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The contribution of selective spatial attention to sound detection and sound localization: evidence from event-related potentials and lateralized alpha oscillations

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Highlights

- N2ac and alpha power were differently modulated in sound localization and detection
- The N2ac occurred irrespective of the task-relevance of spatial information
- Posterior alpha lateralization was more pronounced in sound localization trials
- Alpha lateralization was still evident in the response-locked data
- While the N2ac was modulated by perceptual load, alpha power remained unaffected

Abstract

Auditory selective attention can be directed toward spatial and non-spatial stimulus features. Here, we studied electrophysiological correlates of spatial attention under spatially-specific and purely feature-based demands. Using an auditory search paradigm, in which participants performed a target localization (left versus right) and a target detection task (present versus absent), we investigated whether attentional selection of a relevant sound from a two- or four-sound array necessarily involves the processing of spatial sound information. While the early N2 anterior contralateral component occurred irrespective of task, the subsequent lateralization of alpha power oscillations (8-12 Hz) over parieto-occipital scalp was modulated by the task-relevance of spatial information. Thus, the two correlates appear to reflect differential aspects of attentional orienting: We propose that the N2ac reflects an initial, modality-specific focusing