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Neuronal basis of attentional functions

Attention has been of interest to the field of psychology since its earliest days. In the beginning of scientific attention research, basically the effects of attention were examined. Later, enhanced interest in mechanism of attention developed. Today, attention research focuses on the neuronal bases of aspects of attention. Among neuropsychologists, attention selectivity is subdivided into the ability to focus and to divide attentional capacities. Until now, only a few studies have investigated the neuronal basis of focused and divided attention by means of functional magnetic resonance imaging. These studies suggest that focused attention is supported by a mainly right-lateralized network comprising lateral prefrontal structures, parietal areas and anterior cingulate gyrus. Furthermore, a specific role of the left dorsolateral prefrontal cortex for divided attention has been proposed. None of these studies, however, has matched the tasks utilized to test both attention subfunctions for task difficulty. A recent study demonstrated that differences between the activity patterns of focused and divided attention vanish, if the mental workload of the tasks is considered. It can be concluded, therefore, that both attention aspects depend on a common neuronal network. In addition, the left dorsolateral prefrontal cortex does not represent a divided attention exclusive structure. The utilization - accompanied by a lateralization - of common network components seems to rely rather on processing demands than on the kind of attention (focused vs. divided). Easier conditions begin with mainly right-sided activity within the attention network, but as conditions become more difficult, left-lateralized homologue areas activate.