

## Figure S1

### Short description of special software developed in this study for calculation of EEG coherence.

The coherence  $C_{xy}(f)$  between two signals  $x(t)$  and  $y(t)$  was calculated as:

$$C_{xy}(f) = \frac{|G_{xy}(f)|^2}{G_{xx}(f) * G_{yy}(f)},$$

where  $G_{xy}(f)$  is the cross-power spectrum between  $x(t)$  and  $y(t)$ ,  $G_{xx}(f)$  and  $G_{yy}(f)$  represent the auto-power spectrum of  $x(t)$  and  $y(t)$ , respectively,  $f$  is a frequency and  $t$  is a time [1]. The spectra were calculated as:

$$G_{xy}(f) = X(f) * Y^*(f), G_{xx}(f) = X(f) * X^*(f), G_{yy}(f) = Y(f) * Y^*(f),$$

where  $X(f), Y(f)$  are Fourier transforms of  $x(t)$  and  $y(t)$  signals,  $X^*(f), Y^*(f)$  are complex conjugates of  $X(f), Y(f)$ .

Thereafter, the Welch's averaging technique was applied [2]. The signal was divided into  $N$  equal length segments overlapped by one half, and then spectra  $X_k(f), Y_k(f)$  were calculated for each of  $k$ -segments. After that the averaged coherence function was estimated as:

$$C_{xy}(f) = \frac{\left| \sum_k X_k(f) * Y_k^*(f) \right|^2}{\left( \sum_k |X_k(f)|^2 \right) \left( \sum_k |Y_k(f)|^2 \right)}$$

For coherence calculation, we developed special software based on Embarcadero C++ Builder development environment [3].

#### References:

1. Bendat, J.S.; Piersol, A.G. Random Data, Wiley-Interscience, 1986
2. Welch, P. The use of fast Fourier transform for the estimation of power spectra: a method based on time averaging over short, modified periodograms. *IEEE Trans. Audio Electroacoust.* **1967**, 15, 70–73. doi: 10.1109/TAU.1967.1161901
3. <https://web.archive.org/web/20070831220654/http://www.codegear.com/products/cppbuilder>