Cloninger's model of personality is based on the assumption that human behaviours are generated by neurobiological processes. To address this we aimed at linking self-report personality measure with electrophysiological markers obtained while performing cognitive task in different experimental conditions.A sample of 56 (27 M) adults (mean age 22.9 ± 2.3 years) completed the Temperament and Character Inventory measuring 4 temperament traits: Harm avoidance, Novelty seeking, Reward dependence and Persistence. Dense-array EEG (256 channels) was recorded while participants performed the numerical Stroop task in a reward and punishment conditions. Event-related spectral perturbations (ERSPs) aligned to the button press were calculated for erroneous and correct responses. An error resulted in increased frontal theta (3-7Hz) activity and decreased occipital alpha (10-11Hz) activity. Moreover, these two markers for brain error monitoring system were correlated (theta: $r=0.30$, $p<0.05$; alpha: $r=-0.29$, $p<0.05$) to novelty seeking trait while performing cognitive task in reward condition. These results indicate a neural mechanism of temperamentally-driven sensitivity to rewards and its impact on information processing.

44. Heart Rate Variability dynamics as a psychophysiological marker of temperament and anxiety

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Heart Rate Variability (HRV) is a measure of changes in the time intervals between the consequent heartbeats (beat-to-beat). Normal heart rhytm even under resting conditions is in fact irregular.While investigating HRV, it is crucial to take a dynamic approach, having in mind the irregularity of the heart rhytm. In order to study the dynamics of heart rate a non-linear measure of HRV, Sample Entropy, is used as a perfect tool for investigating irregular time series. High HRV values reflect healthy psychophysiological states, while low HRV can be a sign of many abnormalities. In our study, ECG data was collected during resting-state sessions, from a group of 27 healthy young adults. Participants completed beforehand a variety of tests including Formal Characteristics of Behaviour: Temperament Inventory – Revised Version FCZ-KT (R) and State-Trait Anxiety Inventory. EEG signal was registered during the 10-minute resting-state session, in quitet enviroment - well-lit lab room. Sample entropy was calculated from the R-R signal derived from recorded resting ECG. Data collected showed correlation between sample entropy and temperament traits: negative with activity and endurance (FCZ-KT (R)), but positive with perseverativeness. Moreover, low HRV correlated with high states of anxiety. Data collected using sample entropy of the heart showed negative correlation in activity and endurance (FCZ-KT (R)), but positive correlation with perseverativeness. Data also showed negative correlation between HRV values and STAI-S - a scale of anxiety states.

45. Nonlinear complexity measurements of bioelectrical activity of the brain as predictors of individual differences in fluid intelligence: sex as a moderator

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Human brain is the archetype of a complex self-regulatory dynamical biosystem characterized by feedback at multiple levels of organization. Dynamics of these interactions are directly connected with individual adaptive features and form the basis of individual differences between people. These dynamics are manifested in electric field fluctuations generated by the human brain, which in turn translate into complexity of the EEG signal measured. Resting-state bioelectrical activity of the brain is characterized by: 1) coexistence of cumulative effects and neural noise, 2) variability and adaptiveness, 3) emergent phenomena, 4) self-organization, 5) multiscaleness, 6) hierarchism. These features make resting-state EEG measurements a great medium for studies of individual differences in fluid intelligence in absence of cognitive load. To assess the complexity of the resting-state EEG signal Multivariate Multiscale Sample Entropy (MMSE) and Higuchi\'s Fractal Dimension (HFD) indices were calculated for 40 participants (29 women). Obtained values of MMSE and HFD were used as predictors of individual differences in fluid intelligence measured with Raven Advanced Progressive Matrices (RAPM). Analysis was conducted independently for women and men. Preliminary results allow predicting fluid intelligence with 80% accuracy. Sex is a significant moderator of this relation.

46. Supplementary Motor Area activity differences during working memory task performance associated with fluid intelligence scores

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Working memory plays a fundamental role in human cognitive abilities. Studies have found a correlation between fluid intelligence scores and working memory performance. We investigated brain activity differences during working memory task (n-back) between individuals with higher and lower intelligence test scores. Fluid intelligence level was measured using Raven's Advanced Progressive Matrices. We have found significant brain activity difference between higher and lower intelligence group in Supplementary Motor Area (SMA) when comparing 2-back vs 1-back contrast. This region plays a crucial role in controlling motor functions and is typically activated during working memory tasks performance. Our results suggest that individuals with higher intelligence have a higher increase of activity in SMA related to increasing working memory load. This study implicates the potential of neuro-imaging studies for identifying aspects of the neural basis of intelligence and illustrates the importance of its relation to working memory.
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47. Default mode network connectivity associated with fluid intelligence level

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Default mode network (DMN) or so called task-negative network remains highly active during resting-state condition, while deactivates during cognitive task performance. There are several hypotheses about the potential role of the resting-state DMN activity such as mind wandering, consciousness or memory consolidation. However, the relationship between DMN and cognitive abilities remains unclear. In this fMRI study, we investigated association between fluid intelligence level and resting-state DMN connectivity of 35 individuals. We found that higher intelligence level was associated with lower connectivity between posterior cingulate cortex (PCC) and precuneus. These results suggest that DMN connectivity may help to explain individual differences such as intelligence. This study was supported by a grant (2015/17/N/HS6/03549) from the National Science Center, Poland.

48. Behavioral control and resting-state EEG complexity

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The purpose of the conducted study was to investigate differences in complexity of resting-state brain activity, taking temperament in account. Our previous study showed that differences in cognitive abilities related to temperament traits could be observed only upon performing demanding attentional task. Presented study was based on a sample of 25 people, aged from 19 to 31 years. FCB-TI(M) survey of Regulative Temperament Theory was used as a measurement of temperament traits. Participants were asked to sit relaxed with their eyes open while electroencephalography was recorded. Higuchi's Fractal Dimension (HFD) was calculated and used as a marker of complexity of time series on the preprocessed EEG data. HFD complexity was estimated for every electrode, subsequently grouped into clusters. Negative correlations were found between behavioural control (measured with