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Soft speech in quiet: What gain is required to fully compensate speech intelligibility and listening effort?

Individuals with hearing loss often cannot perceive soft sounds in everyday life. Hearing aids restore audibility by amplifying these signals above the hearing threshold. However, how much gain is required to approximate the speech intelligibility and listening effort of normal-hearing individuals? This question was investigated in 20 participants with hearing losses ranging from N1 to N3. Three gain conditions were examined: NAL-NL2, NAL-NL2 plus 10 dB, and gain corresponding to the individual hearing loss. In addition, the extent to which technical limitations such as internal noise constrain higher gain in practical applications was evaluated. Gain was applied both via research hearing aids and as pre-processing prior to free-field presentation. NAL-NL2 provided only partial compensation. An additional broadband gain of 10 dB significantly improved outcomes but did not reach the performance of normal-hearing individuals. Gain corresponding to the hearing loss resulted in slight overcompensation. The results suggest that gain targets for full compensation lie above NAL-NL2 plus 10 dB, while in practical implementations only slightly lower gain levels appear feasible.