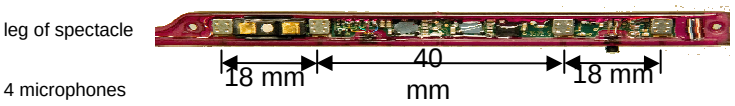
The use of a commercial array-microphone hearing system

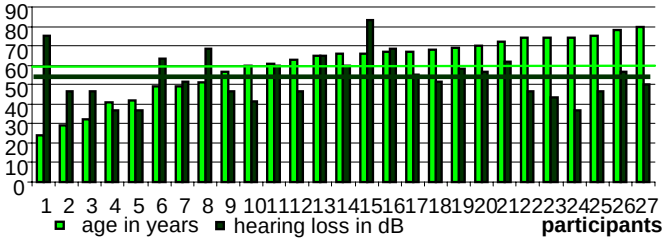
Hans Verschuure[1], Nienke Homans[1], Jacob van der Zwan[2]
[1]Erasmus MC, Rotterdam; [2]Varibel b.v., Meppel

device: prototype pair of spectacles with array microphone system



Summary:
•patient trial with prototype array microphone system build in legs of spectacles. System can be switched from low sensitivity (DI about 4 dB) to high sensitivity (DI of about 8 dB).
•patient selection: volunteers
•questions: perceived benefit of system in comparison with standard commercial hearing aid as measured with APHAB, IOI-ha and specific questionnaire related to acceptance of device and localization aspects

demographics:
n=27; 20 male, 7 female
average age 60 years
average loss: 54 dB
pta 1,2 4 kHz
22 hearing-aid users



Method:
Questionnaire APHAB- Dutch translation
- •Ease of Communication
- •Background Noise
- •ReVerberation
- •AVersiveness of sounds

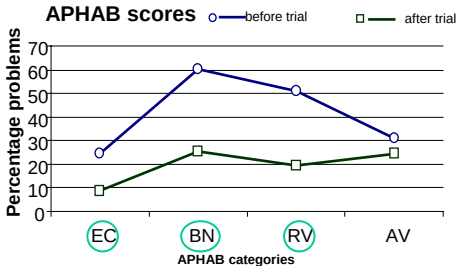
IOI-HA Dutch translation
1.use; 2: desired improvement; 3: resulting effort
4: aids worthwhile; 5: limitations; 6: perceived problems by others; 7: frequency of meeting others;
8: change of quality of life

additional comparative questions:
1. directionality
2. speech intelligibility
3. localization source
4. sound quality

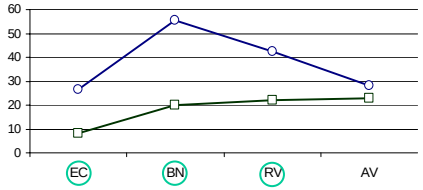
for
•quiet room with 4 persons
•noisy room with many people

scores
•1-5: 3 indifferent; 5 new aid much better

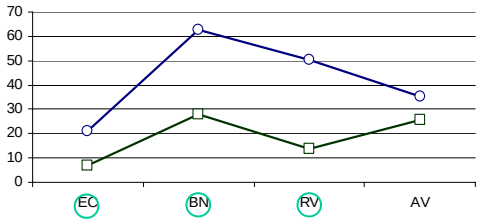
results: all users



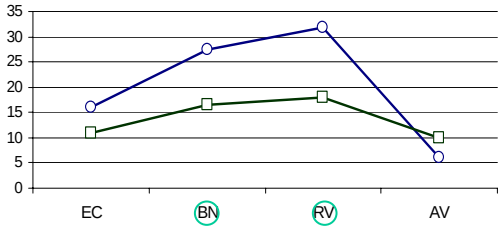
pta:30-50 dB HL (n=11)

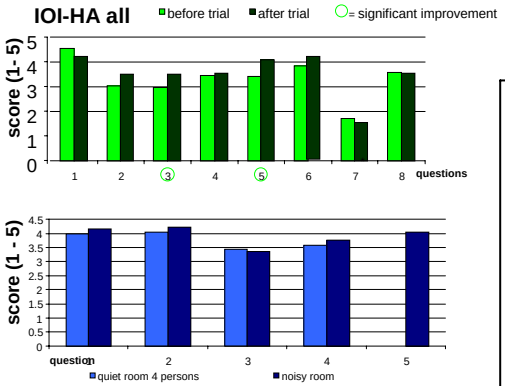


pta: 50-70 dB HL (n=14)



pta: >70 dB HL (n=2)





IOI-HA questions:
questions on effort and limitations significantly improved

IOI-HA questions: no significant differences

IOI-HA questions: no significant differences

References:
•Soede, W., Improvement of speech intelligibility in noise.,Ph.D. thesis TU-Delft, 1990.
•Merks, I.L.D.M., Binaural application of microphone arrays for improved speech intelligibility in a noisy environment., Ph.D. thesis TU-Delft, 2000.

Conclusions:

- •Significant better subjective performance with array-microphone system for EC, BN and RV in APHAB for mild to moderate losses
- •Aversiveness scores in APHAB with array-microphone system comparable to conventional hearing aids
- •Less effort required and less limitations experienced with array-microphone system
- •No problems with sound localization with array-microphone hearing aid
- •High degree of support for concept