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A139

SEQUENTIAL EFFECTS IN EEG DATA

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In many EEG-Experiments, the demands on focused attention and cognitive capacity are very high. In this study we analyze data from demanding and/or long lasting experiments, under the hypothesis that drifts in attention and/or cognitive performance show up as significant temporal coherent deviations in the EEG-signal. The results support the hypothesis and we conclude that these significantly deviating periods in the signal reflect altered states of attention and/or cognitive capacity. If these portions of the signal are considered as task irrelevant periods, we can increase the signal to noise ratio for task relevant EEG parameters by removing them before further analysis. Improving this ratio is of particular importance when further signal analysis includes phase analysis in any form.

A140

COMPARATIVE ANALYSIS OF EVENT-RELATED POTENTIALS AND OSCILLATIONS DURING AUDITORY ODDBALL TASK IN PARKINSON'S PATIENTS WITH PARKIN GENE MUTATIONS AND IDIOPATHIC PARKINSON'S DISEASE

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Parkinson's disease (PD) is characterized by motor impairment, but clinical evidence suggests that PD patients develop deficits across many cognitive functions. Parkin (PARK2) gene mutations are most common cause of the autosomal recessive form of PD. We aimed to compare the cognitive decline of patients with parkin gene mutation and idiopathic PD patients by event-related potentials (ERPs) and event related oscillations (EROs) during auditory oddball task. Experiments were carried out on the following four groups of subjects: control (n = 25), Parkin mutation (PM-PD, n = 15), early onset (EO-PD, n = 25) and late onset (LO-PD, n = 25) idiopathic PD. Both P3 amplitudes and evoked delta (2-4 Hz, 100-400 ms) power of the target condition were significantly reduced in EO-PD and LO-PD groups compared with the controls, while no significant difference was observed for the PM-PD group. However, both total delta (2-4 Hz, 100-400 ms) and total theta (5-12 Hz 50-250 ms) powers in target responses were significantly reduced in all three PD groups. While the absence of significant ERP changes in PM-PD group is in-line with the literature that reports relatively lighter cognitive decline in relatively younger PM-PD patients, the in-depth time-frequency analysis of the brain electrical responses shows that a significant change can be observed in terms of induced (non-phase-locked) EROs. This can be a starting point for understanding the neural mechanisms that are affected in this subgroup of Parkinson's patients.

A141

MATURATION OF HUMAN SPONTANEOUS EEG MATURATION ANALYZED BY POWER SPECTRAL DENSITY, CORRELATIONAL AND PRINCIPAL COMPONENT ANALYSIS

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This report tries to analyze the maturation of the human EEG in the frequency spectrum between 0 and 20 Hz using Correlational and Principal Component Analysis (PCA). Forty-eight subjects were recorded during 3 minutes of spontaneous EEG (24 children and 24 young adults). The comparison of the Power Spectral Density (PSD) among children and young adults showed a higher PSD in children than in adults. The relative PSD showed a more complex pattern including a decrease of delta and theta rhythms and an increase in beta rhythm for adults with respect to children. Both absolute and normalized PSD showed significant correlations with age indicating that these parameters can be considered as predictors of the EEG maturation. The correlation matrix and the Principal Component Analysis (PCA) were used to demonstrate the possible latent structure of the developmental human EEG. The correlation matrix of the normalized EEG demonstrated an inverse relationship between delta and alpha frequencies, and between delta and beta. PCA confirmed that an inverse relationship between high and low frequency bands appears when absolute power instead of normalized EEG is analyzed. PCA find a structure based on latent variables in the EEG during development. The comparison of the profile of the loading factors of the different variables in children and young adults will assess whether the structure of the EEG is similar in both groups or different. A similar but slightly different structure was found in the adults and children PCA. Certain maturational trends can be observed in PSD and PCA, and that might be relevant to assess the state of maturation of a child or young person and their changes over time.

Comparative analysis of event-related potentials and oscillations during auditory oddball task in parkinson's patients with parkin gene mutations and idiopathic parkinson's disease

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