

Effects of dynamic-range compression on temporal acuity - DTU Orbit (09/11/2017)

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Some of the challenges that hearing-aid listeners experience with speech perception in complex acoustic environments may originate from limitations in the temporal processing of sounds. To systematically investigate the influence of hearing impairment and hearing-aid signal processing on temporal processing, temporal modulation transfer functions (TMTFs) and "supra-threshold" modulation-depth discrimination (MDD) thresholds were obtained in normal-hearing (NH) and hearing-impaired (HI) listeners with and without wide-dynamic range compression (WDRC). The TMTFs were obtained using tonal carriers of 1 and 5 kHz and modulation frequencies from 8 to 256 Hz. MDD thresholds were obtained using a reference modulation depth of -15 dB. A compression ratio of 2:1 was chosen. The attack and release time constants were 10 and 60 ms, respectively. For both carrier frequencies the TMTF thresholds decreased with the physical compression of the modulation depth due to the WDRC. Indications of reduced temporal resolution in the HI listeners were observed in the TMTF patterns for the 5 kHz carrier. Significantly higher MDD thresholds were found for the HI group relative to the NH group. No relationship was found between the MDD thresholds and the TMTF threshold. These findings indicate that the two measures may represent different aspects of temporal processing.

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