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Reweighting the contributions of spectral regions to sound localization and its impact on binaural-cue reweighting

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Weighting of binaural cues in sound localization is frequency-dependent. For low-frequency (LF) sounds, the interaural time difference (ITD) dominates, while for high-frequency (HF) sounds, the interaural level difference (ILD) dominates. We performed a training experiment in a real reverberant environment in which visual cues were used to increase the weighting of either HF or LF components of broadband stimuli. Then, we tested whether this spectral reweighting generalizes to mid-frequency sounds, and to the weighting of ITD/ILD cues in mid-frequency sounds in a virtual anechoic environment. Training separate groups to increase their HF or LF weighting led to spectral reweighting in the expected direction for both groups. However, only HF training generalized to new, mid-frequency sounds. In a follow-up, an additional group was trained on HFs while explicitly informed to focus on HFs. This group also increased its HF weight for trained sounds, but not for the mid-frequency sounds. In the virtual environment, all three groups increased their ILD weight from pre- to posttest, not confirming the hypothesis that training on LFs would increase the ITD weight. In conclusion, reweighting of spectral components for localization is possible. However, the generalization to binaural-cue reweighting is not straightforward.

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