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Vortragender: Mark Elliott, Univerität München

Thema: Temporal structure and inner psychophysics: A glimpse of equilibrium?

Some neurophysiological studies have indicated that the synchronization of spatially distributed neuronal assemblies at fast frequencies in the range 20 - 80 Hz (the 'gamma' band) is instrumental for binding the separate feature-elements of a figure or object. In agreement with this hypothesis we have shown that reaction times to a display matrix containing a target Kanizsa square (an illusory square consisting of grouping 90° corner junctions) are expedited when the target is preceded at its location by a synchronous priming stimulus comprising four crosses presented simultaneously within a matrix of otherwise asynchronously presented premask crosses, but only if the premask display flickers at frequencies (within the range 27 - 68 Hz) that are regularly separated by around 6.75 Hz. This intriguing outcome can be partly explained as a function of the return phase of the priming stimulus, suggesting that one of the primary functions of repeated stimulus presentation is the formation of a pattern of anticipatory activity, and it is presumed a pattern of recurrent activity, which relates to the precise timing of stimulus activity. However stimulus timing cannot entirely explain the relationship between stimulating frequency and the timing of the anticipatory response. Rather and as is suggested from subsequent experiments, repeated stimulus presentation is a means of access to a rich, but as yet not fully circumscribed structure of temporal relations within the operator. This conclusion is illustrated with reference to related electroencephalographic findings and extended with reference to related findings in the auditory domain.