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FUNCTIONALLY INDEPENDENT COMPONENTS OF EARLY VISUAL EVENT-RELATED POTENTIALS

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We demonstrate a decomposition of the N1 complex in a visual selective attention paradigm into functionally independent subcomponents with functionally distinct relations to task and stimulus conditions. ERPs were collected from 20 subjects in response to visual target and nontarget stimuli presented at five attended and non-attended screen locations. Independent Component Analysis (ICA) was performed on 500-msec grand average responses from all 25 stimulus/attention conditions and decomposed the nontarget N1 complexes into five spatially fixed, temporally independent and physiologically plausible components. Activity of an early, laterally symmetric component pair ($N1a_R$ and $N1a_L$) was evoked by left and right visual field stimuli respectively. Component $N1a_R$ peaked ~9 msec earlier than $N1a_L$. Stimuli in the right visual field evoked activity in a spatiotemporally overlapping bilateral component (N1b) that peaked at around 180 msec and was strongly enhanced by attention. Stimuli presented *in unattended locations only* evoked a fourth component (P2a) peaking near 240 msec. A fifth component (P3f) was evoked only by targets presented in either visual field. The distinct response patterns of these components across the array of stimulus and attention conditions suggest that they reflect activity in functionally independent brain systems involved in processing attended and unattended visuospatial events.

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