

BRAIN OSCILLATIONS IN WORKING MEMORY

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The aim of the present study was to investigate the gamma response of ERP by incrementally increasing working memory (WM) load in a sensory-motor task. Twelve psychology students participated in this study. The sensorimotor WM paradigm consisted of three tasks. The first task was a simple choice reaction task which served as the control task. The second task (easy WM task) required the subjects to keep in mind the movement at the last response (one trial back). In the third task (hard WM task), the subjects had to remember the last two movements (two trials back). All three tasks were physically the same with the numbers of 1, 2, 3 as stimuli which were presented in a semi-random sequence. Response was a button press on the left or the right side. The side of button press depended on the rule given for the task. The EEG/ERP was recorded from frontal, central, parietal and occipital locations. The data were digitized and analysed in different frequency bands of ERP by means of FFT. The results clearly showed that increasing the memory-demands induced gradual increases in the amplitude values of the gamma-activity in all studied locations. Meanwhile, theta-activity was not only enhanced but also prolonged, especially at the frontal location. These findings confirm the involvement of many cortical areas at working-memory tasks and suggest that the increased gamma- and theta-activity at the anterior and posterior sites are related to the distributed working memory systems.