Spectral integration of interaural time differences in auditory localization - DTU Orbit (11/12/2018)

Spectral integration of interaural time differences in auditory localization
This study investigates how the auditory system integrates spatial information across frequency. In experiment 1, discrimination thresholds for interaural time differences (ITDs) were measured as a function of both reference ITD and center frequency (CF) of noises with bandwidth of one ERB. In addition, discrimination thresholds were also measured as a function of CF for different values of interaural coherence (IC) typical of sounds in realistic acoustic environments. For both high ICs and small reference ITDs, discrimination thresholds were lowest for CFs between 700 and 1000 Hz. For smaller ICs and larger reference ITDs, this dominance region shifted towards lower CFs. A conceptual localization model was developed that used the variance of the ITD thresholds to optimally weight the contribution of the individual frequency bands before spectral integration. In experiment 2, the model was tested by asking listeners to align a broadband noise signal with an ITD that was fixed across frequency onto a broadband noise target with different ITDs in individual 1 ERB-wide subbands. The results were consistent with both the model predictions and the shift of dominance range observed in experiment one.

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