

## **How steady is the auditory steady-state response?**

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Auditory steady-state responses (ASSRs) are auditory evoked potentials used in clinical practice and research for frequency-specific objective hearing assessments. Typically, the electroencephalogram is recorded for 2-5 minutes while presenting a long-duration modulated auditory stimulus. The auditory steady-state response amplitude is then estimated in the frequency domain, assuming that the ASSR amplitude remains stable over time.

However, it is unclear how stable the amplitude really is over time. We recently showed that stimuli typically used for ASSR measurements can yield loudness adaptation, which is a decrease in loudness judgment over time. The aim of this study was to investigate the behavior of the ASSR amplitude over time, using stimuli that are known to cause loudness adaptation perceptually.

The electroencephalogram was recorded from 64 scalp electrodes in 15 normal-hearing participants. During each recording of 92.16s, a 40-Hz mixed-modulated sinusoid was presented at 30 dB sensation level with a carrier frequency of 500 or 2000 Hz. For each participant, 40 repetitions of each stimulus condition were consecutively recorded. Each recording was divided into overlapping window sizes of 20.48s at intervals of 5.12 s.

Due to the 40 repetitions of each stimulus condition, the amplitude of each window could be estimated with sufficient noise reduction by averaging. In addition, the results of individual recordings were compared using a novel type of analysis. We will present an analysis of the stability of the ASSR amplitude over time based on the two methods and compare the results with behaviourally measured loudness adaptation.

*Abstract presented at 9<sup>th</sup> International Symposium on Objective Measures on Auditory Implants, Szeged, Hungary, 15-18 June 2016*