

Computer-based program may help relieve some ADHD symptoms in children

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An intensive, five-week working memory training program shows promise in relieving some of the symptoms of attention deficit hyperactivity disorder in children, a new study suggests.

Researchers found significant changes for students who completed the program in areas such as attention, ADHD symptoms, planning and organization, initiating tasks, and [working memory](#).

"This program really seemed to make a difference for many of the children with ADHD," said Steven Beck, co-author of the study an associate professor of [psychology](#) at Ohio State University.

"It is not going to replace medication, but it could be a useful complementary therapy."

Beck conducted the study with Christine Hanson and Synthia Puffenberger, graduate students in psychology at Ohio State. Their findings are published in the November/December 2010 issue of the *Journal of Clinical Child & Adolescent Psychology*.

The researchers tested software developed by a Swedish company called Cogmed, in conjunction with the Karolinska Institute, a medical university in Stockholm.

The software is designed to improve one of the major deficiencies found in people with ADHD – working memory.

Working memory is the ability to hold onto information long enough to achieve a goal. For example, you have to remember a phone number long enough for you to dial it. Students have to remember the passage of a book they just read, in order to understand what they're currently reading.

"Working memory is critical in everyday life, and certainly for academic success, but it is one of the things that is very difficult for children with ADHD," Hanson said.

The study involved 52 students, aged 7 to 17, who attended a private school in Columbus that serves children with learning disabilities, many of whom also have an ADHD diagnoses. All the children used the software in their homes, under the supervision of their parents and the researchers.

The software includes a set of 25 exercises that students had to complete within 5 to 6 weeks. Each session is 30 to 40 minutes long. The exercises are in a computer-game format and are designed to help students improve their working memory. For example, in one exercise a robot will speak numbers in a certain order, and the student has to click on the numbers the robot spoke, on the computer screen, in the opposite order.

"At first the kids love it, because it is like a game," Puffenberger said. "But the software has an algorithm built in that makes the exercises harder as the students get better. So the children are always challenged."

Half the students participated at the beginning of the study. The other half were wait-listed, and completed the software program after the others were finished.

Parents and teachers of the participating students completed measures of the children's ADHD symptoms and working memory before the

intervention, one month after treatment, and four months after treatment.

Results showed that parents generally rated their children as improving on inattention, overall number of ADHD symptoms, working memory, planning and organization and in initiating tasks. These changes were evident both immediately after treatment and four months later.

On individual measures, between one-fourth and one-third of the children showed clinically significant progress – in other words, enough progress to be easily visible to their parents.

The teacher ratings, while pointed in the direction of improvement, were not strong enough to be statistically significant in this study. That's not surprising, Beck said, because very few treatment studies ever find significance among teacher measures.

"Teachers only see the kids for a few hours a day and they are dealing with a lot of other children at the same time. It would be difficult for them to see changes," Beck said.

Beck said this is the first published study they know of testing this software in the United States. One of the strengths of the study is that it used a very typical sample of children with ADHD – other studies in Sweden had excluded children who were on medication.

"Most kids with ADHD are on some kind of medication, so it helps to know how this intervention works in these cases," he said.

In this sample, 60 percent of the students were on medication. The results showed the program was equally effective regardless of whether they were on medication or not.

"Medication for ADHD does not help directly with working memory, and the training program does, so it can be useful," Beck said.

"One of the encouraging findings is that parents reported even ADHD symptoms improved after the program, and that isn't the focus. This program is focused on improving working memory."

Beck said they can't say for sure how the program works to help kids with [ADHD](#). But it seems that children are learning how to focus and how to use their working memory on everyday tasks, and they are able to use that knowledge at school and home.

One possible criticism of the study could be that it relies on parental reports, and the parents may be biased.

"That's true, but it is also the parents who are observing the kids day in and day out, and they are the ones who would be most likely to observe any changes that occur," Beck said.

The researchers plan on extending the work by using more objective measures of children's progress after using the program.

Provided by The Ohio State University

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