A Randomized Controlled Trial of Two Forms of Computerized Working Memory Training in ADHD

Christopher Lucas, M.D., M.P.H., Howard Abikoff, Ph.D., Eva Petkova, Ph.D., Weijin Gan, M.S., Solomon Sved, Lindsey Brueitt, Brittany Eldridge, B.A.
Department of Child & Adolescent Psychiatry, New York University School of Medicine, New York, NY

Abstract
Working memory (WM) deficits are frequently found in subjects with Attention-Deficit Hyperactivity Disorder (ADHD). Previous studies have suggested that computerized training (specifically visuospatial) WM tasks can improve WM deficits and reduce ADHD symptoms.

Method
Design: Randomized double-blind trial comparing two forms of computerized WM training (CWMT).

Participants: 46 children aged 7-12 with ADHD attending an intensive 8-week, behaviorally based, summer treatment program.

Subjects were randomized to receive Verbal (n=22) or Visuospatial (n=24) WM training.

Group 1 (CWMT-VER) and 24 to Group 2 (CWMT-VS).

The children were administered the Automated Working Memory Assessment (AWMA). Weekly counts were made before (week 2) and after (week 7), blind to group assignment using 5 sub-tests from the AWMA.

Group 1: Dot Matrix (effect size (ES)=0.52, p=0.01) and Block Recall (ES=0.40, p=0.06). There were no differences between groups in verbal WM.

There were no significant baseline differences between groups in terms of gender, age, or IQ. Group 2 (CWMT-VS) children (p=0.04).

The average number of positive behavioral points the children earned each week from counselors, blind to group assignment, as part of their day-to-day progress in the camp, was greater in the group receiving visuospatial WM training compared to the verbal WM training group (ES=0.50, p=0.03).

During weeks 4, 5 & 6 by the group receiving visuospatial WM training compared to the verbal WM training group.

The mean (SD) ADHD symptoms at baseline (week 1) was 20.14 (15.4) for Group 1 and 23.65 (15.0) for Group 2.

Group 2 (CWMT-VS) children (p=0.046).

At baseline, during the first week of the SPK, the children were administered 5 sub-tests from the Automated Working Memory Assessment (AWMA). Subjects were randomized to receive one of two training protocols with CWMT software (ReboGoMoRo) or either 6 visuospatial WM training tasks (CWMT-VS) or 5 verbal and 1 visuospatial training tasks (CWMT-VER). To protect the blind, one visuospatial task was carried out using tasks that were not specifically trained upon. Visuospatial, but not verbal WM training was associated with improvement in parent rated symptoms of ADHD. It has been suggested that WM deficits and reduce ADHD symptoms.

Conclusion
Computerized training of visuospatial working memory tasks can increase WM performance on tasks that were not specifically trained upon. Visuospatial, but not verbal WM training was associated with improvement in parent rated symptoms of ADHD. It has been suggested that WM deficits and reduce ADHD symptoms.

References