652.7
FUNCTIONALLY INDEPENDENT COMPONENTS OF EARLY VISUAL ERPs
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We demonstrate a decomposition of the N1 component in a visual selective attention paradigm into functional subcomponents with functionally distinct relations to task and stimulus conditions. ERPs were collected from 20 subjects in response to visual target and non-target stimuli presented at five attended and unattended locations. The ERP analysis was performed on 500-msec grand average responses from all 25 stimuli/condition trials and decomposed the non-target N1 component into five spatially different, temporally independent subcomponents. Activity of an early, temporally symmetric component pair (N1a and N1b) was evoked by left and right visual field stimuli, respectively. Component N1a peaked 5-9 msec earlier than N1b, and the right visual field activity was evoked 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 (P3o) peaking near 240 msec. A fifth component (P3a) 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 visuo-spatial events.

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652.9
SELECTIVE ATTENTION MODULATES CORTICAL MAGNETIC RESPONSES ASSOCIATED WITH VISUAL WORD RECOGNITION
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In our previous studies, the left peri-Sylvian area, mostly the vicinity of the left auditory cortex, was activated during visual word recognition (Fukuyama et al., 1990; Sakurai et al., 1999). To investigate whether or not the left peri-Sylvian activities are modulated by selective attention, cortical magnetic responses were recorded from bilateral temporal sites of the brain in Japanese volunteers. Subjects were 9 Japanese volunteers (right-handed; age 25-37 years old; 3 females and 6 males). Stimuli were Japanese words consisting of 4 katakana phonemes. Half of the words were presented in red and the other half of the words were presented in green (stimulus duration, 800 ms; inter-stimulus interval, 1000-1400 ms). Subjects were asked to attend words in one of the two colors and to name them for a subsequent recognition memory task. In the both hemispheres, the first component peaking around 180-200 ms was elicited. In the left hemisphere, the sustained component peaking around 250-450 ms followed this first component and its amplitude was reduced for the unattended words compared with the attended words. In the right hemisphere, the second component was not clearly observed. It was thus shown that the left peri-Sylvian activities were modulated by selective attention.


652.11
BEHAVIORAL AND EVOKED POTENTIAL CORRELATES OF NOVEL FIGURES AND BACKGROUNDs A. Warren, L. King, H. Picharam and P. Jackson
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"Room less" metaphor of spatial attention places perceptual organization on the boundary of figure and ground. We report a series of experiments that use spatial attention to study the boundary of figure and ground. Different stimulus conditions were manipulated that varied attention at the boundary of figure and ground. The results show that subjects respond more quickly to novel figures than to novel backgrounds. Experiment 1 was designed to investigate reactions to novel figures and backgrounds. The results show that subjects respond more quickly to novel figures than to novel backgrounds. Experiment 2 was designed to investigate the evoked potential (EP) correlates of the same stimulus conditions presented in Experiment 1. Two significant results emerged: (1) N1 magnitude at parietal and central locations was found to be larger for novel backgrounds than for novel figures, and (2) background was larger for novel figures at central parietal and occipital locations. There was also a tendency for PEs to novel backgrounds to be more pronounced at right hemisphere locations than left hemisphere locations. No lateralization was found for EPs to novel figures.

652.8
EARLY VISUAL EVOKED RESPONSE PEAKS APPEAR TO BE SUMS OF ACTIVITY IN MULTIPLE ALPHA SOURCES S. Makeig, J. Townsend, P. Jung, S. Englehoff, C. Gibson, and T.J. Sejnowski
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The normal early P1/N1 peaks in the human visual evoked response may be followed by a continuing series of peaks at approximately 100 ms intervals, often dubbed "alpha rings." We applied independent component analysis (ICA) to over 1000 single trials (between 50 ms and 250 ms after stimulus onset) collected from 8 subjects during a visual selective attention experiment. Responses to stimuli (visual disks flashed for 116 ms) presented to the left and right occipital locations were decomposed separately. Most of the 31 resulting components could be paired with a component from the opposite-field decomposition with a similar scalp map, EEG spectrum, and grand average response. The N1 component in the grand mean evoked response was decomposed into five or more independent components. The scalp maps of many of these components contained a peak in the alpha range and contributed to more than one peak in the evoked response. Applying ICA spatial filtering followed by time/frequency analysis demonstrated that changes in mean alpha amplitude did not occur after stimulus onset. These results suggest that the early (P1/N1) components of the human visual evoked response turn contributions from multiple spontaneous alpha sources whose activity is phase-reset by visual stimulation.

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