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Towards cognitive control of hearing instruments using EEG measures of selective attention

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Single-trial EEG measures of selective auditory attention have recently suggested the perspective of decoding who a listener is focusing on in multi-talker scenarios. Here, we report results from work within the COCOHA (Cognitive Control of a Hearing Aid) project investigating the possibility of integrating EEG into neuro-steered hearing instruments. Our EEG decoding strategy relies on measuring cortical activity entrained to envelope fluctuations in the attended speech signal. Currently, a major challenge has been to obtain robust EEG measures of selective attention in older hearing-impaired (HI) listeners. We report our recent COCOHA attempts to decode selective attention from the EEG of hearing-impaired (HI) listeners. Aided HI listeners and age-matched normal-hearing controls were presented with competing talkers at 0 dB target-to-masker ratio and instructed to attend to one talker. We show that single-trial decoding accuracies similar to those reported for younger listeners can be obtained with both groups of older listeners (70–100% correct single-trial classification). Importantly, we did not find differences in decoding accuracies between the NH and the aided HI listeners. Although numerous other challenges involved in integrating EEG signals in hearing instruments are evident, our results suggest that single-trial attention decoding is possible with hearing impaired listeners.