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Delta- and gamma-activity of resting state EEG as one of depressive disorder risk markers among migrants from subpolar and polar Siberia regions

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ABSTRACT

- It is well known, that the functional activity of so-called resting-state brain networks, including the brain default-mode network (DMN) and the central executive network (CEN) are related with an inclination to different mental disorders, such as depression and anxiety disorder.

- Peoples migration to novel climatic or social conditions can be accompanied by the increasing of stress-induced depression and anxious disorder risks.

- It could be assumed that the adaptation process to the polar climate and new social conditions among migrants are due to the functional changes within the resting-state networks.
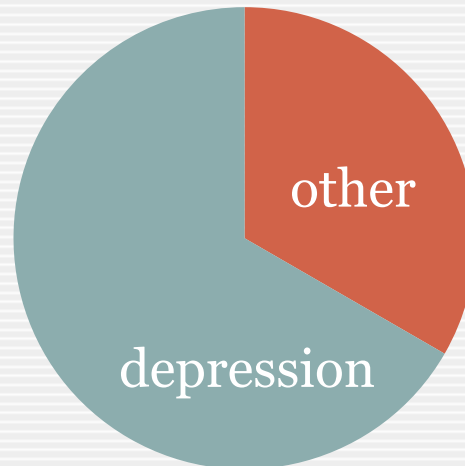
MOTIVATION AND AIM

- *Motivation*

According to the world health organization, today the depression is one of the most common worldwide diseases, affecting more than 264 million people. Modern neuroscience is focused on the search for markers of mental illness for early diagnosis and rational treatment tactics.

Psychiatric disorders

other

depression

MOTIVATION AND AIM

- *The aim* of the study was to investigate the relationship between the resting-state electroencephalography indicators and predisposition to depressive disorders in labor migrants adapting to new climatic and social conditions in Sakha Republic (Yakutia).
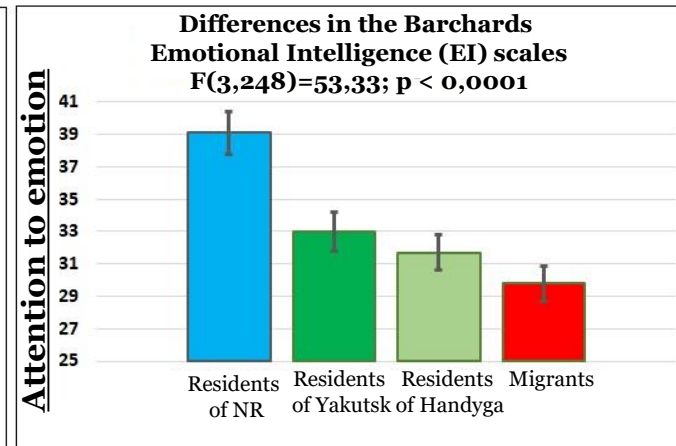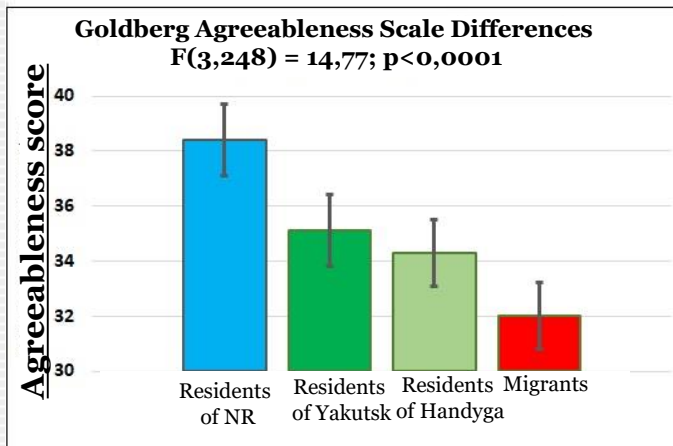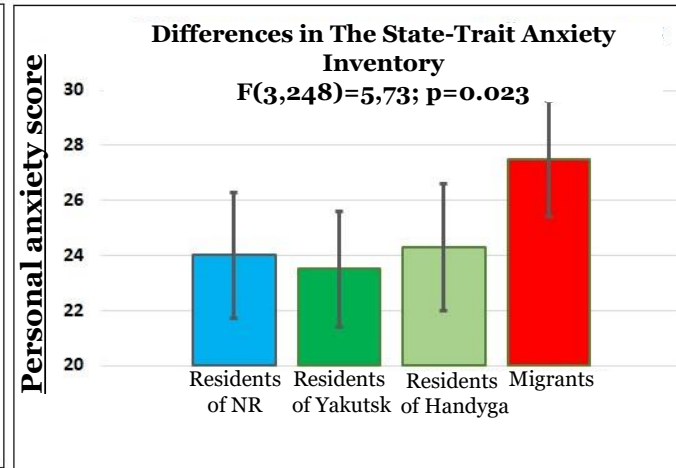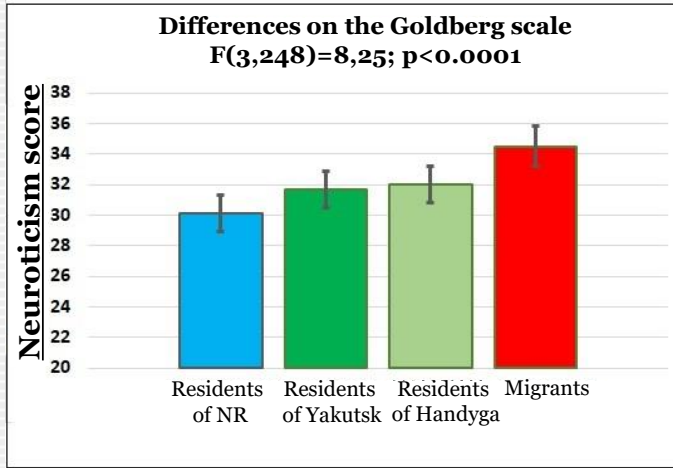
METHODS

- *Test group*: 50 young migrants (mostly from Central Asia and Africa), 100 indigenous people of Yakutia (50 urban and 50 rural) and 100 persons from Novosibirsk who were not previously supervised in psychoneurological dispensers and were not receiving psychological and psychiatric care at the period of study.

- *Long-term study*: The migrants were examined twice: immediately after migration and six months after a continuous residence in Yakutia.

- *The psychological questionnaires:* Beck depression inventory, Achenbach Adult Behavior Checklist, the Goldberg Personality profile, The Barchard's Emotional intelligence questionnaire, etc.

- *Instrumentation:* EEG was recorded at the resting-state (6 min with closed eyes and 6 min with opened eyes) with 128 channels of NeoRec amplifier, Russia. EEG data was processed using EEGLab_toolbox and sLORETA.

RESULTS

- Migrants were characterized by lower levels of agreeableness but higher values of personal anxiety and neuroticism in the Goldberg's scales. Migrants were also characterized by reduced attention to other people's emotions and experiences of other people's misfortune, as measured by the Barchard's Emotional Intelligence (EI) scales.

RESULTS

Differences on the Goldberg scale
F(3,248)=8,25; p<0.0001

Differences in The State-Trait Anxiety Inventory
F(3,248)=5,73; p=0.023

Goldberg Agreeableness Scale Differences
F(3,248) = 14,77; p<0,0001

Differences in the Barchards Emotional Intelligence (EI) scales
F(3,248)=53,33; p < 0,0001

RESULTS

- *Conclusion of psychological testing:*
- Migrants in the first survey had higher scores on the cognitive-affective depression scale of the Beck questionnaire compared to permanent residents of Yakutia ($t = 2.23$, $p = 0.032$) and Novosibirsk region ($t = 2.56$, $p = 0.026$).
- The groups of Yakutia residents (both urban and rural) did not differ in their depressive symptoms.
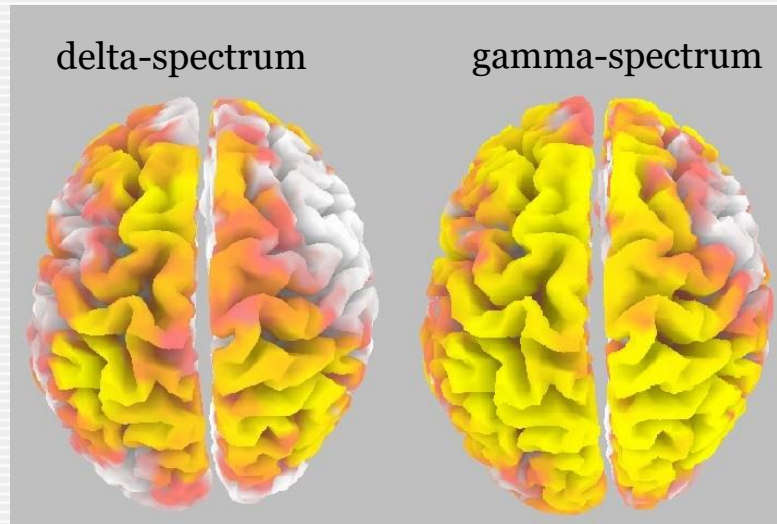
RESULTS

- Depressive symptomatic levels were positively correlated with a neuroticism's score in the Goldberg's questionnaire in all groups of participants (r = 0.42, p = 0.001) .

- Negative correlations of depressive symptoms with extraversion (r = -0.43, p = 0.011) and agreeableness have also been revealed (r = -0.73, p = 0.0016).

- A re-examination of migrants revealed that their cognitive-affective manifestations of depression significantly decreased in comparison with first testing (t = 2.11, p = 0.022).
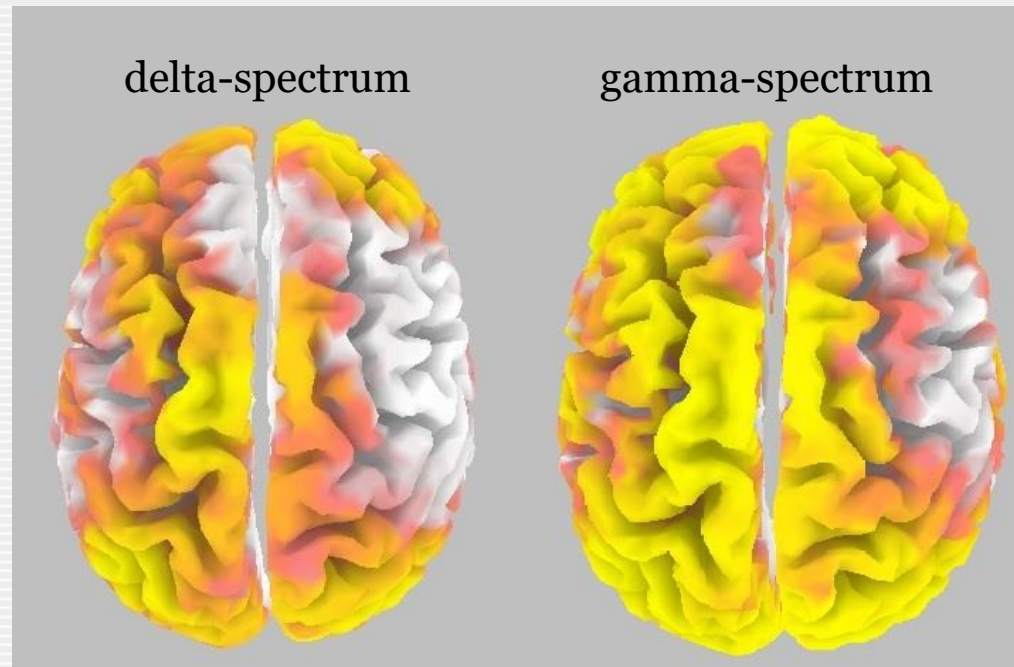
RESULTS

- *Results of the resting-state EEG*

- A comparison in the first phase of the survey of the spectral density cortical topography between migrants and residents revealed that migrants have a significantly higher spectral power (p = 0.00020) in both delta and gamma frequency bands compared to the Yakutian residents. These differences are localized along the medial cortex line from the medial prefrontal to the medial occipital cortical area.

delta-spectrum   gamma-spectrum

RESULTS

- The within-group comparison of migrants showed, that the brain activity significantly differed between the first and second period of study. Cortical distribution of within-group differences among migrants coincide with distribution of between-group differences, where migrants in the first year and residents were compared.

delta-spectrum   gamma-spectrum

RESULTS

- A comparison in the second survey between the migrants and the residents showed that the differences in spectral power persist only within the posterior medial cortex.

- The residents' groups did not differ in terms of the resting-state EEG.

delta-spectrum   gamma-spectrum
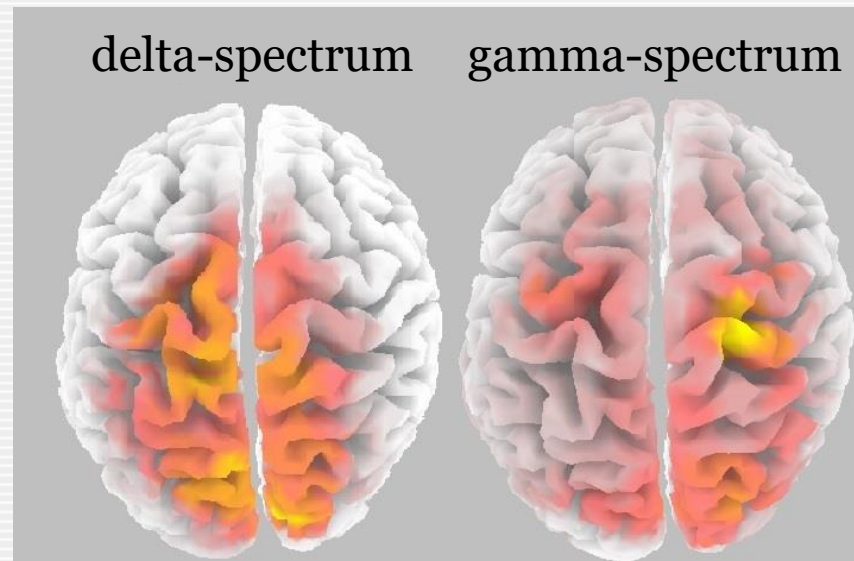
Conclusion

- Thus, from the obtained results, it can be concluded that predisposition to depression directly depends on social and climatic factors. New living conditions impact on the brain resting-state activity. At this point, our task is to understand which of the default networks is positively correlated with depressive symptoms.

Thank you for attention!