Can Pitch Discrimination be detected by Objective Measures?

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Background: Pitch discrimination tasks are usually measured by psychoacoustic tests. However, these tests are time consuming and often show a high variability in their results. Instead, an objective measure has the advantage that no active participation of the subject is required to determine certain hearing parameters. As an example ASSRs can be automatically detected in the EEG by statistical tests. Therefore, it may be preferable to detect pitch discrimination ability with objective methods.

Methods: An adaptive two alternative forced choice (2AFC) task and an ASSR measurement were designed. In both cases subjects have to listen to jittered sinusoidal amplitude modulated (SAM) stimuli. The jitter is applied only to the modulation frequency such that one modulation cycle is presented.

Results: Small jitter can slightly enhance the pitch discrimination ability (just noticeable difference) of normal hearing subjects compared to a signal without jitter. Further increasing of the jitter deteriorates pitch discrimination ability. ASSR tests were not yet conducted.

Discussion & Conclusion: More subjects are needed to see whether the improvement of small jitter is robust. In the future, ASSR with jittered amplitude modulated signals will be compared to the psychoacoustic results. If the results of the AFC test and the ASSR recording are similar, the psychoacoustic test may be substituted by the objective measure.