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Using EEG to explore the benefits of signal processing towards communication success

Hearing science now appreciates "being able to listen easily" as important to a listener's self-perceived communication success. While objective speech-in-noise (SiN) tests remain the benchmark for evaluating hearing aid processing, studies have shown SiN performance does not always align with behavioural or physiological measures of listening effort. This presents an opportunity for developing more holistic evaluations of hearing aid signal processing strategies. In a recent study, we combined behavioural SiN measures with measures of brain activity to evaluate how older hearing impaired adults process speech in noisy multi-talker situations. Using electroencephalography (EEG) with different directional microphone systems, we show that brain activities reflecting the automatic encoding of speech sounds, as well as listening effort, indicate both behavioural improvements to SiN performance and self-reported listening effort. Our results highlight how integrative evaluations of hearing aid processing can provide greater insight into the underlying nature of self-perceived communication success.