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Influence on interlocutor position on communication behavior

→ Introduction

Studies have shown that acoustic challenges, e.g., noise and hearing impairment, affect turn-taking dynamics and communication behavior in controlled experimental settings with equidistant interlocutor positions.

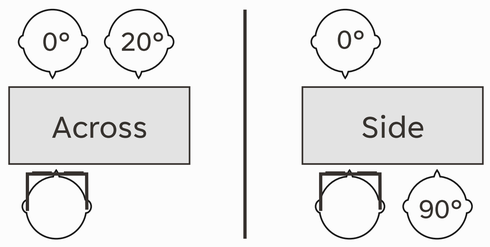
The current study increase the ecological validity by examining conversations held in a canteen with non-symmetric talker positions

How is movement and turn-taking behavior affected by noise, hearing impairment, and seating position in a natural environment?

→ Participants and Setup

- 12 triads of colleagues/acquaintances: 2 normal hearing (NH) + 1 hearing impaired (HI) wearing own hearing aids
- 5-minute free conversations in a cafeteria during (noise) and outside (quiet) lunch hours
- Participants were seated at a long table in two different seating arrangements (across and side)

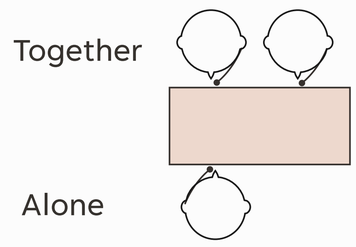
Seating for movement data



→ Recordings

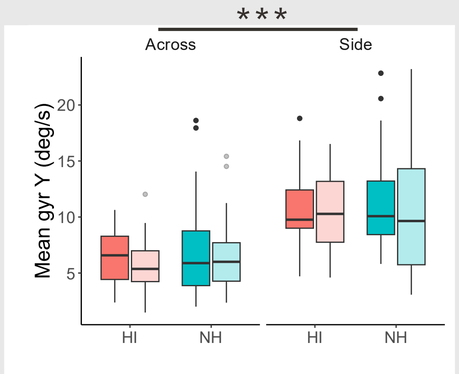
- Head- and eye-movements (Invisible, Pupil labs) from one participants at the time (NH or HI), seated Across or Side.
- Speech data from headset microphones for all participants, with the person seated Together or Alone
- For the 2 conversations were recorded for each condition (quiet/noise, HI/NH wearing eye-tracking glasses, a person sitting Across/Side)

Seating for turn-taking data



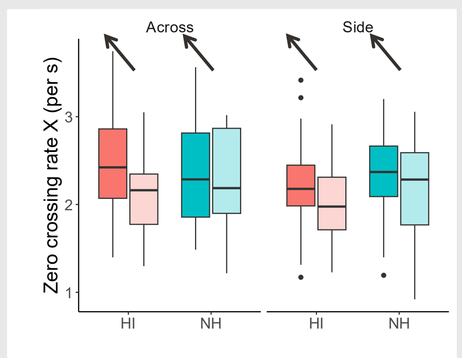
→ Head movement

→ Moving left/right



- Side > Across ***
  With a person sitting on your side, you have more head movement left/right

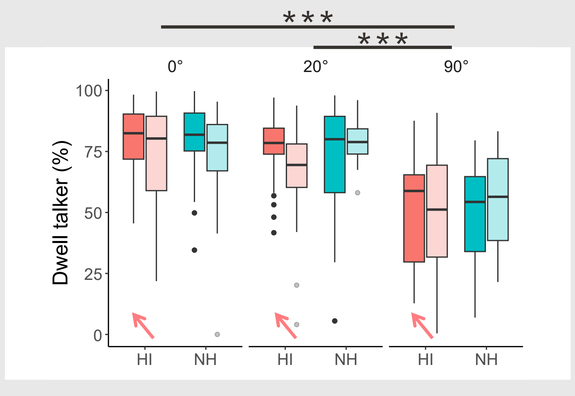
→ Nodding



- Noise > Quiet ***
  More visual backchannels made in noise

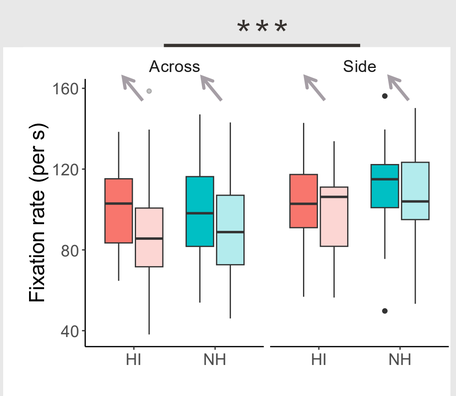
→ Eye movement

→ Looking at current talker

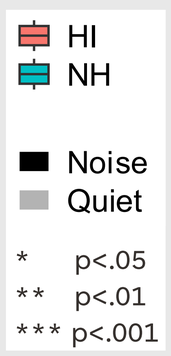


- 0° > 90° & 20° > 90° ***
  Difficult to focus on talker to the side
- HI :Noise > Quiet *
  in noise, HI look more at talker

→ Fixation rate

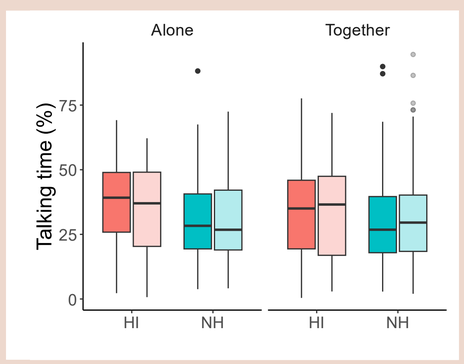


- Side > Across ***
  More fixations when conversation partners are further apart
- Noise > Quiet **
  More fixations in noise



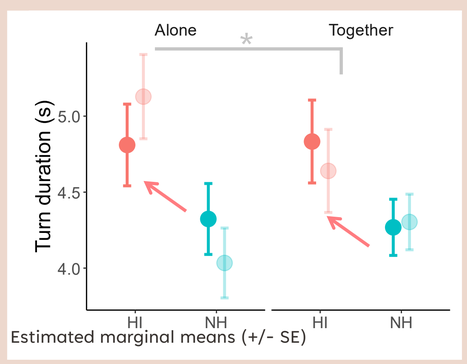
→ Turn-taking behavior

→ Talking time



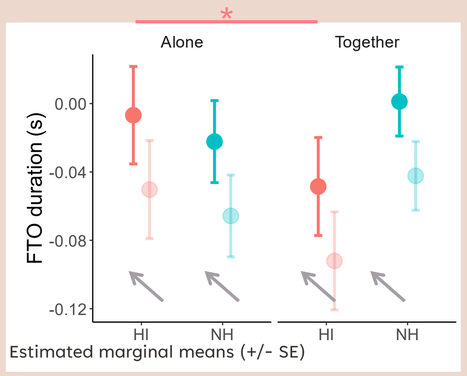
- No significant effects
  Although visually less included, sitting together does not mean you talk less

→ Individual turn duration



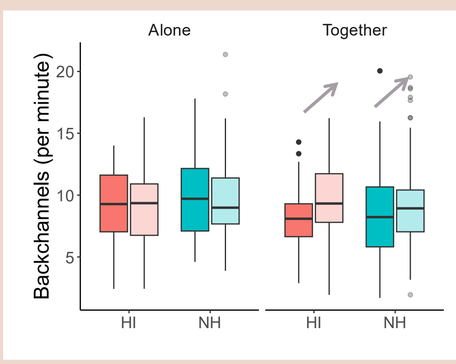
- HI > NH *
  HI talk for longer at the time, but not for more time overall (talking time)
- HI Quiet : Alone > Together *
  HI talk take longer turns when both partners are in view (alone)

→ Individual FTOs

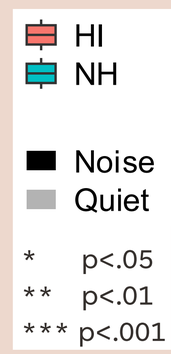


- Noise > Quiet ***
  Longer turn-taking times in noise
- HI : Alone > Together *
  When HI see both partners (alone), they initiate turns faster

→ Backchannels (>0.7 s)



- Together: Quiet > Noise ***
  Fewer verbal backchannels made in noise when you sit next to someone



→ Conclusion

The position of interlocutors significantly affects movement behavior during conversations: With conversation partners more spatially separated participants increase their head and eye movement. Participants looked more at the talkers positioned frontally (across) than those positioned next to them (side), even though the speaking time of the interlocutors was not affected by their seating position.

Seating position had little effect on turn-taking dynamics, in contrast to noise and hearing impairment. Seating position mainly affected the behavior of the hearing impaired interlocutor, who took longer turns in quiet and initiated them faster then both conversation partners were in view.

Seating position significantly affected eye- and head-movement behavior, while turn-taking dynamics were less affected.
To ease communication for hearing impaired people, their interlocutors should be positioned in front of them.

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