Effects of directional processing algorithms on spatial awareness perception in hearing-impaired listeners

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Research into auditory movement perception has been furthered by the availability of tools for creating realistic virtual environments. In a previous headphone-based study, we used such a tool for investigating the influence of different (simulated) hearing aid algorithms on auditory source movement perception (Lundbeck et al., 2017). For a group of elderly hearing-impaired (EHI) listeners, we found that two multi-microphone signal enhancement algorithms could substantially improve the detectability of left-right and near-far source movements in the presence of reverberation and interfering sounds. In the current study, we followed up on this by carrying out corresponding measurements with a loudspeaker-based setup and head-worn hearing aids. We bilaterally fitted a group of 15 EHI listeners with behind-the-ear devices that were programmed to have different settings that varied in spatial selectivity. Apart from measurements of source movement detectability, we used a new method for assessing spatial awareness perception in a realistic environment. Using a street scene with up to five sound sources, the participants had to either count the number of presented sources or indicate the direction of a moving source. In this contribution, we will present the results of the different measurements and discuss the influence of directional processing algorithms on spatial awareness perception.

References

Lundbeck, M., Hartog, L., Grimm, G., Hohmann, V., Bramsløw, L., & Neher, T. (2017). Influence of multi-microphone signal enhancement algorithms on the acoustics and detectability of angular and radial source movements. *Trends Hear,* under review.