The cognitive training with the game “Kalkulilo” and mathematical abilities in children – the preliminary results of a pilot study

Kmiećk et al.

Introduction
The cognitive benefits of playing video games are widely proved in the scientific literature and the use of computer technology to support learning has become popular. Moreover, several studies concerning the effect of this type of intervention methods on the mathematical (and other cognitive) abilities have showed the positive outcomes of using such computer-assisted intervention.

Aim of the study
We examined the effect of training with the use of the computer mathematical game "Kalkulilo" on such mathematical abilities as numerosity assessing, number magnitudes comparison with the use of different formats of displayed numbers (Arabic symbols of numbers and non-symbolic dots patterns) and localization of numbers on the number line (spatial-numerical association).

Methods
Participants
Ten children aged from 5 to 10 participated in the study (4 girls, 6 boys).

Experimental procedure:
The procedure consisted of the pre-test, 3-hours training (divided into 10 sessions) and the post-test.

The tasks in the pre- and post-test:
The pre- and post-test was the performance of the Screening Test for Dyscalculia Risk Assessment (STDRA) which has been developed by our team in the NeuroCognitive Lab of Centre for Modern Interdisciplinary Technologies. It includes 9 tasks that require the responses with a keyboard (1 part) and a computer mouse (2 part).

Results
Training using “Kalkulilo” game did not improve accuracy in any condition of number magnitude comparison task. However, after training we observed a reduction of response times in case of numbers presented in different formats (i.e. when dots vs. digits were compared).

Conclusions
The cognitive training using “Kalkulilo” supports the automatization in the processing of mental representations of numerical magnitudes and transformation between mental representations of numbers processed in different formats (symbolic and non-symbolic notations).