

HOW TO INCREASE ATTENTION USING A COMPUTER ASSISTED TEACHING PROCEDURE

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Attention has effective implications on the learning at school. Because the school setting demands that children wait for turns or cues, pay attention and keep on the task, it is not surprising that many children with attention deficit have school behavioral and learning problems. Their minds are full of learning capacity, but high activity and low attention skills make learning impossible.

Computer Assisted Instruction (CAI) approach could be noted as new technology, and an useful educative tool for improving students' cognitive deficit (Alcalde, Navarro, Marchena & Ruiz, 1998). The low cost and wider computer software available for the last decade, facilitates the spread of CAI in the educational setting. Outreaching the age of text plus pictures, today's new software harnesses the full potential of multimedia: animations, video, sound and music (DuPaul & Eckert, 1998). Multimedia programming technique has potential skills to improve all processes involved in children's attention deficits. Multimedia can be considered a powerful resource that, under a systematic and managed teaching method (CAI), may be an alternative support for children with low attention competencies.

Considering this in the school setting, and the necessity of getting efficient tools to improve attention, a multimedia software was designed to increase children's cognitive attention skills. The "*How to improve your Mental Skills*" software exhibits an applicable and original project to develop cognitive skills linked with self-control, attention and concentration processes.

METHOD

A total of 155, 73 boys and 82 girls, 6th, 7th, and 8th graders, with an average age of 12.4 (sd = 0.93) years for boys, and of 12.2 (sd = 1.02) for girls, from the public school district of San Fernando-Cadiz, Spain, participated in the study. Students attention was assessed with the Perception Differences Test (Faces), and sub-test Spatial of Primary Mental Aptitude (S-PMA).

Attention training was achieved with the "*How to improve your Mental Skills*" computer program (Navarro, Alcalde, Marchena, Ruiz & Amar, 1996). This software has as its general goal to practice and develop relaxation, attention and concentration skills, facilitating control behavior in academic and personal contexts. "*How to Improve your Mental Skills*" has two sections: relaxation practice, and attention and concentration training. The attention and concentration section presents four multimedia games and progressively teaches such skills. Game performance assessment is possible after each session. Each game has three difficulty levels (easy, moderate and hard), and a range of 5 to 10 trials.

Students were randomly assigned to the experimental or control groups according to the test scores. Groups were finally adjusted in the following way: (a) Experimental Group: 51 students received 10 daily, training sessions of 20 minutes each, with the "*How to improve your Mental Skills*" software. Experimental sessions were carried out in the computer lab, and individually seated in front of the computer, they practised three trial games each. Then, scores were recorded. (b) Control-1 Group: 53 students received 10 daily training sessions of 20 minutes each with the "*Tetris*" software game. These sessions were carried out in the computer lab, and individually seated in front of the computer, they practised the game all the time. (c) Control-2 Group: 51 students did

not receive any computer training. They remained in the class following the ordinary learning activities.

RESULTS AND DISCUSSION

According to descriptive statistic data (figure 1) in the Faces pre-test for Experimental Group was a mean of 29.37 (sd = 7.94); Control Group-1 mean = 30.58 (8.65); and Control Group-2 mean = 29.94 (9.25). Faces post-test data for Experimental Group: Mean = 44.49 (8.77); ControlGroup-1: Mean = 38.88 (9.88); ControlGroup-2: Mean = 35.96 (10.17). SPMA pre-test test data for Experimental Group: Mean = 17.41 (13.27); Control Group-1: Mean = 16.18 (10.34); ControlGroup-2: Mean = 15.64 (11.02). And SPMA post-test data were for Experimental Group: Mean = 24.9 (14.16); Control Group-1: Mean = 22.02 (11.84); ControlGroup-2: Mean = 21.86 (11.01). The post-test per group scores increase in the Faces test were: 15.19 points for Experimental Group; 8.3 for Control Group-1, and 5.75 for Control Group-2. The post-test per group scores increase in the S-PMA were: 7.94 for the Experimental Group, 5.84 for Control Group-1, and 6.22 for Control Group-2.

Statistical differences between all groups means at the Faces post-test scores were found ($F[2,145] = 10.492$; $p < 0.0001$). And *a posteriori* ANOVA was calculated to know which groups evinced significant differences. Data revealed that comparisons between Experimental Group and Control Group-1 was statistically different. (Mean differences = 5.61; $p < 0.017$), and Experimental Group and Control Group-2 (Mean differences = 8.80; $p < 0.0001$).

Data suggests that Experimental Group significantly improved attention potential after 10 training session with the "*How to improve your Mental Skills*" specific computer software. That gain was obtained at the Faces test rather than SPMA test. Faces test is a specific test to assess the continuous attention, it would be reasonable to consider that the better scores obtained by students in the Faces test represented a continuous attention gain. Therefore, specific computer software, designed to improve attention, would be effective maintaining the attention processes.

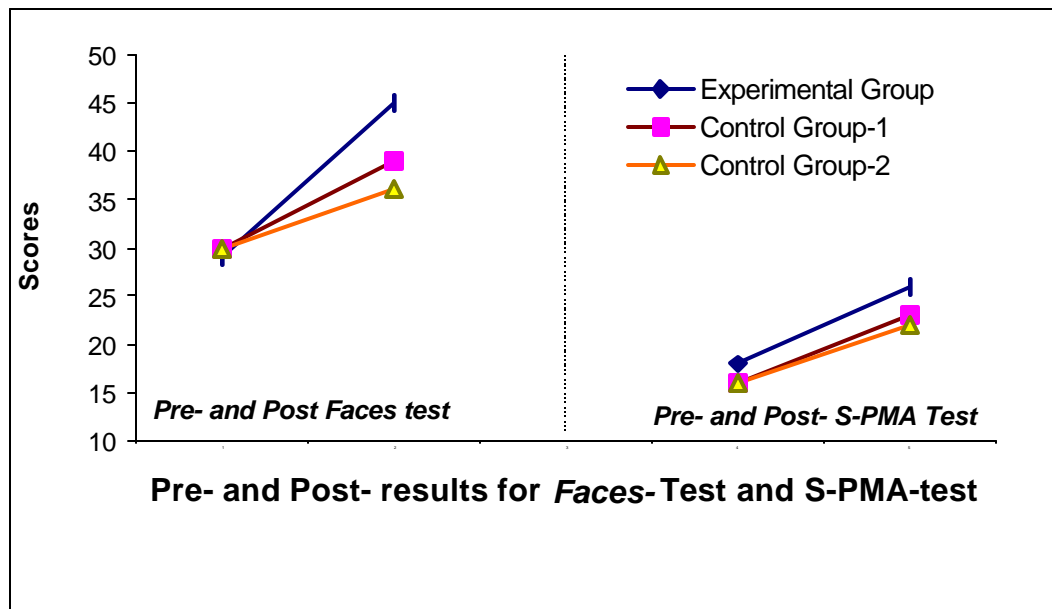
These results admit a positive perspective for low attention skill children. Multimedia computer design constitutes another teaching support. Its versatility and easy use establishes CAI as a choice teaching approach (Howell & Navarro, 1997). The suitable practical impact to this effect would be substantial since consolidation of attention resources during childhood would reduce future learning disabilities (Roznowski, Dickter, Hong, Sawin & Shute, 2000).

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Figure 1
Pre-test and post-test experimental and control groups mean scores for Faces and E-PMA tests.



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