The LiSN & Learn Auditory Training Program for Children with CAPD

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Background Information

- Children with Central Auditory Processing Disorder (CAPD) commonly report difficulty understanding speech in noise.
- Spatial Processing Disorder (SPD)- a deficiency in the ability to selectively attend to sounds arriving from one direction while suppressing sounds arriving from other directions- has been shown to be a cause of difficulty understanding speech in noise for a percentage of normal-hearing children.
- SPD can be diagnosed with the Listening in Spatialized Noise – Sentences test (LiSN-S).

Aim: To develop and assess the efficacy of the LiSN & Learn auditory training program for remediating SPD.

What is the LiSN & Learn?

- Auditory training program incorporating 4 games presented over a computer
- Target sentences presented at 0º azimuth
- Distracting stories presented at ±90º azimuth
- Child selects a picture that matches a word from the target sentence
- Weighted up-down adaptive procedure used to adjust the signal-to-noise ratio
- SRT calculated over 40 sentences

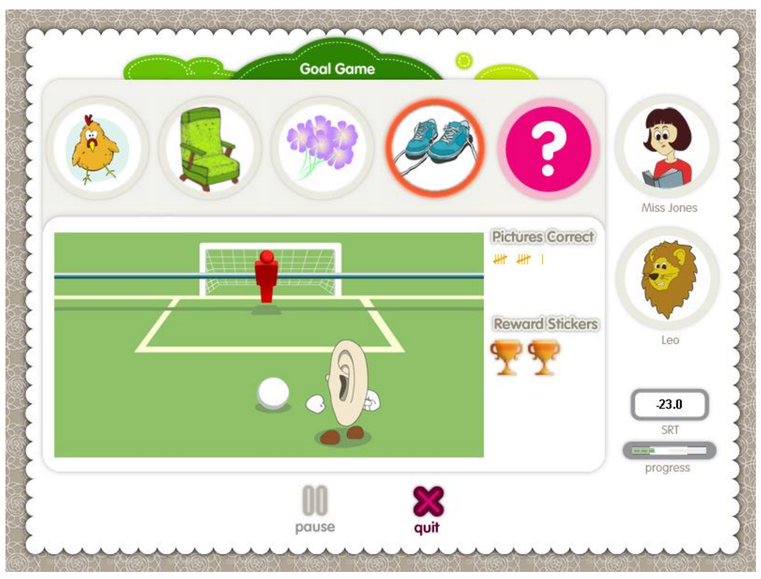

Figure 1- Example of LiSN & Learn game

Phase I Study: Methodology

- 9 children aged 6 to 11 years diagnosed with SPD
- Assessed pre, post and 3 months post training with:
  - LiSN-S
  - Test of Variables of Attention (TOVA-A)
  - Tests of Auditory Processing Skills (TAPS 3)
  - Paediatric version of Speech, Spatial, Qualities Questionnaire
- Train for 12 weeks, 5 days/week, 15 minutes/day

Phase I Study: Results

- All participants performed within normal limits on LISN-S post-training.
- Significant improvements found on high cue SRT ($p < 0.0002$), spatial advantage ($p < 0.0001$) and total advantage ($p < 0.003$) measures of LiSN-S
- Significant improvements shown on tests of attention ($p = 0.013$) and memory ($p = 0.012$).

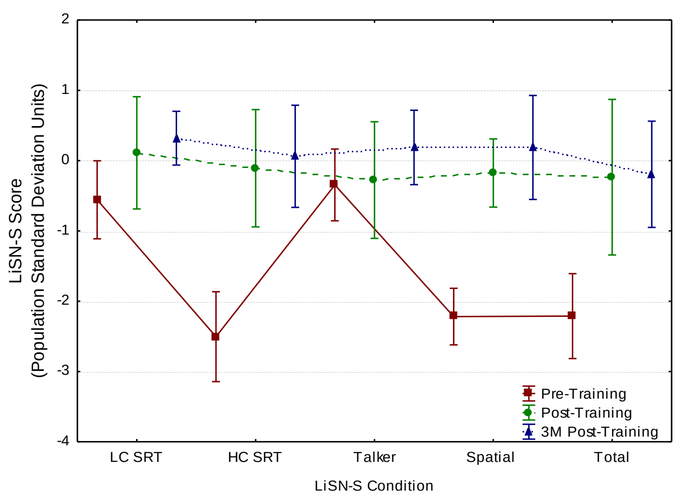

Figure 2- Graph of pre vs post LiSN-S results.

Phase II Study: Methodology

- 10 children aged 6 to 11 years diagnosed with SPD
- Participants were randomly allocated to train with either LiSN & Learn (n=5) or Earobics (n=5)
- Assessed pre and post training with:
  - LiSN-S
  - Listening Inventory for Education (LIFE) questionnaire
- Train for 12 weeks, 5 days/week, 15 minutes/day

Phase II Study: Results

- Only LiSN & Learn group showed significant improvement on LiSN-S high cue SRT ($p = 0.008$), spatial advantage ($p = 0.0008$), total advantage ($p = 0.03$) measures post-training.
- Parent, teacher & child questionnaires show trend of greater improvement for LiSN & Learn group

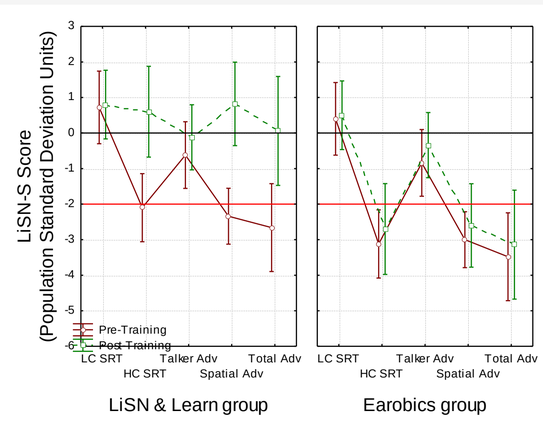

Figure 3- Pre vs post LiSN-S results for LiSN & Learn group and Earobics group.

Conclusions

- LiSN & Learn training strengthens or reorganizes connections dedicated to binaural processing.
- LiSN & Learn training effectively remediates SPD.
- Remediation of SPD requires deficit-specific training.