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 0° azimuth
- Distracting stories presented at ±90° 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

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).

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 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

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.