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第一和第二语言Stroop任务中EEG同步化分析

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采用基于多元自回归的瞬时EEG相干方法研究了十位汉英双语者执行Stroop任务时脑神经电活动及其功能皮层区的协同作用。结果显示：a）在b1（12-18 Hz）频段，不一致条件的EEG相干值明显大于一致条件的EEG相干值，无论是汉语（第一语言，L1）还是英语（第二语言，L2）呈现的刺激。表明b1频段对刺激类型敏感；b)与L2相比，L1的Stroop任务中，额－顶区的相干值显著增强了。EEG相干值反映了不同脑皮层间的相互作用强度。因此本研究结果表明：判断和处理冲突信息（如Stroop的不一致条件）时脑功能皮层区之间的协同作用增强了；相对于第二语言，第一语言处理过程中额－顶区之间的通信协作增加了。

Analysis of EEG synchronization during the native and second language Stroop task

Together with the behavioral data (reaction time) and ERP analysis, instantaneous coherence estimation based on the multivariate autoregressive model (MVAR) was applied to investigate the neural electrophysiological activities and the interaction of functional cortical areas whilst 10 Chinese-English bilinguals performing Stroop task presented in Chinese (L1) and English (L2). It was found that: a) In b1 (12－18 Hz) frequency band, higher EEG coherence for the incongruent situation vs. the congruent situation is observed in both L1 and L2 versions, which indicated that b1 was sensitive to the discrimination between the congruent and the incongruent situations; b) A stronger EEG coherence between frontal and parietal regions in L1 version occurs, compared to that in L2 version. These findings indicated that interaction of functional cortical areas was enhanced to evaluate the conflicting information of the incongruent stimulus, and stronger interaction between frontal and parietal areas occurred whilst processing the first language relative to the second language.

关键词