to improve working memory.

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