

In UHR patients the opposite relationship was found ($p < 0.05$). The differences of the saccades latency, depending on the signal value and its spatial location in patients and healthy subject can reflect the spatial attention disturbance in the prodromal stage of schizophrenia. The reduction of saccade latency in UHR was correlated with increase of gray matter volume in the frontal, parietal and temporal cortex, which may reflect the brain compensatory mechanisms prior to schizophrenia manifestation. The applying of diffusion-weighted imaging revealed a decline of the fractional anisotropy in the right temporal part of the superior longitudinal fasciculus in patients. The abnormality of the brain tract may be associated with the found neurophysiologic differences laying in base of the cognitive control disturbances in UHR patients. The study was supported by the RFBF (projects 14-04-01634 and 16-04-01079).

doi:10.1016/j.ijpsycho.2016.07.397

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Trajectories of event-related theta oscillations during reward processing in offspring of alcoholics

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Studies have used event-related oscillations (EROs) as a sensitive measure to examine brain (dys) function during cognitive tasks in individuals with alcohol use disorder (AUD) and their high risk offspring. The current study examines the developmental trajectory of reward related ERO theta power in a monetary gambling task, as well as externalizing features, in adolescent and young adult subjects from the Collaborative Study on the Genetics of Alcoholism (COGA) prospective study (12-25 years old), who were retested longitudinally at ~2-year intervals ($N = 4821$ observations; males = 48%). The high risk (HR) offspring were drawn from families with a dense history of AUD, and had positive parental histories of alcoholism (HR, $N = 3975$ observations), while the comparison low risk (LR) offspring were recruited from community families (LR, $N = 846$ observations) screened for a parental history of alcoholism. Mean total theta power (3.5-7.5 Hz) during the time window of 200-500 ms following the onset of the outcome stimulus (loss or gain) was analyzed in the ERO data from each recording session. Trajectories of ERO power, estimated using the LOWESS method, demonstrated that male HR offspring manifested lower theta power than their LR counterparts during both loss and gain conditions throughout the course of development (from 12-25 years). However, female subjects did not show any distinct pattern of theta ERO differences between HR and LR groups. Gender differences were most robust during 12-18 years, during which males displayed higher theta power in both loss and gain conditions than their female counterparts, particularly in the LR group. By contrast, both male and female HR offspring exhibited higher impulsivity scores and increased prevalence rates of externalizing disorders compared to LR offspring. These results suggest that HR offspring manifest sustained neurocognitive deficits related to reward processing as well as heightened impulsivity and risky behaviors during the course of development from adolescence through young adulthood.

doi:10.1016/j.ijpsycho.2016.07.398

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Electrophysiological, cognitive and clinical profiles of at-risk mental state: The longitudinal Minds in Transition (MinT) study

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The onset of schizophrenia is typically preceded by a prodromal period lasting several years during which sub-threshold symptoms may be identified retrospectively. Clinical interviews are currently used to identify individuals who have an ultra-high risk (UHR) of developing a psychotic illness with a view to provision of interventions that prevent, delay or reduce severity of future mental health issues. The utility of biomarkers as an adjunct in the identification of UHR individuals is not yet established. Several event-related potential measures, especially mismatch-negativity (MMN), have been identified as potential biomarkers for schizophrenia. In this 12-month longitudinal study, demographic, clinical and neurocognitive data were acquired from 103 UHR and 65 healthy controls, of whom 81 UHR and 61 controls provided valid EEG data during passive and active auditory tasks at baseline. Despite widespread differences between UHR and controls on other measures [JT1], ERPs did not differ between these groups. MMN amplitude was modulated by age and the effects of cannabis, which is recognized as a risk factor for development of psychosis. Of 67 UHR at the 12-month follow-up, 7 (10%) had transitioned to a psychotic illness. The statistical power to detect differences between those who did or did not transition was limited by the lower than expected transition rate. ERPs did not predict transition, with trends in the opposite direction to that predicted. In exploratory analysis, the strongest predictors of transition were measures of verbal memory and subjective emotional disturbance. This study's findings suggest caution is required when interpreting recent reports of reduced MMN and P3b in UHR groups. These findings are consistent with indications that abnormalities in these components are indicators of biological changes associated with illness onset as opposed to general vulnerability factors.

doi:10.1016/j.ijpsycho.2016.07.399

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Mirror system deficit in ADHD? Study of Mu rhythm suppression during observation and imitation of emotion-related facial movements

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Mu rhythm is an EEG oscillatory measure (9 -13 Hz), whose suppression during movement execution or action observation is considered an indicator of the activity of the human analog of the mirror neuron system. Detection of facial emotional expressions involves detailed observation of facial movements. ADHD is known to be associated with social cognition impairments, including emotional face perception, theory of mind deficits and reduced empathy. The present work compared Mu suppression in 22 ADHD children and 18 matched control participants (32 % female, ages 9 to 14, Mean 10.8 SD: 1.5), while observing and later imitating the movements involved in the dynamic unfolding of facial emotion expressions. Participants observed and imitated facial expressions performed by actors in 96 short video clips, composed by two seconds of a neutral face and two seconds where a happy, sad, angry, or fear expression unfolded. The clip was preceded by a 1 second fixation cross and followed by a 1 second blank screen. In each trial, after the observation stage, they were asked for the presence of a specific emotion, (present in 50% of the trials). Then, they had to press a key to start co-acting the same facial movements. EEG (40 channels) was recorded using a NeuroScan NuAmps system. Eye movements were recorded using an Eyelink 1000 system. After artifact rejection, epochs of -500 ms to 3000 ms were extracted. The Morlets' wavelets procedure was used for time frequency analysis and a -500 to 0 ms window was used as a baseline for Z scoring. Change in power in the 9-13 Hz band during the 2000 ms window where movement occurred was used for statistical analysis. Results showed significant Mu suppression over central regions, more marked over the left hemisphere, during observation and imitation ($F(1, 38) = 3.07, p < 0.05$). Movement execution produced larger suppressions than observation in Controls. Suppression in the Control Group was significantly larger than in the ADHD group in both conditions ($F(1, 18) = 6.68, p < 0.01$) for all emotional expressions. Furthermore, observation and imitation did not significantly differ in the ADHD group. Nevertheless, when comparing the groups using only those trials in which a significant Mu suppression occurred no between groups difference was observed. Lack of suppression in other networks has been reported in ADHD. This pattern is compatible with a functional, but not structural, deficit of the mirror system in ADHD. This work was supported by CONICYT/FONDECYT 1150241.

doi:10.1016/j.jpsycho.2016.07.400

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Correlation between the wave P200 amplitude and cognitive status at schizophrenia

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Background: The number of research examining the correlation between the P200 component and cognitive functions is extremely little.

Aims: The study of relationships between the P200 wave and cognitive characteristics in patients with schizophrenia.

Methods: Event related potentials (ERP), Brief Assessment of Cognition in Schizophrenia (BACS).

Sample: The experimental group was consisted of 63 people: 19 with diagnosis «paranoid schizophrenia»; 44 healthy controls.

Results: The P200 level was higher in patients with schizophrenia in comparison with control group. This fact could be referred to the reduction of mismatch negativity in response to deviant auditory stimulus. In the group of patients with schizophrenia responding to standard stimulus, the highest number of correlations between the P200 amplitude and working memory, verbal learning and problem-solving skills was registered. The extent of mismatch negativity in patients with schizophrenia was mostly related to the working memory, motor and problem solving skills. In the control group responding to standard stimulus the correlations structure was different. The strong positive correlation was found between P200 amplitude and motor and problem solving skills. Mismatch negativity was negatively correlated with verbal learning, verbal fluency and speed of mental processes.

Conclusion: Patients with schizophrenia differed from the control group in the reduction of mismatch negativity and in the declining of cognitive function. The correlation between mismatch negativity and working memory, basic processes of attention was found in patients with schizophrenia.

doi:10.1016/j.jpsycho.2016.07.401

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Psychophysiological correlates of Attention Deficit Hyperactivity Disorder in children

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Attention Deficit Hyperactivity Disorder (ADHD) is the most common cause of behavioral disorders, learning difficulties, school dysaptation. Currently, diagnosis is based on clinical criteria only. Research of psychophysiological correlates of ADHD in middle childhood (children 7-12 years of age) is very actual. In our work, instrumental methods for a quantitative assessment of functional hemispheric asymmetry (FHA) and emotiogenic changes of function of color discrimination are presented. To assess selective attention and activity level the Toulouse-Pieron test was applied. The measurement of FHA is based on the preceding effect of dichotic sound stimulation. We estimated level of the FHA by the values of the threshold interaural delays. The computer campimetry is the measurement of color discrimination thresholds in the framework of HLS color model. 41 subjects between 7 to 12 years of age participated in the study: 18 children with ADHD and 23 children without diagnosis. In 68% of children with ADHD the right brain hemisphere is dominant. During dichotic stimulation with increasing interaural delay there is decrease in lability and excitability parameters for both the right and the left hemisphere ($p = 0,001, t$ -tests). Concerning the indicators of stability, the significant