Effects of Binaural Jitter on Sensitivity to Interaural Time Differences: Hearing Impaired Listeners

Anna-Katharina Könsgen, Bernhard Laback, and Piotr Majdak
Acoustics Research Institute, Austrian Academy of Sciences, Vienna

Interaural time differences (ITDs) provide important information for localizing sound sources and for understanding speech in noise. For pulse trains at higher rates, the sensitivity to ongoing envelope ITD is strongly reduced, an effect known as binaural adaptation. Recent studies showed that binaurally synchronized randomness (binaural jitter) of the timing of individual pulses improves ITD sensitivity at such high pulse rates. This has been shown in normal-hearing (NH) and in cochlear-implant (CI) listeners.

This study tested the hypothesis that for such high pulse rates, binaural jitter improves ITD sensitivity also in hearing-impaired (HI) listeners with moderate sensorineural hearing loss. ITD sensitivity was measured in twelve HI listeners using a left/right discrimination task. Stimuli were narrow-band noise (NBN) and bandpass-filtered click trains with and without jitter. The pulse rates were 400 and 600 pulses per second (pps).

The results support the hypothesis that introducing binaural jitter improves ITD sensitivity in HI listeners. ITD sensitivity improved with increasing amount of jitter. For NBN, ITD sensitivity was similar to that for 400-pps trains with moderate jitter and to that for 600-pps trains with large jitter. Overall, the importance of temporal randomness appears to generalize to normal and impaired acoustic hearing and electric hearing.

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