Emotion regulation in Schizophrenia. Neurofeedback applications as assessed by EEG and optical imaging

Michela Balconi, Maria Elide Vanutelli

Objectives: Research on Schizophrenia (S) revealed abnormal electroencephalographic activity (EEG) in schizophrenic patients and anomalies in brain responsiveness, as revealed by neuroimaging measures. However, no integration of these methods is usually applied to test the emotional deficit in S. The present pilot study applied Neurofeedback (NF) technique to retrieve the “unbalance cortical activity” in S in response to emotional stimuli, and applied functional near-infrared spectroscopy (fNIRS) and EEG co-registration to analyze: a) the initial (T0) anomalous prefrontal activity (main delta band); b) the NF application during a training protocol of five weeks (T1); c) the NF efficacy in term of balanced cortical activity (T2).

Participants and methods: 8 patients have been randomly assigned to either control (3 patients, C), or neurofeedback group (5 patients, N).

Results: The initial evidence of an unbalanced prefrontal activity within the left/right hemisphere (higher delta) was verified in T0. Nevertheless, no anomalous behavior was observed in S about the explicit evaluation about stimuli emotional valence.

Conclusions: NF treatment effect in T2 was observed for N group in comparison with C group: indeed in T2 the anomalous responsiveness to emotional cues was modulated as shown by both EEG and fNIRS measures.

Correspondence: Michela Balconi, Catholic University of Milan, michela.balconi@unicatt.it

Influence of education on cognitive and functional performance in patients with schizophrenia

Silvia Cámara-Barrio, Israel Contador, Francisco Ramos, Juan Jose Silva, Pablo Ruisoto, Inmaculada Herranz, Luis A. Cuéllar

Objective: The aim of this research is to analyze whether educational attainment predicts cognitive and functional scores in patients with schizophrenia.

Participants and Methods: A sample of 116 patients (Mean age = 40 ±9.62, 63% men) with diagnosis of schizophrenia (93 paranoid subtype and 23 other subtypes) was selected from consecutive referrals to the Psychosocial Rehabilitation Center of Benito Menni Hospital (Valladolid, Northwest Spain). All participants completed an standardized protocol to assess cognitive and functional performance which consisted of K-Bit, Trail Making Test (TMT), strop, verbal fluency (digits fashion and backward), digit symbol-coding, symbol search and the Health of the Nation Outcome Scale (HONOS). Multiple regression (MR) analyses were used to test the relationship between education and cognitive-functional scores after controlling the effect of age, sex and severity of the symptoms.

Results: Education showed a significant correlation (range = 0.17-0.28, p <.05) with cognitive scores (digits, speed processing, strop, phonological and semantic fluency) and HONOS behavioural (r = -0.23) and clinical (r=-0.22) subscales. MR analysesindicated that education predicts significantly cognitive and functional scores, even when age, sex and clinical severity were introduced as covariates in the models. The highest explained variance was associated with verbal fluency and speed processing tasks.

Conclusions: Our findings suggest that higher levels of education ameliorate cognitive and functional impairment in patients with schizophrenia.

Correspondence: Silvia Cámara-Barrio, Hospital Niño Jesus, silvia_1809@hotmail.com

Executive functioning in Dual-Diagnosis

Judith Duijkers, Constance Vissers, Jos Egger

Objectives: In mental health, the term dual-diagnosis (DD) is used for the co-occurrence of Substance Use Disorder (SUD: alcohol/drugs) with another mental disorder. These co-occurring disorders can have a shared cause, and can cause/intensify each other’s expression. Forming a threat to health and society, DD is associated with relapses in addiction-related behaviour and a destructive lifestyle. This seems due to a failure to control impulses and to maintain adequate self-regulatory behaviour. Impaired executive functioning (EF) is taken as underlying factor for several
mental disorders. Studies on EF in dual-diagnosis are limited in amount and frequently methodological issues are encountered like unclear abstinence periods.

**Participants and Methods:** In the current study, 30 patients with DD (psychotic, mood, or personality disorder with SUD) and 30 healthy controls were examined, with comparable intelligence and age. Patients with DD were abstinent for 14.5 weeks on average.

**Results:** Preliminary results show delayed information processing-speed and impaired word-fluency for the DD group as compared to healthy controls. Furthermore, on other EF tasks involving inhibition (Approach-Avoidance/Stroop) patients with DD are impaired and a trend is present for impairment of shifting (a.o. Wisconsin Card Sorting Task). Remarkably, decision-making performance (a.o. Cambridge Gambling Task) does not differ compared to healthy controls.

**Discussion:** Patients with DD might not take sufficient time to utilize EF abilities. More research zooming into the diversity of EF is necessary to deepen insight and test findings. Detailed insight in the strengths-weaknesses profile can lead to tailored treatment indications, pointing out which aspects need training.

**Correspondence:** Caroline East, Alexandra R.-Mercier, Danielle Nadeau, Caroline Cellard

**Objective:** Several meta-analyses evaluating the impact of psychiatric disorders on neuropsychological functioning have been published but the methodological quality of these meta-analyses is still unknown. The main objective of this systematic review was to assess methodological quality of these meta-analyses in order to provide guidelines for future research and for clinicians about the valid inferences that can be drawn.

**Methods:** A literature search was conducted to identify all meta-analyses of cognitive deficits in psychiatry published between 1970 and 2015. There was no restriction for age and the following psychiatric disorders were considered: mood disorder, psychotic disorder, autism spectrum disorder, attention deficit hyperactivity disorder, anxiety disorder. Methodological quality assessment of these meta-analyses was done using the R-AMSTAR (Revised Assessment of Multiple Systematic Reviews), which provides a rating ranging from 11 to 44 points.

**Results:** A total of 106 meta-analyses were included. R-AMSTAR mean score was 23.28 points (SD= 3.78; range= 15-33), which indicates moderate quality. Few meta-analyses used guidelines such as PRISMA and MOOSE. Therefore, gold standards for meta-analyses are not often considered in research methodology and when reporting results.

**Conclusions:** Confidence about the quality and the clinical relevance of the conclusions in meta-analyses is essential since clinicians often based their practice on such evidence-based conclusions. Therefore, many important aspects such as publication bias and scientific quality of included studies should be considered when performing meta-analyses in order to draw valid conclusions in research and in clinical settings.

**Correspondence:** Caroline East-Richard, Laval University, caroline.east-richard.1@ulaval.ca

**Neurocognitive intra-individual variability in mood disorders: effect on attentional response time distributions**

**Participants and Methods:** The Attentional Network Test (Fan J, et al. 2002. Journal of Cognitive Neuroscience, 14, 340-347) was administered to 100 healthy controls and 110 patients with a mood disorder (46 BD and 64 MDD patients). Measures of IIV, including individual standard deviation (ISD) and coefficient of variation (CoV), were derived for each participant. Ex-Gaussian (and Vintcentile) analyses were used to characterise the RT distributions into three components: mu and sigma (mean and standard deviation of the Gaussian portion of the distribution) and tau (the 'slow tail' of the distribution).

**Results:** Compared to healthy controls, iSD was increased significantly in all patient samples. Ex-Gaussian modelling indicated a significant increase in tau in BD (Cohen’s d=0.84, p<0.001), with an increase in mu (d=0.76, p<0.001), sigma (d=0.76, p<0.001) and tau (d=0.68, p <0.001) in depressed MDD patients compared to controls.

**Conclusions:** Increased cognitive variability may be a core feature of mood disorders. These data highlight the utility of applying measures of IV to characterise neurocognitive variability and the great potential for future application.

**Correspondence:** Peter Gallagher, Newcastle University, p.gallagher@ncl.ac.uk

**Cognitive endophenotypes of affective and non-affective psychosis**

Evi Gkiontou, Eleftherios Pallis, Panos Bitsios, Stella Giakoumaki

**Objective:** Cognitive deficits are reliable endophenotypic markers of schizophrenia and bipolar disorder (BD). BD patients with history of psychosis perform poorly compared with BD patients without family history of psychosis in several cognitive domains, thus resembling schizophrenia patients. In this study, we examined the cognitive profile of unaffected first-degree relatives of patients with schizophrenia or BD with history of psychosis.

**Participants and Methods:** Participants were 66 unaffected first-degree relatives of schizophrenia patients (SuN-R), 36 unaffected first-degree relatives of BD patients with history of psychosis (BDUnR) and 102 age-, sex- and education-matched controls. They were tested for cognitive function and general psychopathology.

**Results:** The SuN-R group had higher Depression and Somatization and the BDUnR group had higher Anxiety compared with the controls (all P values <0.005). After taking into consideration the differences in psychopathology, we found that both relatives’ groups performed poorly compared with the controls in visual memory, control inhibition, working memory, cognitive flexibility and abstract reasoning (all P values <0.005). Only the SuN-R group had poorer verbal fluency compared with the controls (P<0.001) and they also performed worse than the BDUnR group in visual memory and processing speed (all P values <0.01).

**Conclusions:** Control inhibition, working memory, cognitive flexibility and abstract reasoning are reliable endophenotypic markers of affective and non-affective psychoses as both relatives’ groups were equally impaired in these cognitive domains. Visual memory, verbal fluency and processing speed deficits are more specific to schizophrenia as they were found only or mainly in the SuN-R group.

**Correspondence:** Stella Giakoumaki, University of Crete, sgiakoumaki@uoc.gr

**Evaluation of the efficacy of Sociocognitive and Neurocognitive Training dedicated for patients with anorexia nervosa**

Julia Jeschke, Ewelina Wilkos, Dorota Kulakowska, Katarzyna Kucharska

**Objective:** Patients with AN experience difficulties in social cognition and neurocognition functioning during the course of the disease. The aim of this research was to evaluate the efficacy of original intervention - Sociocognitive and Neurocognitive Training in improving these impairments.

**Participants and Methods:** Research group: Patients hospitalized at the Department of Children and Adolescents Psychiatry, diagnosed with anorexia nervosa (AN) got an assessment of neurocognitive and sociocognitive functioning before and after the Sociocognitive and Neurocognitive Training programme. The study included patients diagnosed with AN (according to ICD-10; DSM-V), age variety 14 - 20 y.o. of Polish origin, right-handed, unrelated, with at least a basic education and within the intellectual norm. Exclusion criteria from the study was a brain damage, impaired hearing or sight, and alcohol or drug misuse/dependence. The control group of healthy subjects (n = 40) was recruited from school students. The training programme is built of 20 sessions, conducted in the period of 10 weeks. Programme consists of 2 parts: neurocognitive therapy and social cognition therapy, 10 sessions each.

**Results:** Preliminary results show an improvement in neurocognitive and social cognitive functioning, both in performance in the final assessment using test batteries, as well as in the evaluation written by patients themselves.