

EPP1018

Predicting unipolar and bipolar depression using inflammatory markers, neuroimaging and neuropsychological data: a machine learning study

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Introduction: About 60% of bipolar disorder (BD) cases are initially misdiagnosed as major depressive disorder (MDD), preventing BD patients from receiving appropriate treatment. An urgency exists to identify reliable biomarkers for improving differential diagnosis (DD). Machine learning methods may help translate current knowledge on biomarkers of mood disorders into clinical practice by providing individual-level classification. No study so far has combined biological data with clinical data to provide a multifactorial predictive model for DD.

Objectives: Define a predictive algorithm for BD and MDD by integrating structural neuroimaging and inflammatory data with neuropsychological measures (NM). Two different algorithms were compared: multiple kernel learning (MKL) and elastic net regularized logistic regression (EN).

Methods: In a sample of 141 subjects (70 MDD; 71 BD), two different models were implemented for each algorithm: 1) structural neuroimaging measures only (i.e. voxel-based morphometry (VBM), white matter fractional anisotropy (FA), and mean diffusivity (MD)); 2) VBM, FA, and MD combined with NM. In a subsample of 71 subjects (36 BD; 38 MDD), two similar models were implemented: 1) VBM, FA, and MD combined with only NM; 2) VBM, FA, and MD combined with NM and peripheral inflammatory markers. Finally, the best model was selected for comparison with healthy controls (HC).

Results: Overall, the EN model based on all the modalities achieved the highest accuracy (AUC = 90.2%), outperforming MKL (AUC=85%). EN correctly classified BD and MDD with a diagnostic accuracy of 78.3%, sensitivity of 75%, and specificity of 81.6%. The most significant predictors of BD (variable inclusion probability (VIP) > 80%) were the parahippocampal cingulate, interleukin 9, chemokine CCL5, posterior thalamic radiation, and internal capsule, whereas MDD was best predicted by chemokine CCL23, the anterior cerebellum, and the sagittal stratum. In contrast, NM did not help to differentiate between MDD and BD. However, they help to distinguish patients from HC. Psychomotor coordination and speed of information processing discriminated between MDD and HC (VIP>90%), whereas fluency, working memory, and executive functions differentiated between BD and HC (VIP>80%).

Conclusions: In summary, BD was predicted by a strong proinflammatory profile, whereas MDD was identified by structural

neuroimaging data. A multimodal approach offers additional instruments to improve personalized diagnosis in clinical practice and enhance the ability to make DD.

Disclosure of Interest: None Declared

EPP1019

Altruistic decision-making is associated with certain patterns of local brain functional connectivity

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Introduction: The brain mechanisms of altruism cannot be strictly localized; therefore, the analysis of brain functional connectivity (FC) can reveal intrinsic mechanisms of altruism or, conversely, anti-social tendencies in behavior.

Objectives: The objective was to investigate local FC patterns of altruistic decision-making using the “Pain versus Gain” (PvsG) paradigm.

Methods: The sample included 38 participants (18 females), 21.2±2.1 y.o. who signed the informed consent form and filled in the Interpersonal Reactivity Index questionnaire (IRI). The study protocol was approved by the local ethical committee. The PvsG task consisted of the control (CC) and experimental condition (EC) with 20 trials, each with 6 possible decisions. In the CC, participants had to decide which finger the second fake participant (FP) to move (one of five fingers or no move). In the EC, they were given money (1000 rubles) and had to choose in every trial between self-benefit (to keep 50, 40, 30, 20, 10 or 0 rubles) or FP's pain induced by the medical electromyostimulator (with 6 levels of intensity, from “highest” to absence), e.g., when a participant keeps no money, the FP receives no stimulation. The FP was not present, and his finger moves and hand reactions to the stimulation were pre-recorded and presented as feedback. 62-channel EEG was recorded simultaneously, and the time intervals for decision-making were used for the weighted Phase Lag Index (wPLI) computation between the reconstructed cortical sources. Spearman coefficients with p-values correction via permutations were calculated between FC difference (EC vs. CC) and the sum of money given out.

Results: The money given out correlates positively with the Empathic Concern (R=0.38, p=0.01), Perspective-taking (R=0.42, p=0.01), Fantasy scale (R=0.4, p=0.01), and does not correlate with the Personal Distress scale (R=0.17, p=0.28) of the IRI. Significant correlations were found between the money given out and the FC between the right lingual gyrus (lg) and caudal ACC in 4-30 Hz band (R=0.54, p<0.001) and FC between the caudal ACC and left insula in 8-13 Hz band (R=0.58, p<0.001).

Conclusions: The PvsG task is a valid paradigm for the investigation of brain mechanisms of altruistic decision-making. We described local FC correlates of prosociality formalized in the

money given out which is associated with the measures of empathic concern and cognitive empathy. The ACC and insula are involved in salience network and pain matrix with the Iq as an afferent, and their activity is modulated by empathy towards others. Thus, we claim that altruism depends on empathic motivation, which is associated with FC between these regions.

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EPP1020

Fight or flight mechanism and sports activities: psychophysiological aspects

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Introduction: Specialists in biology, medicine, and psychology need to pay special attention to theoretical and practical research on the implementation of the fight or flight mechanism in humans in conditions of war and hostilities. Adaptation mechanism of fight or flight is related to individual and social forms of behavior among people and animals, and is aimed at the homeostasis preservation in difficult living conditions. The evolutionary fight or flight mechanism in the functional connection with stress as a general adaptation syndrome and stress reactivity has individual features due to the strengthening of the functions of certain body systems. The systemic mechanism of fight or flight is accompanied by the corresponding functional and clinical symptoms and significantly influences physical and mental health of a person in various conditions of activity.

Objectives: In this regard, the main goal of this work was to determine the relationship between the behavioral strategy of fighting or escaping under stress and during sports activities.

Methods: The following research methods were used to realize the goal of the work: theoretical analysis and generalization of literary sources and Internet data.

Results: In our opinion, possible versions of Walter Cannon's concept of the fight-or-flight mechanism are: 1) attack-or-flight mechanism; 2) defense or escape mechanism; 3) pursuit or escape mechanism. At the same time, it is advisable to consider aggression as a struggle, and escape as a struggle. In addition, in line with the concept of Walter Cannon and Hans Selye, it is possible to distinguish the stress of struggle and the stress of flight. Any intense muscle activity is accompanied by changes in the hormonal and nervous regulation of metabolism, as a result of which the body adapts to a certain physical load. In the athlete, these functional changes are observed even before the start of physical exercises, in particular, in the conditions of the pre-start and start state. The nature and reaction of neuro-endocrine mechanisms in the pre-start state depend on the nature of the load, as well as on the individual characteristics of the athlete (age, gender, type of nervous system, temperament, character, training, sports experience, etc.). It is important that the pre-start changes in metabolism contribute to the mobilization of the athlete's functional potential even before the start of the corresponding physical activity. Moderate activation

of the neuro-endocrine mechanisms of the athlete's body ("combat readiness" state) is optimal. Functionally, it is less beneficial for the athlete's body to have a sharp strengthening of neuro-endocrine mechanisms ("pre-start fever" state) or their paradoxical inhibition ("pre-start apathy" state).

Conclusions: Thus, in humans, sports activities include a behavioral mechanism of fight or flight in combination with physiological and psychological stress.

Disclosure of Interest: None Declared

Psychopathology

EPP1021

How can key findings from patients with Urbach-Wiethe Disease (UWD) support the role of amygdala in socio-emotional-cognitive functioning? The case of a young adult with genetically proven UWD without amygdala calcifications

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Introduction: Urbach-Wiethe disease (UWD; also named *Lipoid proteinosis* or *Hyalinosis cutis et mucosae*) was first described in 1929 by the Austrian scientists Erich Urbach and Camillo Wiethe and constitutes an autosomal recessive disorder which is characterized by several changes of body and brain. Most patients – and especially older ones – show symmetrical calcifications in the medial temporal lobes, especially the amygdala and the periamygdaloid region (Siebert *et al.*, Brain 2003, 126, 2627-2637).

Patients with UWD with bilateral amygdala calcifications show several changes, from impairments in interpreting of odors to more complex changes in socio-cognitive and emotional domains (Markowitsch & Staniloiu, *Neuropsychologia*, 2011, 49, 718-733).

Objectives: Here, we describe the rarer case of a 19-year-old man with genetically proven UWD, who – up to now – lacks significant brain calcification.

Methods: The patient was investigated medically, psychiatrically and with neuropsychological and neuroimaging methods.

Results: Findings of CT (see Figure 1) and MRI scans yielded no evidence of significant brain calcifications. Our patient AC manifested only a subset of changes encountered in patients with UWD with bilateral amygdala calcifications, namely in emotional processing (such as in more complex subsets of the Florida Affect Battery and Recall of Emotional/Neutral photographs), social cognition (Reading the Mind in the Eyes) and personality dimensions (suggestions for obsessive tendencies). The impairments in emotion-related task performance were similar in extent to those of the three UWD patients with bilateral amygdala calcifications of Brand *et al.* Neuropsychologia 2007, 45, 1305-1317., indicating a probable sub-normal amygdalar functioning, in the absence of evidence of macrostructural amygdalar changes on imaging.

In the Game-of-Dice Task 17 out of 18 trials were so-called safe trials. His intelligence quotient (IQ) was 124 (33 points; MWWT-