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Statistical Learning Guides Auditory Attention

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Abstract

The statistics of the auditory environment can be computed globally (the probability of single ‘sound events’), and locally (how often does one sound precede another). We examine how the global probability and temporal predictiveness of sounds of different acoustic frequencies affect decisions on an orthogonal sound dimension, duration. An ideal observer could perform this task perfectly by selectively attending to duration. Yet listeners judge duration faster for tones whose frequency has a high global probability compared to those with a frequency of low probability. Moreover, when a preceding ‘cue’ tone’s frequency predicts that of a subsequent ‘target’ tone, listeners are faster at judging the duration of the target tone. This latter effect is not solely a result of temporal cueing in that cue-target relationships that are not predictive do not speed response. Statistical regularities may drive attention to perceptual dimensions, even when the dimensions are irrelevant to optimal task performance.