INTRODUCTION

Benefits of listening with two ears

- Normal hearing (NH) participants
  - TQG (26 y/o), TOD (26 y/o), TQG (27 y/o), TQI (27 y/o)
  - *Participants passed a hearing screening (20 dB HL at octave frequencies from 250-8000 Hz).
- Stimuli
  - Target (T): Harvard IEE sentences* spoken by a female.
  - E.g., “The juice of lemons makes fine punch.”
- Maskers (M): AzBio sentences* spoken by a different female than targets.
  - E.g., “You must live in a gingerbread house.”
- Procedure
  - Participants sat in a soundproof booth with their head in a chin rest.
  - They were instructed to fixate their gaze on a small cross in the center of the computer screen and repeat target sentences.
  - Stimuli were presented over circumaural headphones.

Individuals with hearing loss experience increased effort when listening and trying to understand speech, and this is associated with adverse effects, like fatigue and early retirement.

Listening effort

- "Listening effort is a component of auditory perception involving cognitive processing or load.*
  - o As tasks get harder (e.g., sentence complexity increases, maskers are more similar to target) and cognitive load increases, pupil size also increases. 5, 10

Pupil size

- "Pupil size can be used to objectively quantify changes in listening effort during cognitively demanding tasks (e.g., listening to speech in noise) by capturing changes in pupil dilation.

PURPOSE OF THIS STUDY

To explore whether binaural hearing can facilitate a release from listening effort and improve speech understanding in:

1) Individuals listening to two normal hearing ears.
2) Individuals listening to one normal hearing ear and a CI-simulation in the other ear to simulate the experience of individuals with SSD.

METHODS

Normal hearing (NH) participants

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Fig. 1. Participant’s head

Fig. 2. Examiner’s view of participant’s head

DISCUSSION

Results indicate that adding a copy of the maskers to the second ear improves speech intelligibility scores in both bilateral conditions.

- However, improvement decreases when the input to the second ear is degraded with a CI-simulation.

- All 4 participants exerted the most effort in the bilateral CI-simulation condition, suggesting that integrating input from a NH ear or a CI-simulation facilitates binaural hearing with the addition of a NH ear or a CI-simulation facilitates improved speech understanding.

- Improvement decreases when the input to the second ear is degraded with a CI-simulation.

- 3 out of 4 participants (TQG, TOD, TQG) showed a release from effort in the bilateral NH condition compared to the monaural, suggesting that listening to speech-in-noise with two NH ears requires less effort than just one ear alone.

REFERENCES

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