The effect of cochlear nonlinearities on binaural masking level differences

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The detection of a tone in noise is impaired when the interaural phase difference of the signal at the two ears is not the same as that of the masker. The detection threshold of a tone presented with a 180° degree interaural phase difference in a dichotic noise masker is typically lower than the detection threshold of a tone in a masker, both presented at one ear only. This difference between monaural and binaural detection thresholds is commonly referred to as the binaural masking level difference (BMLD) and can be as large as 15 dB for broadband noise.

In this study, the BMLD was measured for 500-Hz tones in 3-kHz-wide maskers with a level of either 20 or 50 dB/Hz. For attenuation in one ear only, thresholds were measured for two masker levels (reference level: either 20 or 50 dB/Hz).

The detection of a tone in noise is improved when the interaural phase difference of the noise masker presented at different levels in the two ears differs from that of the masker. This phenomenon, known as binaural masking level difference (BMLD), can be as large as 15 dB for broadband noise.

In line with predictions for NeS0 and NeS100 in Fig. 5, the BMLD for NeS0 and NeS100 is predicted by the extended nonlinear model, while the Brentaart et al. (2001) model can only predict the BMLD for the NeS0 condition.