Application of ICA algorithm to EEG data from a visual attention experiment

Article *in* Frontiers in Computational Neuroscience · January 2008

DOI: 10.3389/conf.neuro.10.2008.01.069

4 authors:

Jan Kamiński
California Institute of Technology
34 PUBLICATIONS **259** CITATIONS
SEE PROFILE

Mateusz Gola
University of California, San Diego / Polish Ac…
67 PUBLICATIONS **336** CITATIONS
SEE PROFILE

Aneta Brzezicka
SWPS University of Social Sciences and Hum…
42 PUBLICATIONS **279** CITATIONS
SEE PROFILE

Andrzej Wrobel
Nencki Institute of Experimental Biology
121 PUBLICATIONS **1,296** CITATIONS
SEE PROFILE

Poster Presentation

Application of ICA algorithm to EEG data from a visual attention experiment

Jan Kaminski[1*], M Gola[2], A Brzezicka[2] and A Wróbel[1]

1 Nencki Institute of Experimental Biology, Poland

2 Warsaw School of Social Psychology, Poland

Scarce observations in human EEG studies indicated that enhanced beta activity which accompany certain experimental tasks may be used as an arousal index. In our cat studies (Wróbel et al. 2007) we have found that local field potential oscillations in beta band (12-29 Hz) might serve as a carrier for attentional activation within the visual system. Here we have adopted our animal model of shifting anticipatory attention demands between visual and auditory modalities to study alertness related changes of beta activity in human subjects. The ICA algorithm was applied to each participant's data and the whole analysis resulted with 11 components, which were later clustered among all subjects using k-means method. Results indicated increased alertness manifested by faster response to target stimuli in visual trials is accompanied by higher EEG activation in beta band in cluster with maximal amplitude in occipito-parietal sites. The shorter reaction time the amplitude of beta power appeared to be higher (this relation was most pronounced at lower beta power). This finding supports our hypothesis that beta band might serve as carrier for attentional activation within the visual system. This experiment proved also the usefulness of ICA algorithm application to EEG data, even with limited number (11) of channels.

References

1. Wróbel, A., Ghazaryan, A., Bekisz, M., Bogdan, W. i Kamiński, J. (2007). Two Streams of Attention-Dependent beta activity in the Striate Recipient Zone of Cat`s Lateral Posterior-Pulvinar Complex. Journal of Neuroscience 27(9), 2230-2240.

Conference: Bernstein Symposium 2008. Munich, Germany, October 08 - 10, 2008.

Citation: Kaminski J, Gola M, Brzezicka A and Wróbel A (2008). Application of ICA algorithm to EEG data from a visual attention experiment. *Frontiers in Computational Neuroscience. Conference Abstract: Bernstein Symposium 2008*. doi: 10.3389/conf.neuro.10.2008.01.069

***Correspondence:** Jan Kaminski, Nencki Institute of Experimental Biology, Poland. j.kaminski@nencki.gov.pl