

Conversational eye patterns and hearing impairment

Speech comprehension and intelligibility are severely affected by the ability to process audio-visual cues in the scene. When listening conditions are degraded by increased background noise, listeners adapt their eye gaze patterns to follow a single talker: Normal hearing (NH) listeners show longer fixations in general [1], and both normal and hearing-impaired (HI) listeners fixate more often on the lower half of the talker's face [2-3]. While these two groups have been explored separately, a direct comparison of their eye gaze behaviours remains to be done.

Presumably, this emphasis on the lower half of the face reflects the listener's reliance on visual information from the lips to supplement for the degraded auditory information. While this strategy may be helpful for improving speech intelligibility, it may also potentially come at the cost of missing other meaningful visual cues in the talker's face and body. Previous research indicates that such visual cues can help a listener predict the end of a talker's turn in a conversation [4]. As such, missed cues may result in more variable timing, or the delay, of the transfer of gaze to a new talker.

In a cross-disciplinary project with close collaboration with experts in human hearing, vision, and cognition the master's student(s) will explore the gaze behaviour of hearing-impaired and normal hearing listeners while following a natural conversation between two talkers with variable levels of background noise. Consistent with previous research in single talker listening, we expect both groups to show changes in fixation duration and facial areas-of-interest when background noise levels change. Furthermore, we hypothesize that this change in eye gaze patterns will result in a reduced ability to follow conversational turn-taking cues, resulting in changes to the timing of saccades between talkers. Potential differences between HI and NH listeners will be investigated.

Experiments can be done at both/either the Humanities Lab and/or at Eriksholm Research Centre (ERH), using recorded audiovisual dyadic conversations and a Tobii spectrum eye tracker.

Supervisors: Martin Skoglund (Oticon), Martha Shiell (Oticon), Sergi Rotger Griful (Oticon), Diederick Niehorster (Lund University Humanities Lab), Marcus Nyström (Lund University Humanities Lab)

Contact person at the Department of Psychology: Roger Johansson (roger.johansson@psy.lu.se),

Contact person at Humlab: Marcus Nyström (Marcus.Nyström@humlab.lu.se)

Contact person at Eriksholm: Martha Shiell (mrhs@eriksholm.com)

References:

[1] Examining the Role of Eye Movements During Conversational Listening in Noise. Šabić Edin, Henning Daniel, Myüz Hunter, Morrow Audrey, Hout Michael C., MacDonald Justin A. In *Frontiers in Psychology* 2020.

[2] Speech, movement, and gaze behaviours during dyadic conversation in noise. Hadley, Lauren V., Brimijoin, W. Owen and Whitme, William M. . In *Nature Scientific Reports* 2020.

[3] The Effect of Varying Talker Identity and Listening Conditions on Gaze Behavior During Audiovisual Speech Perception. Buchan, Julie N., Paré, Martin, and Munhall, Kevin G. In *Brain Research* 2008.

[4] Knowing when to respond: the role of visual information in conversational turn exchanges. Lativ, Nida & Alsius, Agnès and Munhall, K. G.. In *Attention, Perception, & Psychophysics* 2018.