Asymmetrical hearing loss (AHL) is a common type of hearing loss (14-20%)\(^1\) that heavily distorts sound localization\(^2\).

Multisensory integration (MSI) of auditory (A) and visual (V) input normally greatly enhances perception of AV input when A and V are spatially aligned \(^3,4\).

The impact of (simulated) AHL on MSI was investigated by measuring eye-movements.

Hypothesis: AHL disrupts MSI because of the spatial conflict between hearing and vision.

Visual localization
• Saccade accuracy for visual targets was unaffected by plugging the ear.
• Saccade precision was generally higher for visual targets.
• As expected, saccade precision was lower for the large relative to the small Gaussian blobs.

RESULTS: WHERE DO WE LOOK?

Audiovisual localization: accuracy

CONCLUSIONS
• Impairs auditory localization
• Creates sensory conflict between hearing and vision
• Impairs multisensory integration on the affected side
• Causes immediate non-optimal reweighting of sensory input to improve external accuracy
• The larger the auditory localization error, the smaller the benefit of multisensory integration

NORMAL HEARING

Audiometer: 100ms 60/44 dB(A) high-pass noise (>3kHz).

Targets:
• Auditory: 100ms 60/44 dB(A) high-pass noise (>3kHz).
• Visual target: Small or large Gaussian blob
• Aud iovisual: Combination of A and V
• Catch trial: No target

Eye-tracker: Eyelink 1000
Sennheiser HD 201 headphone for the hearing test.
Ohropax Soft earplugs. Noise reduction: ~37 dB(A)(Fig. 1).

Equal loudness test
Saccade task

METHODS

Targets:
• Auditory: 100ms 60/44 dB(A) high-pass noise (>3kHz).
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