Auditive training effect in children using a dichotic listening paradigm.

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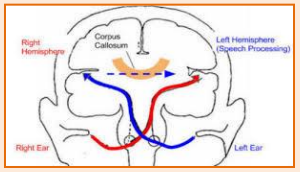


Introduction.

Along with language development, there is a gradual shift in brain lateralization dominance for language towards the left hemisphere.

- A frequently asked question is to what degree atypical brain lateralization interacts with developmental language impairments as specific language impairment (SLI) and dyslexia [2, 4]

- If there is a significant interaction, one may speculate that early intervention to stimulate language lateralization should be applied in these impairments

- Due to the predominance of the contralateral neuronal pathways, a right ear advantage (REA) in the dichotic listening (DL) task reflects the superior processing capacity for the right ear stimulus in the left hemisphere.

- This study examined the effects of auditory training in typical children with DL involving consonant-vowel (CV) syllables.

- A new mobile device (MD) version of the DLCV paradigm (*iDichotic*) made it possible to carry out training with DL using iPod touch devices [1]. The aim was to see if training with DL would alter the response pattern in children who are learning to read and write.

Method.

Participants in the study were 30 eight-year old children assessed with the DL using the MD version with headphones and touch screens.

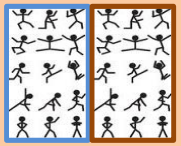
- The subjects listened to 36 stimuli combinations of CV-syllables /ba/, /da/, /ga/, /pa/, /ta/, /ka,/ including six homonym pairs, presented simultaneously in both ears using the three classical conditions non-forced (NF) forced right (FR) and forced left (FL).

- The established groups, Control (M/F: 10/5) and Training (M/F: 8/7), were tested pre and post a training period. The Training group trained collectively once a day for five days using the previously described paradigm. Controls received no training.

iDichotic

PRE

Control Training



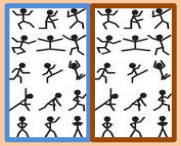
Training period

Training

1 session a day, five days

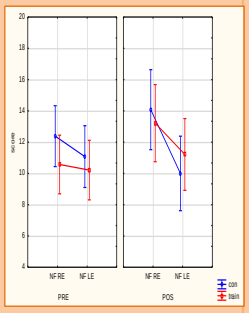
POST*

Control Training

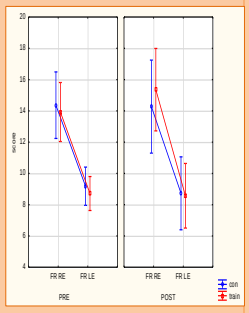


RESULTS 1*

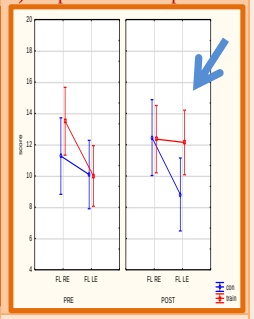
No sign effects



Significant effect of Rep measures (RE < LE***)



Significant effects of
1) group (con<train**);
2) rep measures (pre>post*);
3) LE post train>LE post con



RESULTS 2*

PRE	Control	Training
REA	11	7
LEA	4	4
NEA	1	4

REA: right ear advantage
LEA: left ear advantage
NEA: no ear advantage

POST	Control	Training
REA	11	**10**
LEA	**1**	4
NEA	1	**0**

*Missing data: 2 on pre FR and FL; 4 on post

- The DL scores were subjected to factorial analyses of variance (ANOVA) with the design group (Control, Training) by ear (right, left) by test (pre, post). Also, ear advantage pre and post testing was reported.

Results.

1. The Training group showed a significant higher posttest left ear score in the FL condition compared to their pretest scores and also to the pre- and posttest scores of the Control group.

2. A similar effect was also reflected in the ear advantage scores, but not in the NF and FR scores.

- Thus, the results showed significant training-related effects for the FL "top-down" (cognitive-driven control) training but not for "bottom-up" NF and FR (stimulus-driven attention) training. These effects were evident as higher accuracy rates in the FL condition sets demands on cognitive control.

Discussion.

The results indicate that training with the DL paradigm can modulate children's attentional control.

- Although SLI and dyslexia are impairments associated with left hemisphere language functions, studies point to impaired executive functions in these impairments. [3] One may speculate that a longer period of training could improve both a "bottom-up" and a "top- down" driven language function in these impairments.

- Also, as impaired pragmatic language functions are seen in both ADHD and in autism spectrum disorders, one may speculate that auditory "top-down" training could be beneficial to these groups.

References: on the back page

References

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4. Helland, T., Asbjørnsen, A. E., Hushovd, A. E., & Hugdahl, K. (2008). Dichotic listening and school performance in dyslexia. *Dyslexia, 14*(1), 42-53. doi: 10.1002/dys.343