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Thema: Neural bases of time perception mechanisms

The ability to estimate time accurately is essential for humans to perform optimally. Nevertheless, the neural bases of time perception mechanisms has been long poorly studied in comparison with those relative to other characteristics of sensory information. Brain imaging studies have begun to identify cerebral areas involved in temporal information processing. Thus, the role of cortical (prefrontal and parietal cortices) and of sub-cortical areas (particularly basal ganglia) have been examined. However, a basic question, which remains to be answered, is whether these areas specifically subtend temporal information processing. Recent event-related potential studies have also provided very important data on the electrophysiological correlates of time estimation, mainly examining the amplitude and time course of a slow negative wave, called the Contingent Negative Variation (CNV). First, I will report data from studies using PET and fMRI methods aimed at investigating the specificity of brain regions involved in the perception of duration. Then, I will review ERPs studies that have shown relationships between the amplitude and temporal course of CNV and accuracy of duration estimation. The CNV recorded from the scalp is probably the summation of several cortical potentials that have different origins and different functions. Therefore, I will end by showing the importance of combining PET, fMRI and ERP data to specify where and when in the brain temporal information is processed.