MITTWOCHSVORTRAGSREIHE AM PSYCHOLOGISCHEN INSTITUT DER UNIVERSITÄT SALZBURG

IN ZUSAMMENARBEIT MIT DER SALZBURGER GESELLSCHAFT FÜR PSYCHOLOGIE

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Thema: Event-related phase-coupling phenomena during verbal memory encoding and short-term memory processing

Usually EEG coherence is used to describe synchronized oscillations for different sites of the cortex. Thereby, synchronization concerns correlation across trials of both amplitude and phase. In contrast, phase synchronization takes into account phase relations only and additionally.
Gabor wavelet analysis is used to calculate time-variant phases of EEG oscillations for arbitrary frequencies. This approach enables the investigation of different kinds of phase-coupling phenomena. First, phase-locking to the stimulus onset separates stimulus-evoked oscillations and induced oscillations. Second, phase synchronization between EEG of different sites of the cortex with regard to oscillations of the same frequency offers the stability of phase relations between them. Third, generalized phase synchronization reveals nested oscillations of different frequencies for the EEG of the same site or of different sites. All three aspects of phase-coupling give an insight into understanding the integrative mechanism of synchronized oscillations.
In a first study phase synchronization analysis is applied to memory encoding of concrete nouns. Differences in phase synchronization between recalled and not recalled nouns appear for theta, alpha and gamma oscillations. Further on, gamma oscillations at Fz and Cz are nested in theta oscillations for recalled nouns. For the alpha1-frequency band phase differences between different locations were investigated for concrete and abstract nouns. It was shown, that the network of stable phases is more dense for concrete nouns than for abstract nouns. Further, the speed of propagation of information is faster for abstract nouns.
In a second study phase synchronization phenomena are investigated during the retrieval period of a Sternberg paradigm. It was shown, that there appear stimulus-locked theta and alpha2-oscillations. Furthermore, the interplay between alpha2-oscillations in the posterior area and theta-oscillations in the anterior area increases with memory load.