

## Do memory training programs improve the learning of academic skills?

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### Statement of the problem

Many students have difficulty maintaining information in working memory (WM) long enough and with sufficient clarity to make use of it. They may also struggle to sustain task-oriented attention.

### Proposed solution/intervention

There are numerous (usually) computer-based WM training programs intended to stimulate general cognitive change by addressing WM and attention. The programs include tasks designed to be enjoyable while training and testing individuals' WM. Item difficulty is normally increased incrementally, according to the students' performance.

### The theoretical rationale

Adequate WM is seen as a pre-condition for higher order cognition. Thus, the potential benefits of directly training under-developed WM are worth investigating, although attempts to train a range of underlying processes in order to boost academic skills have not been productive. The WM training approach is predicated upon the brain's neuroplasticity, such that the stimulation caused by the repeated practice on relevant tasks produces beneficial changes in the brain's neural structure and function. It is proposed that these changes improve WM, intelligence, concentration, endurance, impulse control and emotional regulation. It is also expected that these changes will generalise to other tasks and settings, such as those required in academic and professional domains. It is critical that any training benefits transfer to other tasks measuring non-trained cognitive functions important in everyday life.

### What does the research say? What is the evidence for its efficacy?

WM training programs have been shown to improve WM on trained tasks and, to a lesser extent, on tasks similar to those taught, but the benefits have not been demonstrated to generalise to academic learning, or be maintained

over long periods. Even positive results have been inconsistent within and across studies. The few studies with positive findings have been criticised on a number of methodological grounds, including measurement instrument difficulties, a lack of control groups (especially active controls), small sample sizes, and non-random subject assignment. There is also a concern that the proposed mechanism for producing improvement has not been clearly demonstrated to have caused improvement beyond what might have resulted from a placebo effect. To provide ineffective interventions has serious negative implications for struggling students. Even if an intervention is benign, there is an opportunity cost for students (and often a financial cost to parents), and a residue of negative emotion for both parents and child if an approach has no discernible effect. Research is ongoing, with some of it involving specific groups, such as those with ADHD, learning disabilities, cochlear implants, those born preterm, and those with brain injury or dementia.

### Conclusion

Not enough supportive research on this type of intervention currently meets the scientific standards that would justify claims of effectiveness.

### Key references

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Further references: <https://tinyurl.com/y7ayrtop>