NICOLAUS COPERNICUS UNIVERSITY IN TORUŃ

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

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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).

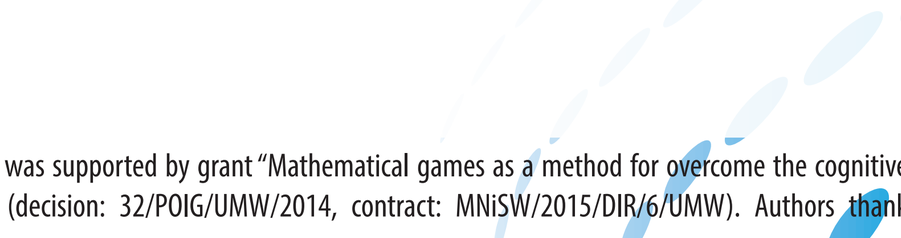
Methods

Participants

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

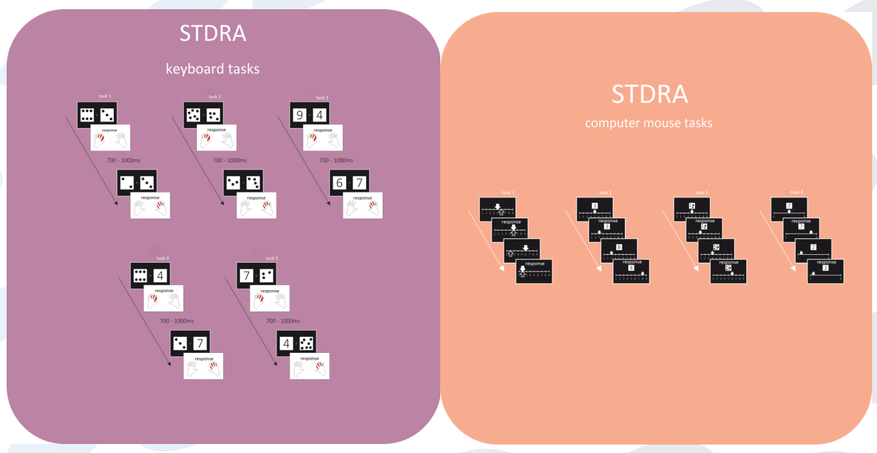
Experimental procedure:

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



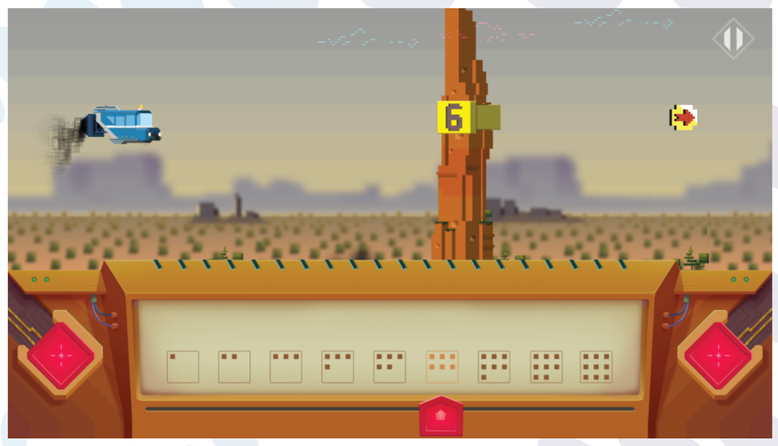
The tasks in the pre- and post-test:

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)



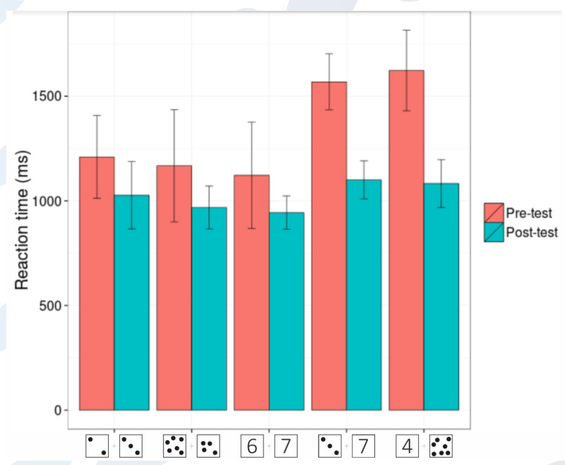
The training:

Between pre- and post-test children were taking part in the training with the game 'Kalkulilo'. The precise description and application of "Kalkulilo" is presented during this conference on the other poster of our research team (see a poster next to this one, by Stępińska et al.). The training lasted approximately 3 hours and was divided in the sessions. Each session lasted about 30 minutes per day (M=22 min). Twenty-four hours after the finish of the training, children were again tested with STDRA.



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).



The diffrences between reaction times in pre-test vs post-test obtained in particular experimental conditions.

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).

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