SUMMARY OF FINDINGS

COGMED: The Current Status of the Research into the Program, Its Impact, and Long-Term Outcomes for Students

CogMed is a computer-based intervention that has been developed to improve working memory and associated cognitive processes. It is a widely disseminated commercial product that was developed by researchers interested in improving brain functioning, and therefore has been at the forefront of the ‘brain training’ movement that has been highly visible recently in both scientific and educational circles. CogMed has been evaluated fairly extensively, and there is a growing body of research devoted to understanding the impact of CogMed on cognitive functions, primarily those involving working memory, attention, and executive functions, in a range of populations.

The CogMed program is well described in readily available materials via its website (www.cogmed.com), as well as a number of the studies listed below in the attached list of references. Our group sought out a range of sources – including both those studies that were done by researchers involved with CogMed, as well as those done by independent scientists – in an effort to produce a picture of CogMed’s benefits, drawbacks, and issues in which further study is needed. We focused primarily, though not exclusively, on studies of school-aged children.

It is important to note that one challenge in reviewing this literature is the lack of a clear understanding of the nature of the working memory construct. Beyond the fact that it is an incredibly important cognitive skill for a wide range of tasks, there is little agreement on how to define it, and even less agreement on how to operationalize it for measurement. Indeed, it is not uncommon for authors in this field to question whether a particular measure assesses working memory at all, or another construct entirely. This conceptual and applied weakness impacts the research reviewed below, as it is makes it difficult to know both precisely which aspects of working memory are targeted by CogMed, and how they then may transfer to gains in other, unrelated tasks.

FINDINGS

A number of the studies authored by individuals involved with CogMed report findings consistent with the following: “WM training could be used as a remediating intervention for individuals for whom low WM capacity is a limiting factor for academic performance or everyday life.” (Klingberg, 2010). These findings are based on a number of studies in which students underwent the 5-week CogMed training, and were generally compared to control groups on a range of measures tapping working memory. In a number of these studies, students were found to have improved significantly compared to a control group on a working memory task post-intervention. Two primary questions emerge from this literature: 1) Does CogMed produce gains in skills that are close in form to the type of training received; and 2) Are these gains limited to the time of training, or do they represent sustained, long-term gains that will remain long after the training is completed? These questions are central to the claims of CogMed, and are critical to understand if we are to appreciate the value of CogMed to children and their parents.

The first question relates to the question of near-transfer vs. far-transfer. Near-transfer connotes benefits that are close in type to the type of training administered. In other words, near-transfer suggests that CogMed training leads to gains in activities like those practiced during CogMed training. There is good evidence that, in the short-term, CogMed leads to near-transfer gains in skills closely related to working memory span in the visual domain, and in attentional stamina, or vigilance. However, the research has...
also led to replication failures on a number of occasions, calling into question whether CogMed leads to gains in skills that are materially different than the specific skills practiced during the exercises. In addition, the findings have not been conclusive regarding whether CogMed produces gains in working memory capacity, which is the key variable targeted by the training. Finally, the duration of any gains exhibited has not been fully examined at this point.

The issue of far-transfer examines whether CogMed produces gains in skills considerably different in type than the skills explicitly practiced during CogMed training. These skills include reasoning, reaction time, hyperactivity, academic skills such as reading and math, and behavioral self-control. The findings currently do not provide much support for CogMed producing significant gains in these skills. In the few instances in which gains have been found, they have not been replicated at long-term follow-up.

SUMMARY

Currently, the available research on the impact of CogMed training indicates that the program is most likely to produce short-term benefits in areas that are closely linked to the specific skills utilized during CogMed training, such as visual working memory. There is very little evidence supporting far-transfer, and similarly little evidence indicating that gains remain at long-term follow-up.

These findings do not suggest that CogMed training, or working memory training in general, are not worthy of further investigation. Rather, they suggest that the current state of the field includes the following: an unclear, inconsistent definition of the target variable (working memory); the lack of any consistent theory explaining the role of working memory in academic skills; and a clear neurologically-based understanding of how working memory relates to other neurological functions and cognitive tasks. It is the view of many of the researchers who publish in this area, as well as this group, that working memory training holds promise of benefit to students, but that the scientific understanding of the key processes involved in such training remain limited, and as a result the potential benefits of the technology remains unclear, for now, as well.
References:


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