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Action Video Games Improve Multisensory Perceptual Noise Exclusion in Children with Dyslexia

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INTRODUCTION

Reading acquisition is extremely difficult for about 5% of children because they are affected by an heritable neurobiological disorder called Developmental Dyslexia (DD). DD is not only characterized by a reading difficulty, but also by phonological, motor and visual attention deficits. Some studies have argued the crucial role played by altered auditory and visual mechanisms of perceptual noise exclusion in DD. To test the causal role of perceptual noise exclusion in reading abilities, we proposed two different training with action (AVG) and non-action video games (NAVG) to a group of 14 children with DD.

METHOD

14 children (mean age: 8.93 y.o.)
14 AVG
12 NAVG

T1 - BASELINE
First Cognitive Assessment
2-3 days before the training

AVG/NAVG TRAINING
First session of training.
9 days of AVG sessions and 9 days of NAVG sessions of 80 minutes each

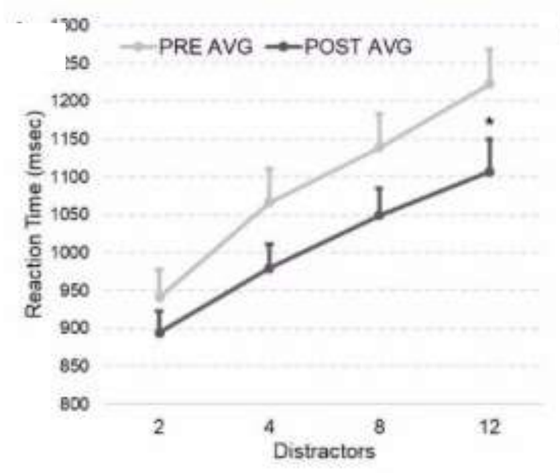
T2
Second Cognitive Assessment
2-3 days after the training

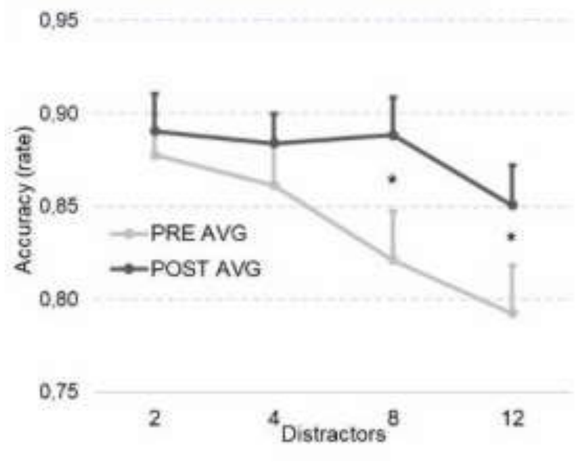
BREAK 10-DAYS

NAVG/AVG TRAINING
Second session of training
9 days of NAVG sessions and 9 days of AVG sessions of 80 minutes each

T3
Final Cognitive Assessment
2-3 days after the training

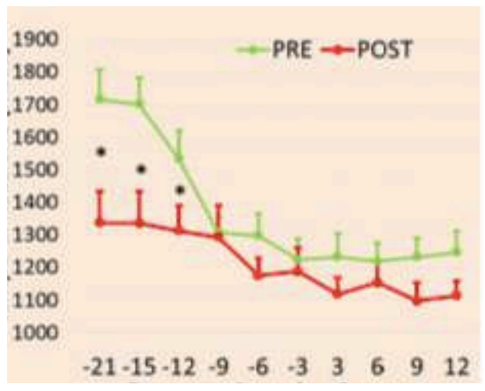
RESULTS: VISUAL SEARCH TASK





RESULTS: PERCEPTUAL NOISE EXCLUSION

Left Ear (AVG)



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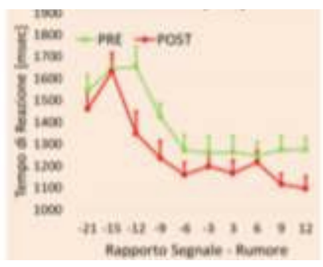
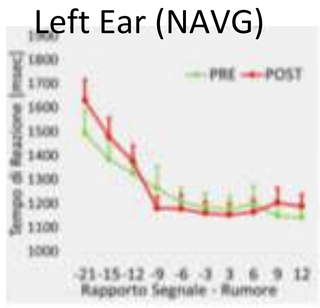
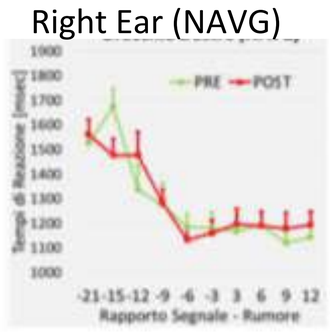
Right Ear (AVG)



Left Ear (NAVG)

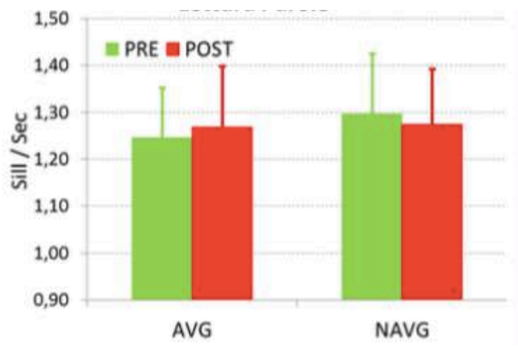


Right Ear (NAVG)

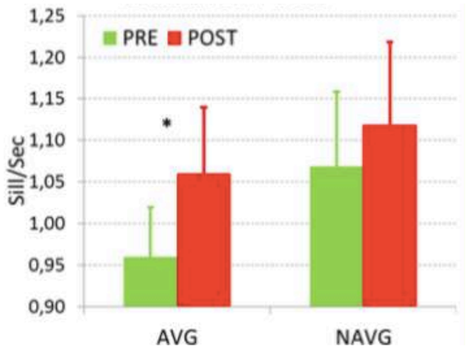


RESULTS: READING TASKS

Words



Pseudowords



CONCLUSION

This study supports the conclusion that a disorder of the multisensory perceptual noise exclusion mechanism is causally linked to the reading deficits that characterize DD. Indeed, a training that enhances the efficiency of this attentional mechanism appears to improve phonological decoding skills in children with DD .

Moreover, for the first time, through this study we directly investigated the causal role of multisensory mechanisms of perceptual noise exclusion in children with DD by using AVG training.