

Remote EMA study about modification and avoidance of difficult listening situations by hearing aid users

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Motivation

- Previous hearing aid ecological momentary assessment (EMA) studies show surprisingly few negative ratings on hearing aid satisfaction

Possible reasons:

- Maybe subjects try not to stay in dissatisfactory situations but modify or leave these situations.
- Modifications can be subconscious (e.g. leaning forward to increase SNR) or conscious (e.g. changing the environment or hearing aid setting, leaving the situation)

Research questions:

- Do hearing aid users avoid situations with poor hearing performance?
- How do hearing aid users modify difficult hearing situations?

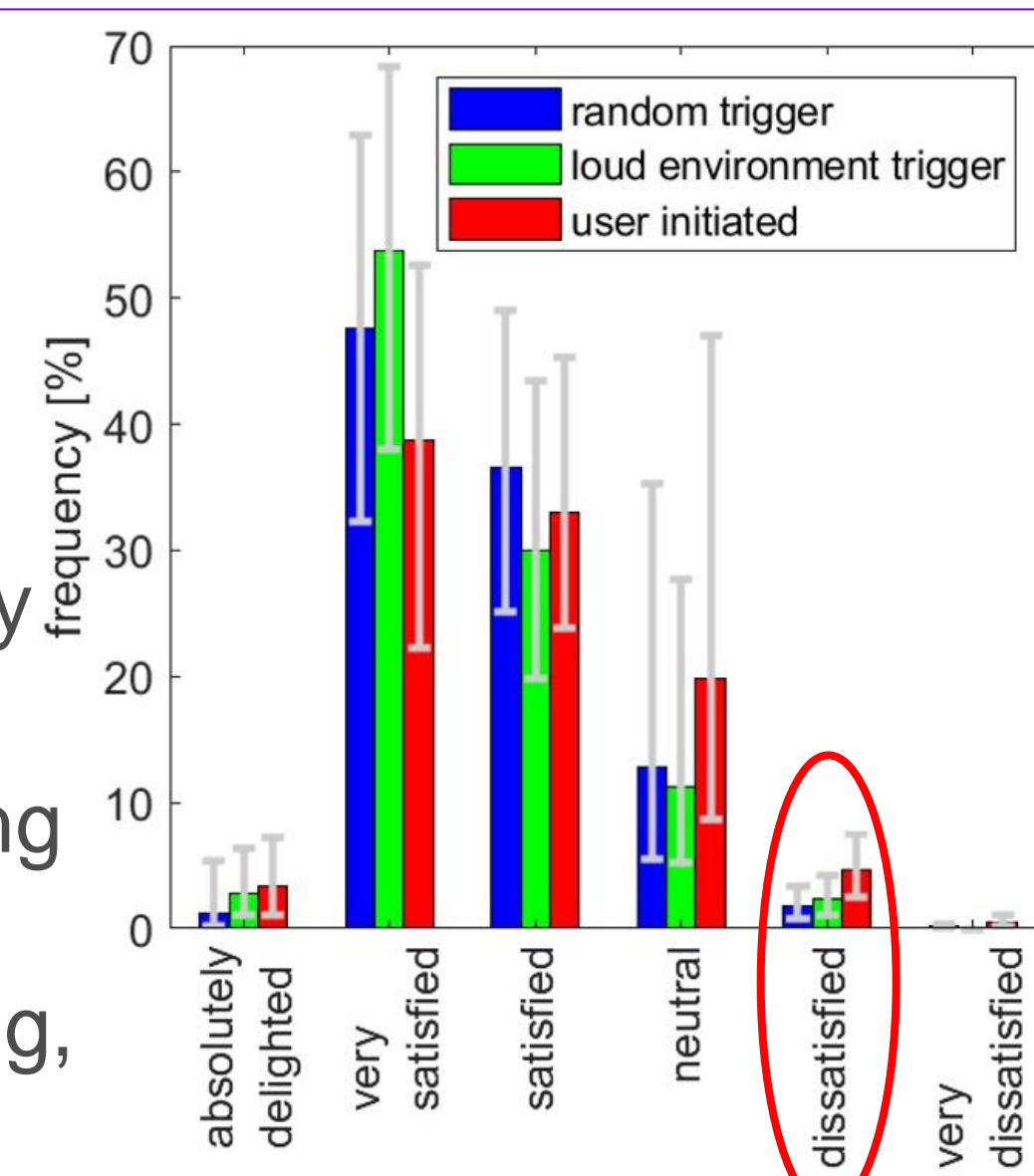


Fig.1: satisfaction rating [Schinkel-Bielefeld, N. (2020)]

Results : Changing the listening situation

Participants were able to change 77% of difficult listening situations

Changes to the hearing aids was done in 38% of the situations (only volume change possible)

Fig.5: Were you able to change the listening situation?

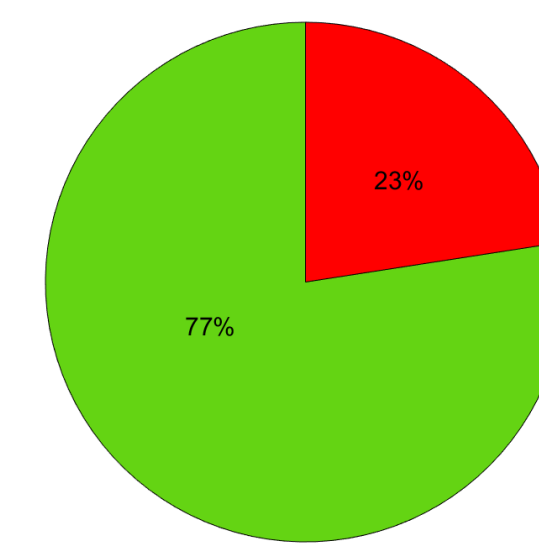
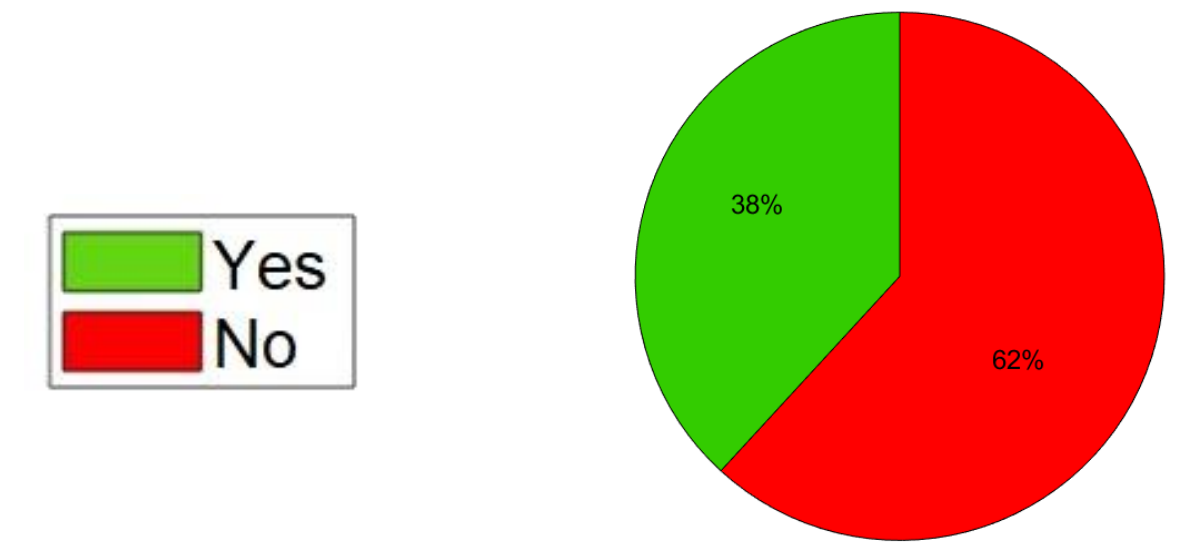


Fig.6: Have you made any changes to the hearing system?



Only in 5% subjects continued a conversation elsewhere and in less than 1% they left the situation completely

In 51% of the situations the changes improved the listening situation so leaving was not necessary

Fig.7: Have you left the listening situation?

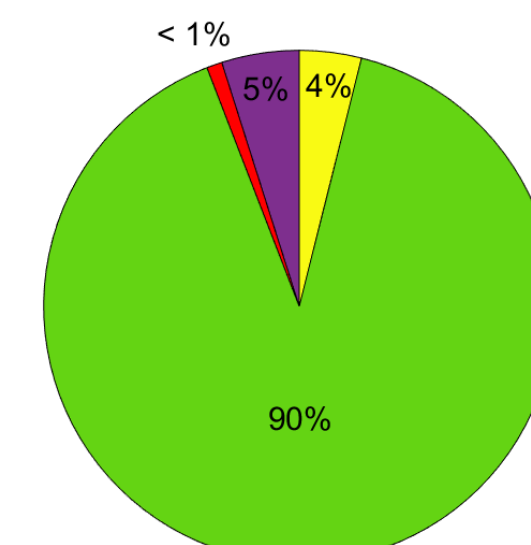
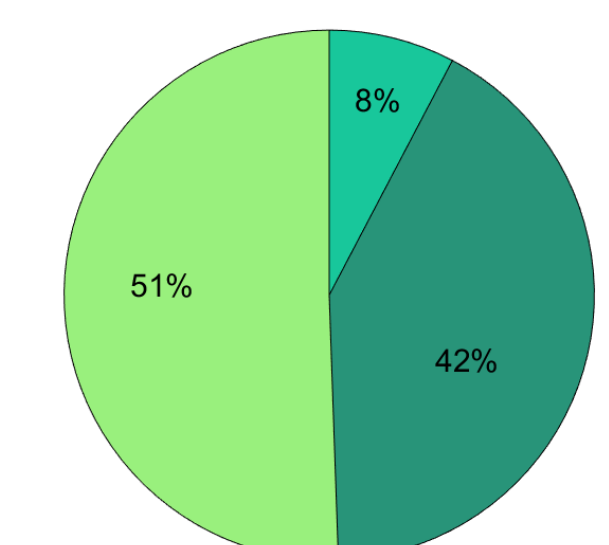


Fig.8: Why didn't you leave the situation?



Results : After what time was the change made?

Changes were usually done in the first 30 minutes of the situation, in 27% within less than 5 minutes

If leaving was necessary, 75% left within less than 10 minutes the situation

Fig.9: When did you change the listening situation?

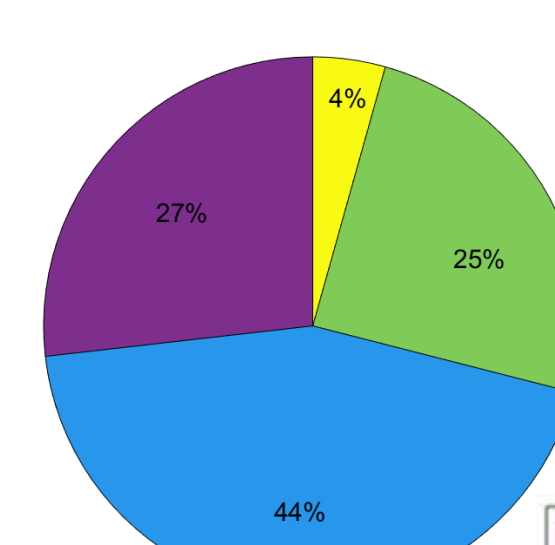
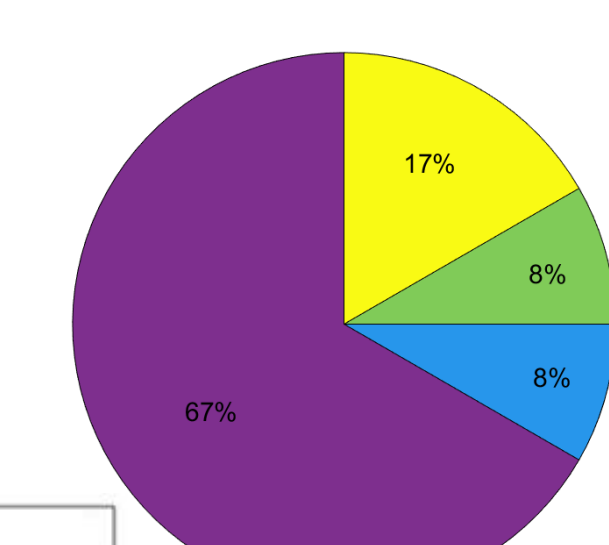


Fig.10: When did you leave the listening situation?



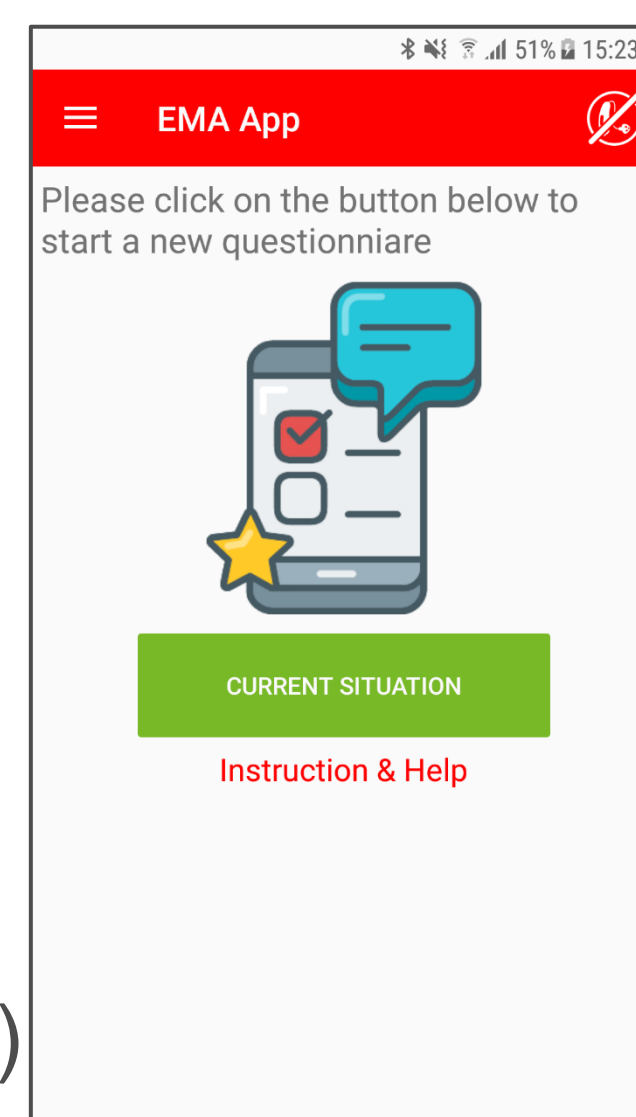
Methods

❖ EMA-App

- Self-triggered questionnaire when in a listening situation with the desire to change something (regardless of whether they have changed something or not in the situation)
- Continuous data about acoustic situation (e.g. level, class)

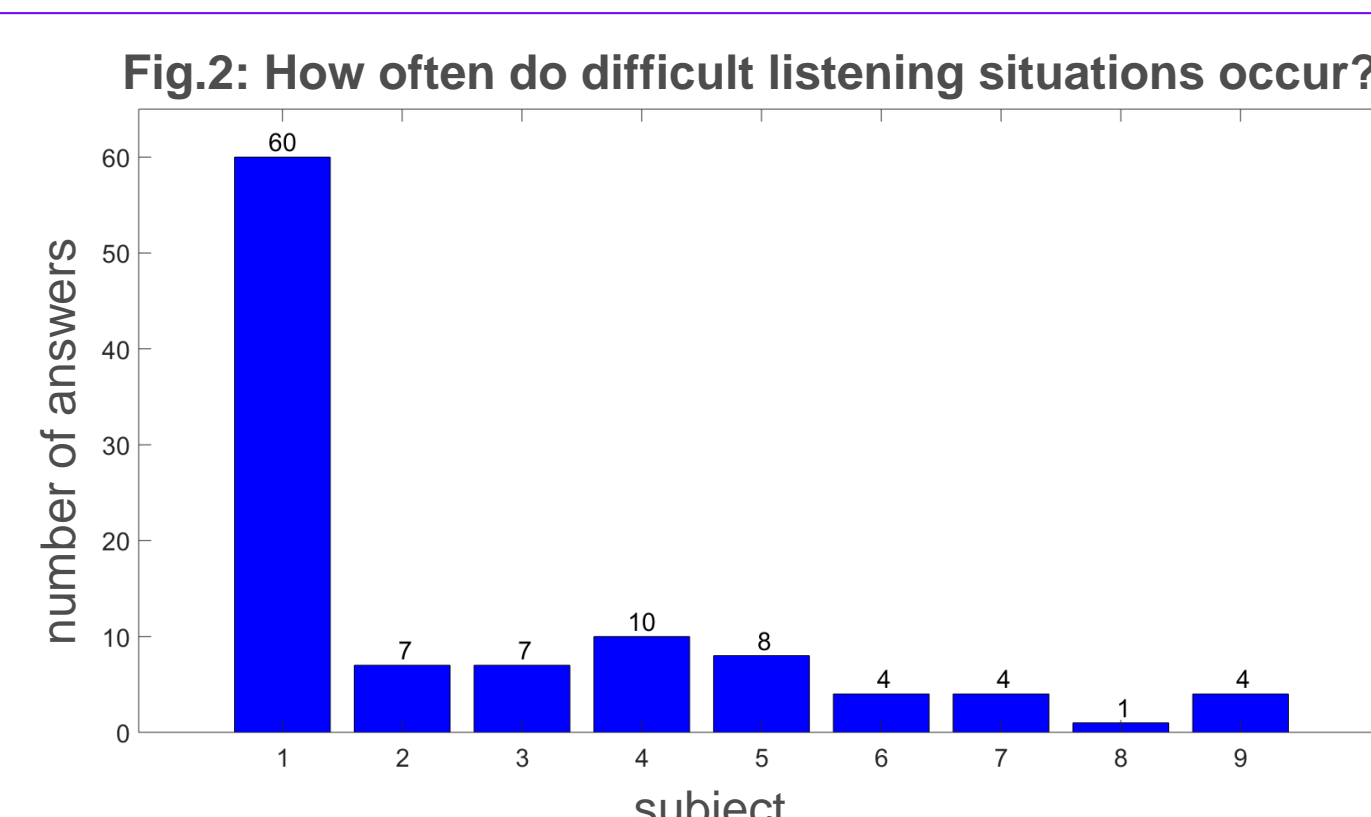
❖ Experimental Procedure (Remote Study)

- N=9 subjects (age 53-89 years, mean 65 years)
- Moderately hearing impaired (PTA4 = 41 dB HL, STD 7 dB)
- Signia Pure 312 7X hearing aids (bilateral)
- Pre-fitted hearing aids and a smartphone with EMA app was sent to the participants by mail
- Remote fine tuning by using the Signia app after own voice processing
- Three weeks home trial
- Exit-Interview

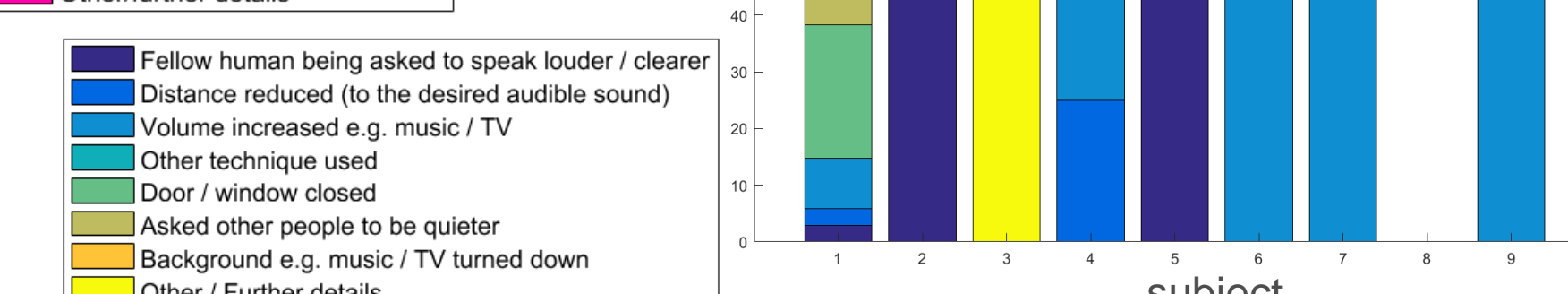
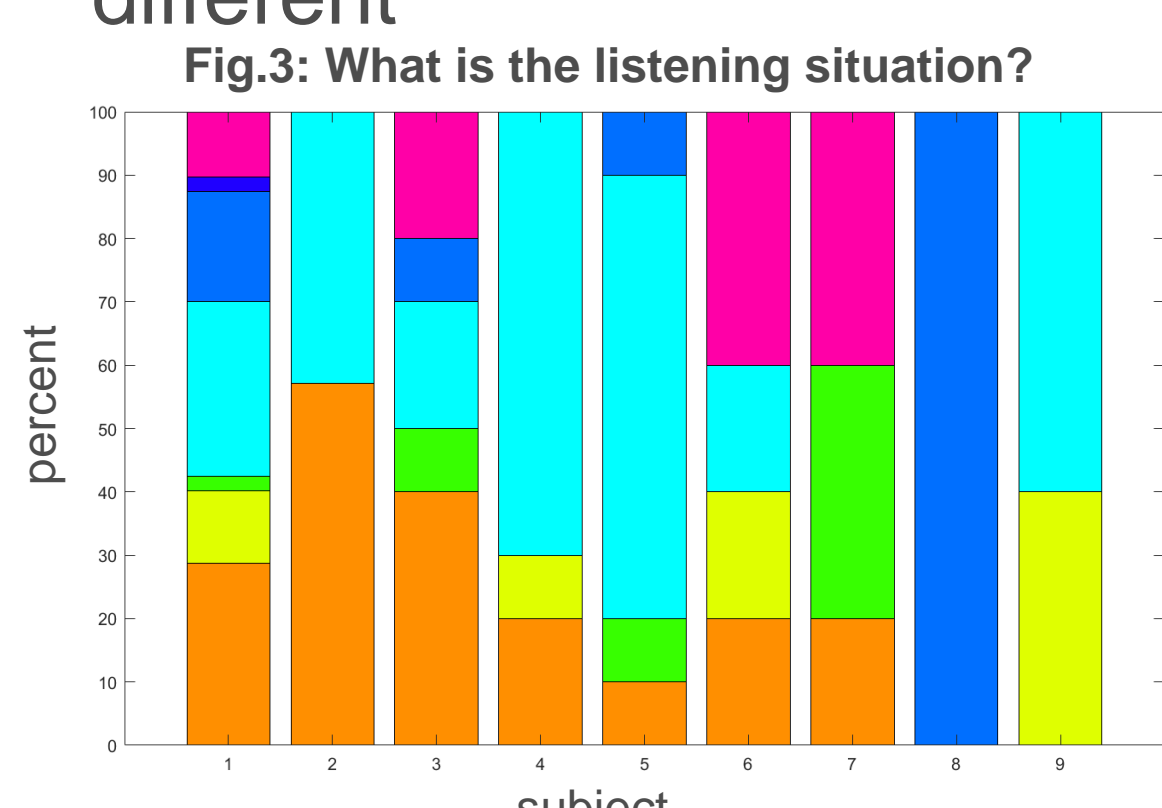


Results : Difficult listening situations

- Subjects reported on average 1.9 difficult situations per week, except for one subject who encountered in total 60 difficult situations (20 per week)
- 67% reported to have experienced fewer difficult situations during the study due to fewer social situations because of the Covid-19 pandemic



- The types of difficult listening situation reported by the subjects were very different
- Changes that were made are very different e.g. distance reduce, volume increase or closing the door / window



References:
Schinkel-Bielefeld, N. (2020). Laboratory Experiments versus Ecological Momentary Assessment - The Quest to Evaluate Real Life Hearing Aid Performance. In 9th Forum Acusticum (pp. 91-98). EAA; SFA.

Results : Improvement of the situation

- Conscious modification of the situation improved the listening difficulty by 1.0 points (STD 0.9 pts) on a 7-point Likert scale (very easy – very difficult)
- The sound quality improved by 0.9 points (STD 0.9 pts)
- And the subjectively reported speech intelligibility by 1.4 points (STD 1.6 pts) (excluding 3 situations without speech)

Fig.11: listening difficulty

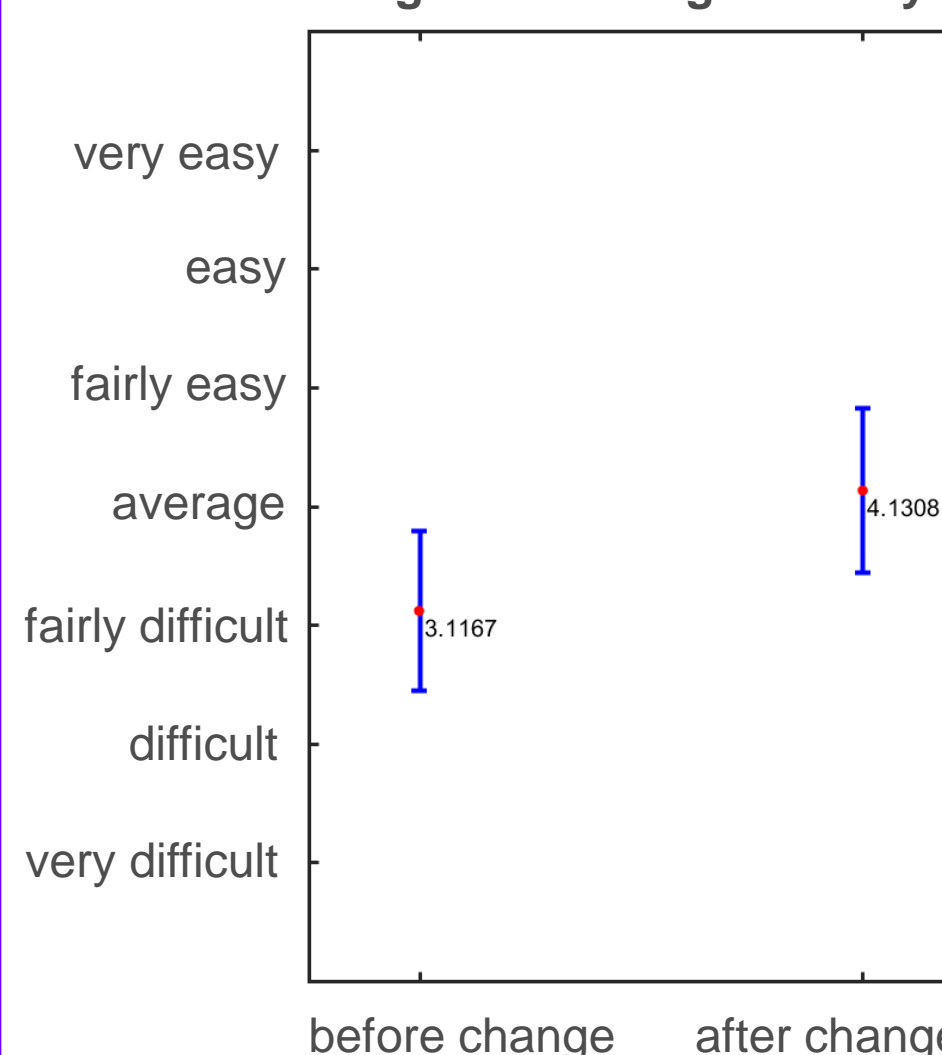


Fig.12: sound quality

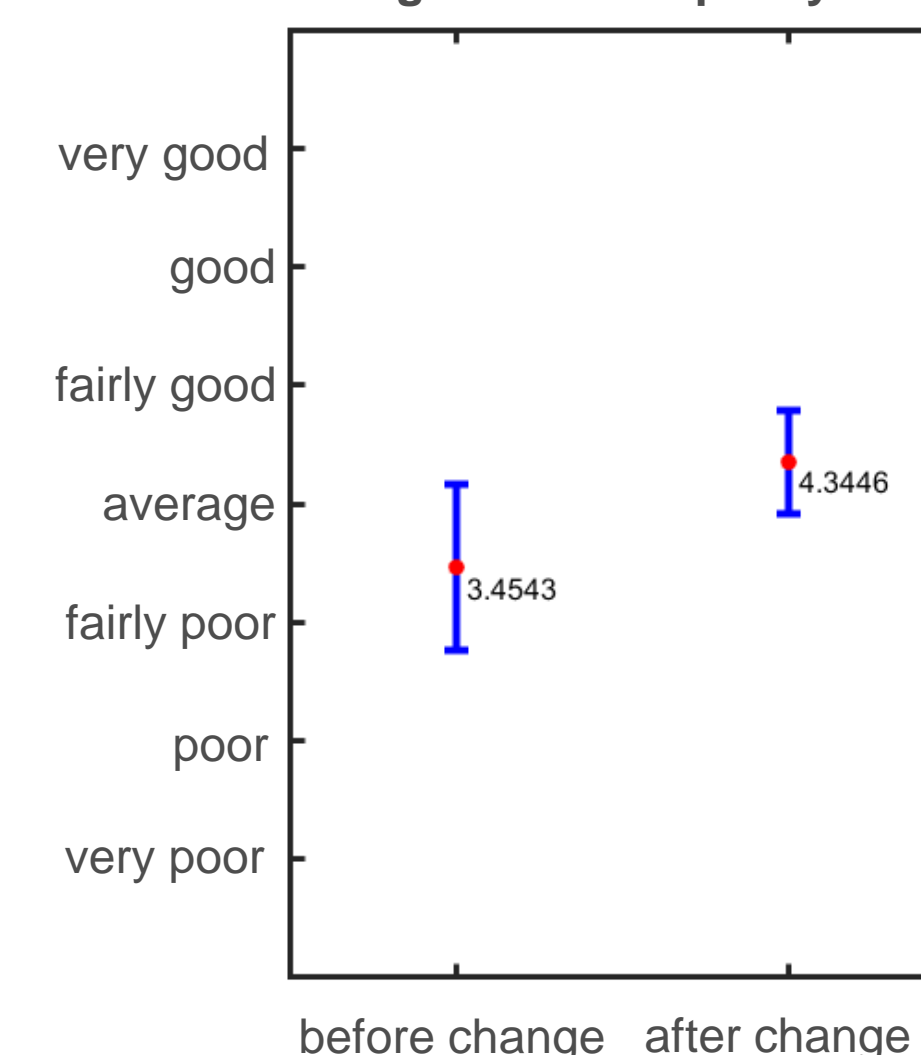
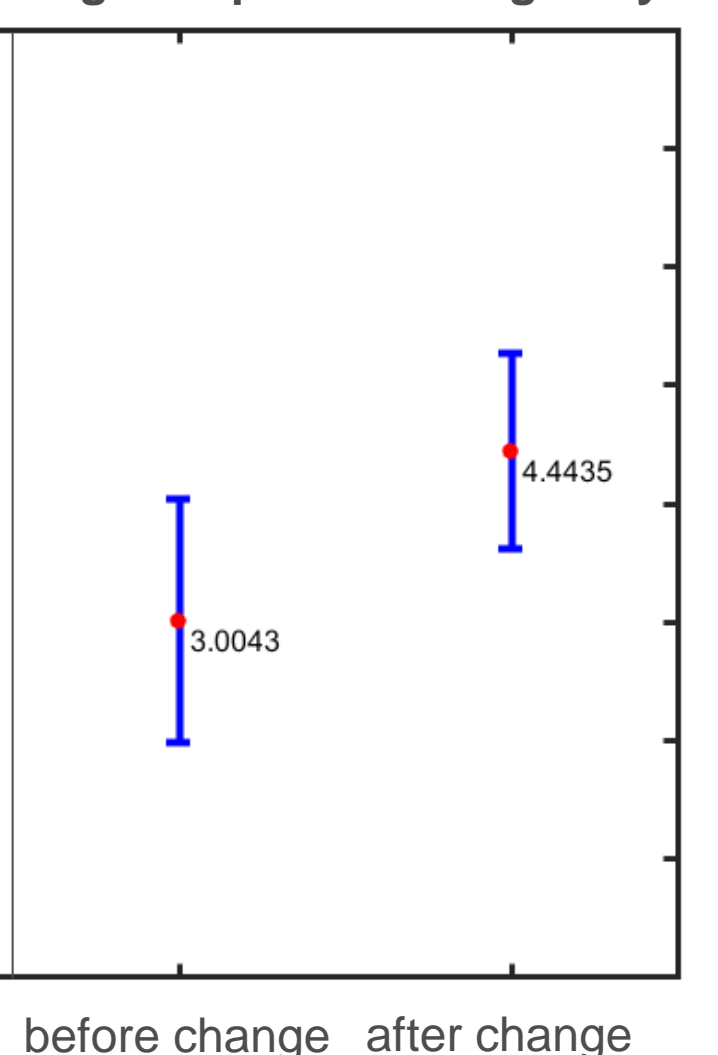


Fig.13: speech intelligibility



Conclusions

- Few difficult listening situations were reported.
- Both, the type of dissatisfactory listening situation and the way of dealing with them was very different across individuals.
- There are ways to change situations and to improve them, enduring is not necessary!

Outlook:

- Are there really so few difficult listening situations? Or is it difficult to recognize and perceive them in everyday life?
- Further studies are necessary including different hearing programs to see if a modification of the situation depends on hearing program.

Acknowledgements

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