P351

INNOVATIVE TECHNOLOGIES AND TRANSLATIONAL THERAPIES

Understanding the Impact of Hearing Loss and Evaluating Listening Conditions to Improve Speech Communication in Video Conferencing Calls

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Background

Need of study

- Video conferencing (VC) platforms have become essential in daily life with the global rise of remote and hybrid work.
- There is increasing concern about the impact of VC on people with hearing loss (HL) (Kushalnagar and Vogler, 2020).
- There is limited evidence on how hearing loss affects communication during VC calls.

Objectives

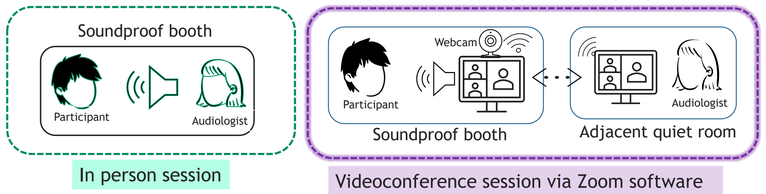
- To explore the challenges people with HL face in understanding speech and following VC calls (Part 1).
- To evaluate whether different listening configurations can alleviate these difficulties during VC calls (Part 2).

Methods

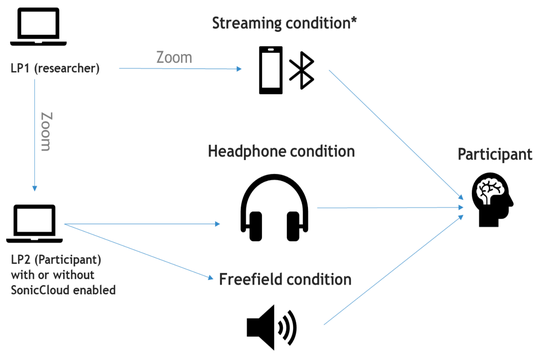
Participants

- Bilateral hearing aids (HAs) users (n=16 in Part 1; n=25 in Part 2)
- Normal hearing adults (NH) (n=16 in Part 1 only)

Experimental setup



(A) Setup for Part 1 of the study



(B) Setup for Part 2 of the study

Outcome measures

- **Speech perception:** BKB-like sentence test in quiet and noise conditions
- **Speech comprehension in noise:** NAL Dynamic Conversations Test (DCT)
- **Self-report evaluation:** Participants' feedback on their experience and preferences in listening effort, sound quality, speech understanding, confidence, satisfaction, and their overall acceptability of the audio-video call.

Participants with HL were evaluated under different conditions (Part 2):
1 High-quality speaker in freefield without sound-enhancing (SE) software (i.e. SonicCloud Frisson software (Sonitum Inc.,USA) .
2 High-quality speaker in freefield with SE software.
3 Headphones without SE software
4 Headphones with SE software
5 Bluetooth streaming directly to hearing aids.

Reseults

Communication difficulties faced by people with HL (Part 1

- Compared to NH people, people with HL experienced significant communication difficulties on most outcome measures during the VC call, even when wearing HAs.
- Performance differences between the VC and in-person conditions showed HA users had significantly worse results compared to the normative deviation range on several measures (Fig 1).

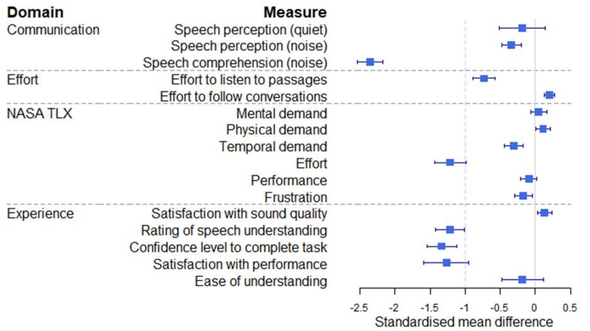


Fig.1. Standardised mean differences between the VC and F2F conditions (converted as z-scores on the x-axis) for each outcome measure (y-axis) for people using HAs in Part 1 of the study. The performance of the NH listeners was within the range -1 to 1.

Evaluation of different listening conditions (Part 2)

- People with HL had varied performances under different conditions, with significant differences between their best and worst conditions across nearly all measures (Fig 2).

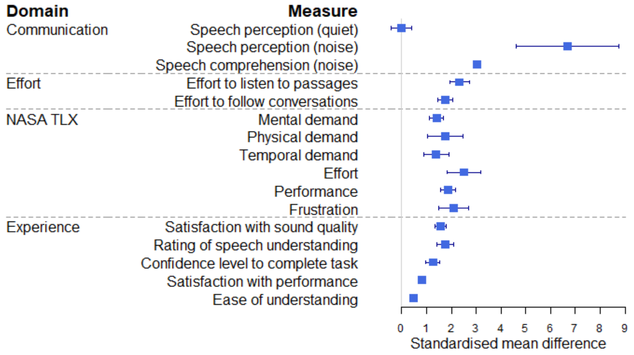
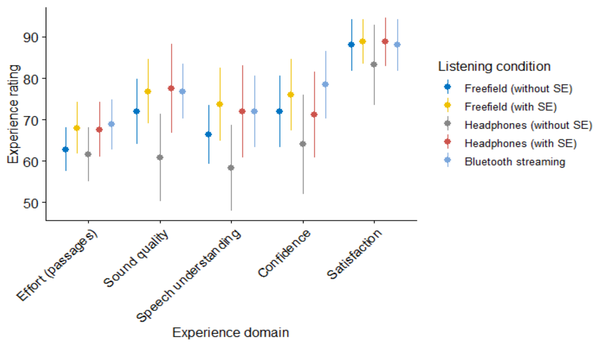


Fig. 2. Standardised mean differences between each individual's best and worst listening conditions (converted as z-scores on the x-axis) for each outcome measure (y-axis) in Part 2 of the study.

- Participants were most likely to achieve their best performances in the Bluetooth streaming or headphones with SE software conditions (Fig 3).



Conclusion

The experiences of people with HL can be enhanced by tailoring their listening setup based on their individual preferences in order to improve communication and reduce listening effort during video calls.

References

Kushalnagar, R. S., & Vogler, C. (2020, October). Teleconference accessibility and guidelines for deaf and hard of hearing users. In Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility (pp. 1-6).

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