Preterm children’s long-term academic performance after adaptive computerized training: A randomized controlled trial

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Background and aims

Preterm children often struggle in school because of working memory and mathematic difficulties. Adaptive computerized interventions may help improve academic success but randomized trials for school-aged preterm children are rare. We tested whether adaptive online math training (XtraMath®) versus working memory training (Cogmed®) improves academic performance.

Methods

During their first year of elementary school, N=65 preterm children (28 – 35+6 weeks gestation; stratified for gestational age and gender) were recruited into a prospective multi-center trial (Figure 1). Participants were randomized into two groups and received one of two computerized trainings at home for five weeks.

Primary Outcome: Teachers rated academic performance (TAAS) in math, reading, and attention compared to classmates before (pretest), directly after (posttest), and 12 months after the intervention (follow-up). Total academic growth (change from baseline) was calculated as z-standardized difference. Math tests were administered as secondary outcomes.

Figure 1. Randomization flow chart

HIE: Hypoxic Ischemic Encephalopathy; PVL: Periventricular Leucomalacia; IVH: Intraventricular Hemorrhage; ODD: Oppositional Defiant Disorder

Results

Bootstrapped linear regressions with intervention as main factor and baseline TAAS (T1) as covariate showed that total academic growth to post-test was higher in the XtraMath group (B= -.29 [95% CI: -.60 to -.04], p=.045), but this difference was not sustained at 12-months follow-up (B=.10 [-.64 to .87], p=.784; Figure 2).

There were no significant group differences on secondary outcomes according to training condition, however, children in the XtraMath group showed a tendency to do better in math (Figure 3).

Figure 2. Teacher-rated Academic Attainment Score (TAAS) Growth by Intervention (XtraMath versus Cogmed)

Figure 3. Standardized Math Test Scores (DEMAT) Growth by Intervention (XtraMath versus Cogmed)

Conclusion

Our findings do not show a difference in effectiveness between Cogmed and the open-access online training XtraMath, but XtraMath may tend to better support preterm children’s success in mathematics.

Please have a look at our related e-poster: *Feasibility of adaptive computerized working memory and math intervention in 7-year-old children born preterm* by Heuser et al.

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