Spectral Weighting of Binaural Cues: Effect of Bandwidth and Stream Segregation

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Introduction

Hypothesis

It is hypothesized that binaural information is integrated over frequencies in the binaural system to lateralize sounds (Buell and Hafter, 1991; Woods and Colburn, 1992) using a spectral weighting function. Furthermore, it is hypothesized that this weighting is not fixed but can vary depending on the signal properties and on the acoustical context of the sound.

Method and Stimuli

- Parameters: 10 normal hearing listeners.
- Psychophysical method: Two-alternative forced-choice (2AFC) on a lateralization task.
- STIT condition: Different from equal sensitivity thresholds of narrowband stimulus.
- Stimuli: 11 ITDs (500/100/500/100/Hz) and 11 ILDs (1 dB ± 3 dB).
- Stimulus presentation via earplugs via headphones (ITA200).
- Data analysis: Right or left lateralization.
- Regression model: Linear model.

Results

- Weighting of frequency bands depends on spectrally near content.
- Effect only at low frequencies for ITD.
- Streaming leads to increase in weights.
- Release from interference.
- Increase in weight only when binaural information available.
- At low frequencies for ITD.
- At all frequencies for ILD.

Discussion and conclusions

- Results obtained different to what would be expected from the duplex theory.
- Spectrally most outer bands play a special role.
- Weighting of frequency bands depends on spectrally near content.
- Streaming leads to an increase in weights.
- Release from interference.
- Increase in weight only when binaural information available.
- At low frequencies for ITD.
- At all frequencies for ILD.

Literature