

Title: Wavelet energy distributions of P300 event-related potentials for working memory performance in children

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Abstract: The purpose of this study is to investigate the P300 event-related potentials (ERP) from background Electroencephalograph (EEG) of working memory performance by visual stimuli task. The proposed analysis for each channel at the prefrontal cortex is to compare the energy distribution via wavelet scalogram with the change of time and frequency of ERP signals. Wavelet energy distribution gives a lot of information for decomposing the frequency bands with necessary wavelet coefficient. This method was applied to data of normal children's with age groups (7, 8 and 9 years old) in a visual stimulation. Results showed that an alpha band was chosen for ERPs analysis according to the high energy level in the scalogram graph. This consequence of the alpha band was supported by the theory of chose the suitable frequency for working memory task. From the P300 signals in alpha band, the young children (7 years old) have a significant increase of amplitude variability rather than others. During the working memory task, the alpha band was increased when age increase: 7yo (4.88 Hz), 8yo (6.84 Hz) and 9yo (7.81 Hz). In conclusion, it is verified that the alpha band varies as a function of working memory performance.