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Binaural masking level difference as a function of noise bandwidth and noise delay

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ABSTRACT

The human binaural system can exploit differences between the interaural phase of a noise and a target tone to improve detection thresholds. The maximum masking release is obtained for detecting an antiphasic tone (Sπ) in diotic noise (N0). It has been shown in several studies that this benefit gradually declines as an interaural time difference (ITD) is applied to the N0Sπ complex. This decline has been attributed to the reduced interaural coherence of the noise. Here, we report detection thresholds for a 500 Hz tone in masking noise with up to 8 ms ITD and bandwidths from 25 to 1000 Hz. When reducing the noise bandwidth from 100 to 50 and 25 Hz the masking release at 8 ms ITD increases, in part because the narrower bandwidths result in a higher coherence length. For bandwidths of 100 to 1000 Hz, however, no significant difference was observed, indicating that an auditory filter with a bandwidth <100 Hz is operational and produces identical coherence for this group. Thus, our coherence-based model requires an effective auditory filter bandwidth <100 Hz, in line with established monaural models but in contrast to delay line-based models for N0Sπ detection.

Keywords: Binaural, Interaural Time Difference, Interaural Coherence

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