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**Lateralization of binaural stimuli with independent fine-structure
and envelope-based temporal disparities**

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A computational model for the lateralization of binaural stimuli, motivated by recent physiological findings in the literature and psychoacoustic data is presented. The model is based on the evaluation of the interaural phase difference (IPD). In the model, IPDs are separately assessed for the stimulus' fine-structure and envelope. Psychoacoustic measurements were conducted and compared to model predictions. Sinusoidally amplitude modulated 1-kHz tones with a modulation frequency of 25, 50, and 100 Hz were employed. The IPD of the fine-structure and the envelope IPD were independently matched with an interaural level difference or were traded against each other. Lateralization increased for increasing IPDs up to 135° of either the fine-structure or envelope independent of the modulation frequency. However, trading a fine-structure IPD with an opposing envelope IPD revealed a most persistent fine-structure IPD at 45° . The data could be modeled assuming a physiological distribution of the best IPDs of binaural neurons clustered around 45° . The model was also utilized to correctly predict the perceived lateralization of critical stimuli from literature. Individual differences in the perceptual salience of envelope and fine-structure cues, also known from the literature, could be modeled by a personal weighting coefficient for the fine-structure cue.