

# Study of 5-HTTLPR allele polymorphism and its effect on neurophysiological processes in a stop-signal paradigm in residents of northern regions

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# Aim

A comparison of the association of neurophysiological reactions under execution of Stop-signal paradigm (SSP) with 5-HTTLPR allele polymorphism in different ethno-cultural groups of people:

- Siberian Russian Caucasians from Novosibirsk,
- Siberian Mongoloids from Yakutia and Tuva,
- Labor migrants living in Yakutia from Egypt and Tajikistan.

# Subjects and procedures

- **Participants:** healthy Russians (241 subjects, age  $24.5 \pm 3.5$ , 175 men), Tuvinians and Yakuts (181 subjects, age  $23.2 \pm 4.1$ , 97 men), and the labor migrants (50 subjects, age  $23.5 \pm 3.1$ , all men)
- **Personality traits** were measured by State Trait Anxiety Inventory; Goldberg Big Five Questionnaire, Buss-Perry Inventory, Gray-Willson Inventory, and Emotional Intelligent Inventory.
- **DNA** was taken from blood or buccal epithelium using PCR method, Biosilica, Russia
- **EEGs** were recorded by means of 128 channels with Brain Products amplifiers (sampling rate: 1000 Hz, high-cutoff: 100Hz, low-cutoff: 0.1 Hz).

# Stop-signal paradigm (SSP)

- **SSP** is a method of refraining a planned motor action
- Participants needed to respond to stimuli by pressing buttons. 35/130 trials had a stop signal



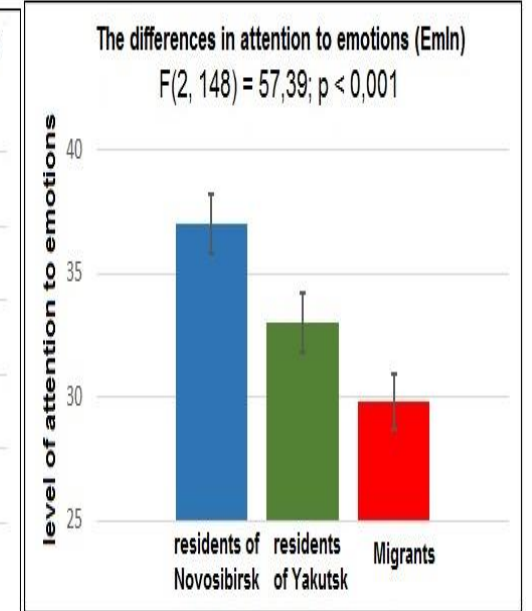
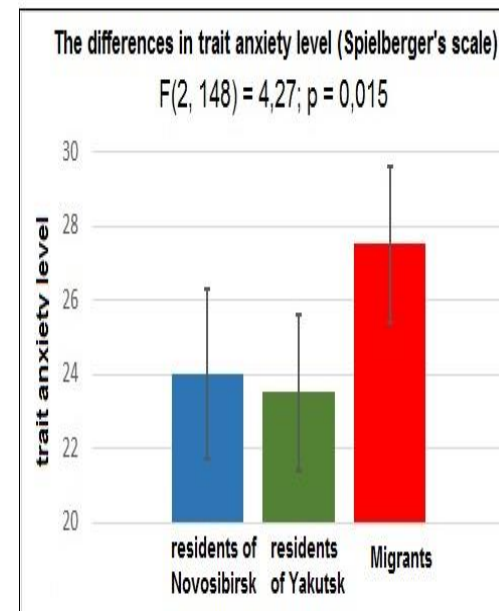
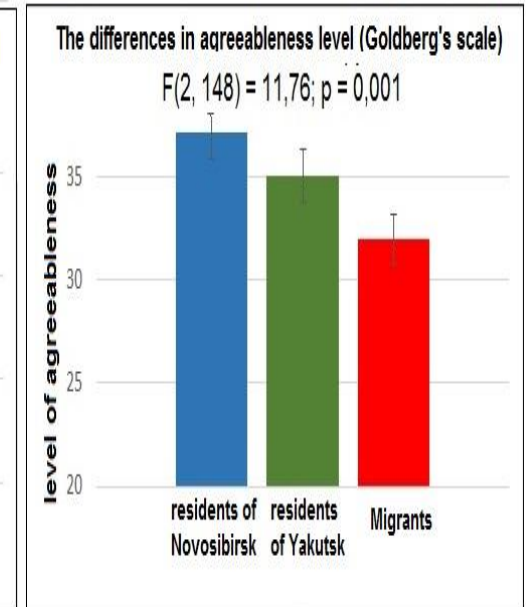
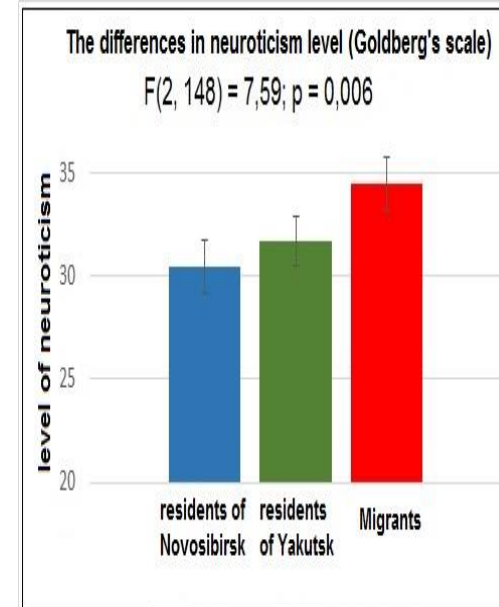
# Results: behavior

**Caucasians** had higher levels at recognizing emotions of others, regulating own emotions.

**Mongoloids** had higher levels of neuroticism, fear, warring and keeping attention on bad events and higher level of consciousness.

**Migrants** had higher level of neuroticism and anxiety, less friendly. (1<sup>st</sup> period of adaptation)

This effects don't depend on the genotype.



# Results: behavior

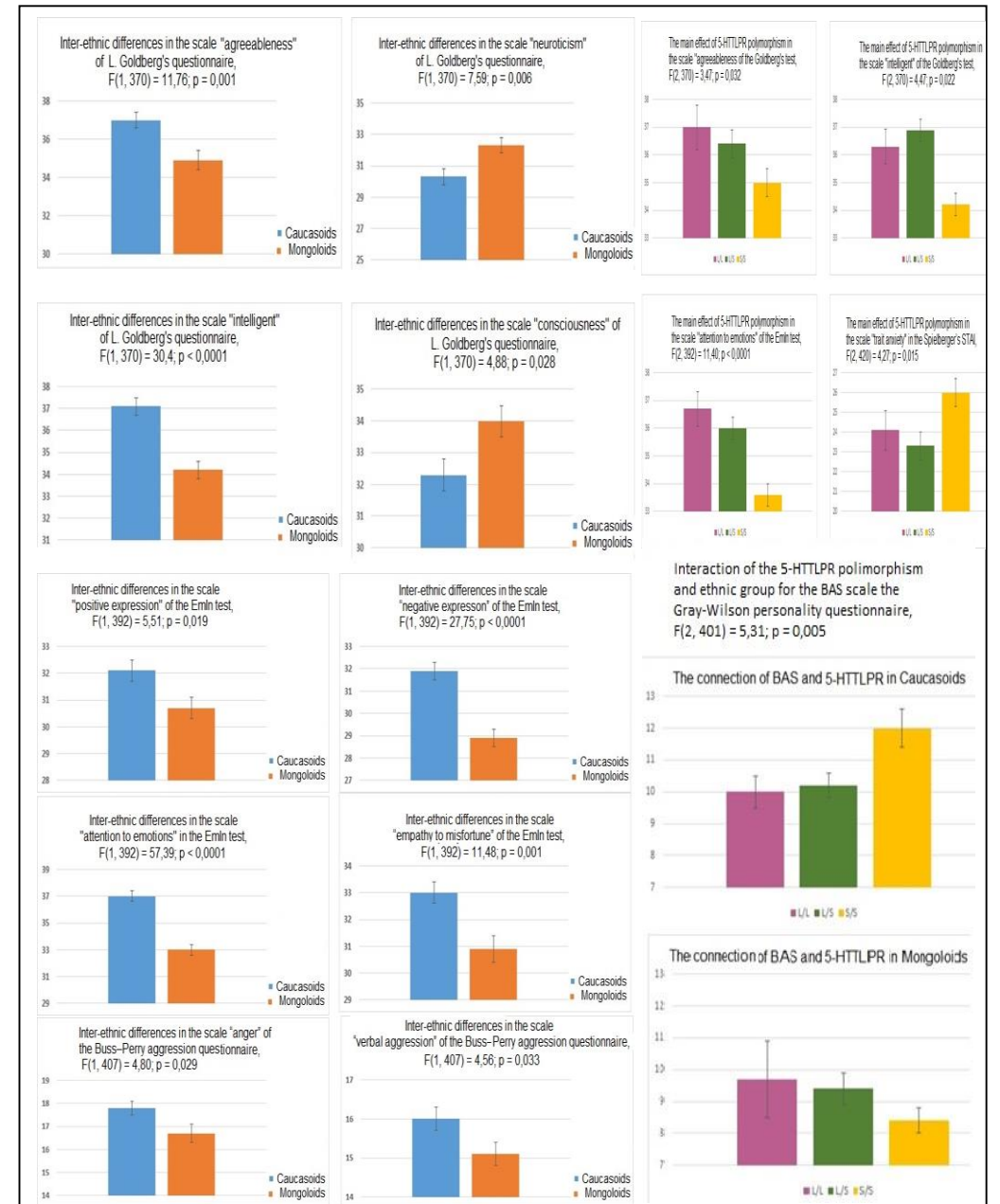
## Genotype differences:

**SS** genotype vs LL as LS: higher level of anxiety, lower level of emotional intelligence and less friendly.

Behavioral activation system: genotypes' effect is different in ethnic groups.

**SS in Caucasians** – more sensitive to encourage

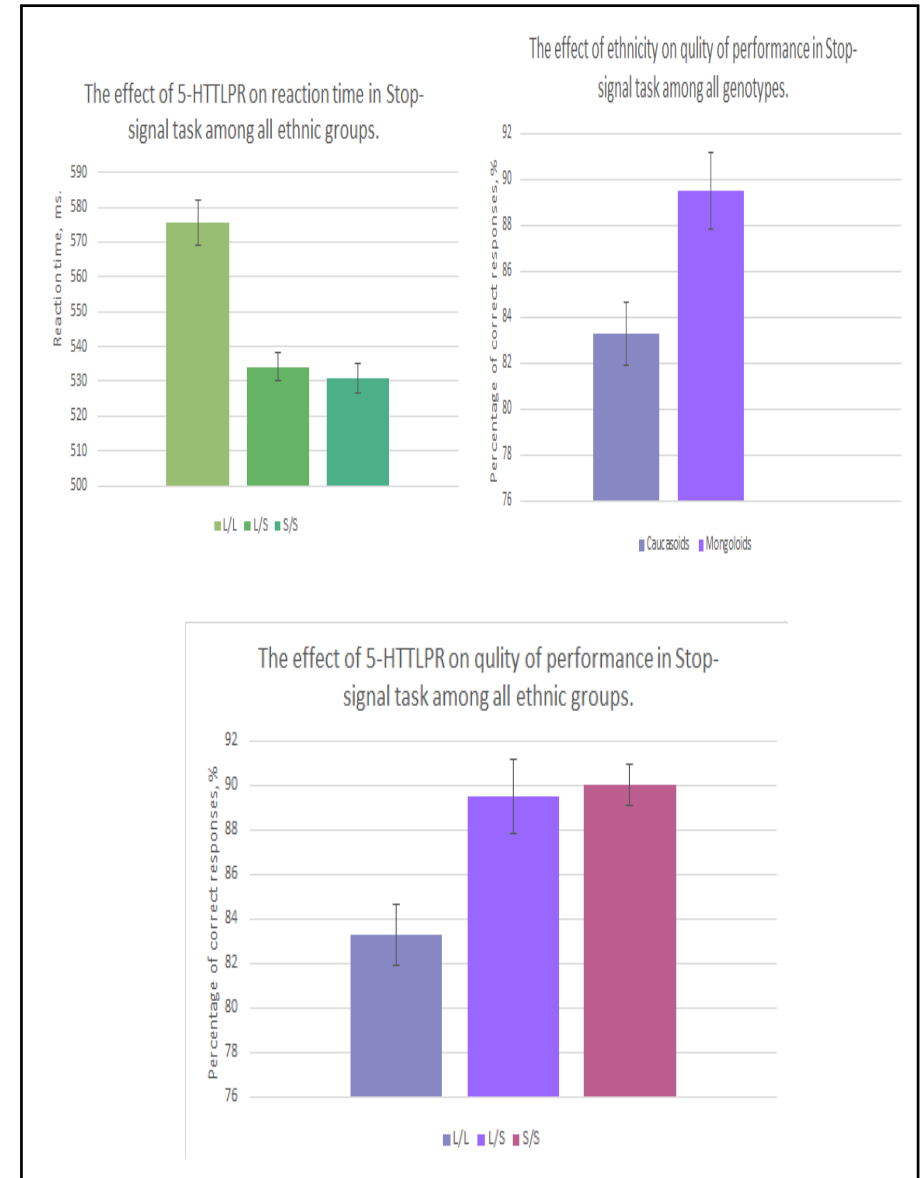
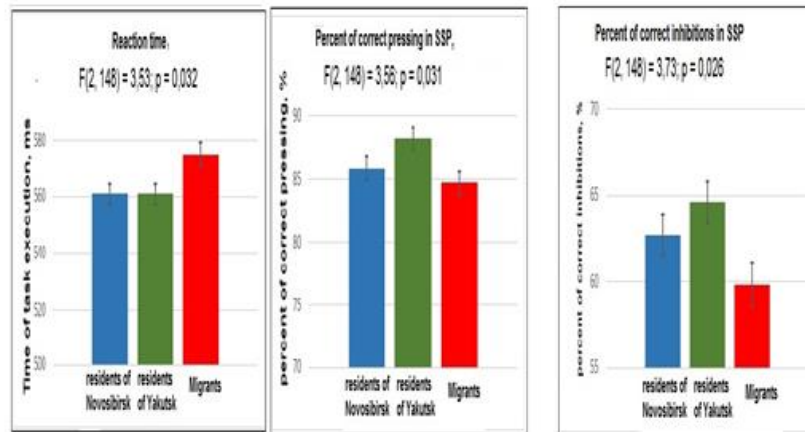
**SS in Mongoloids** – less sensitive to encourage



# Results: SSP

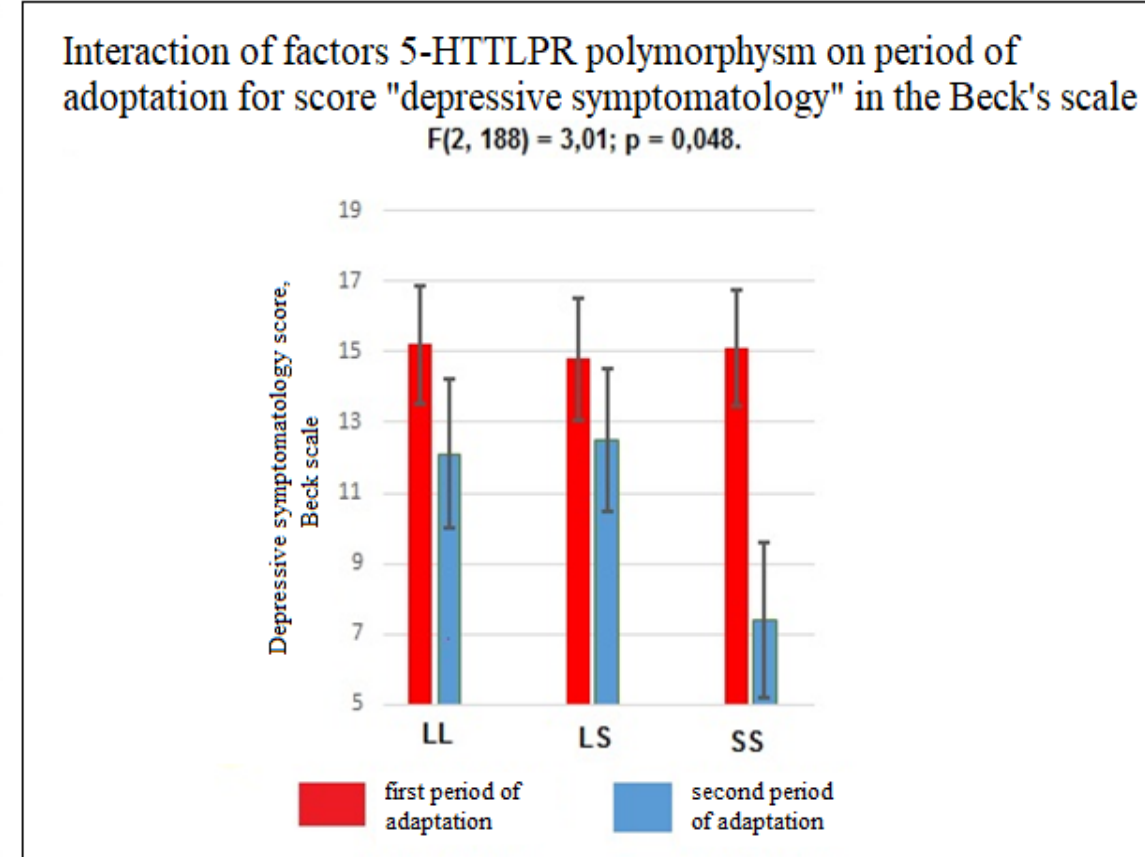
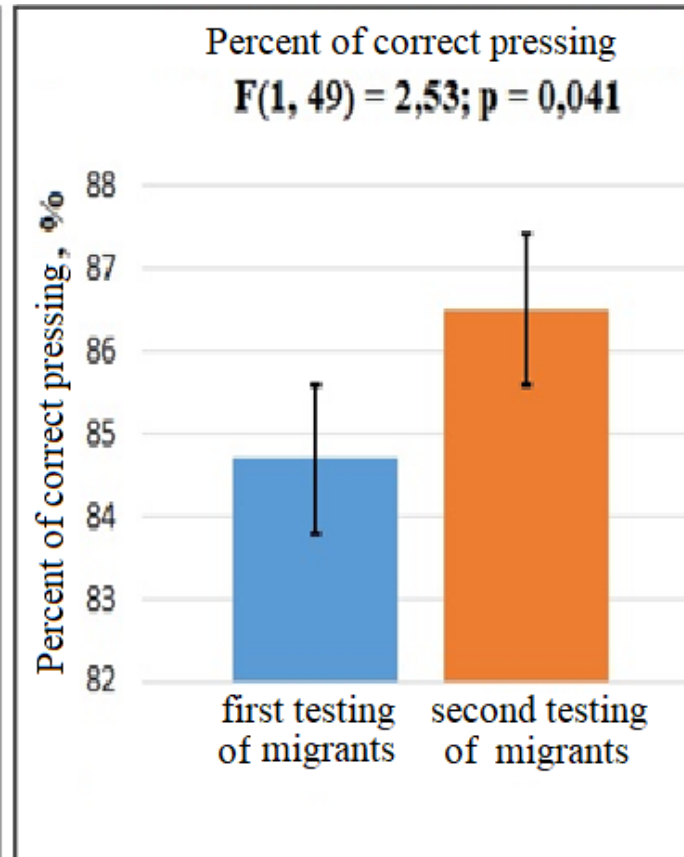
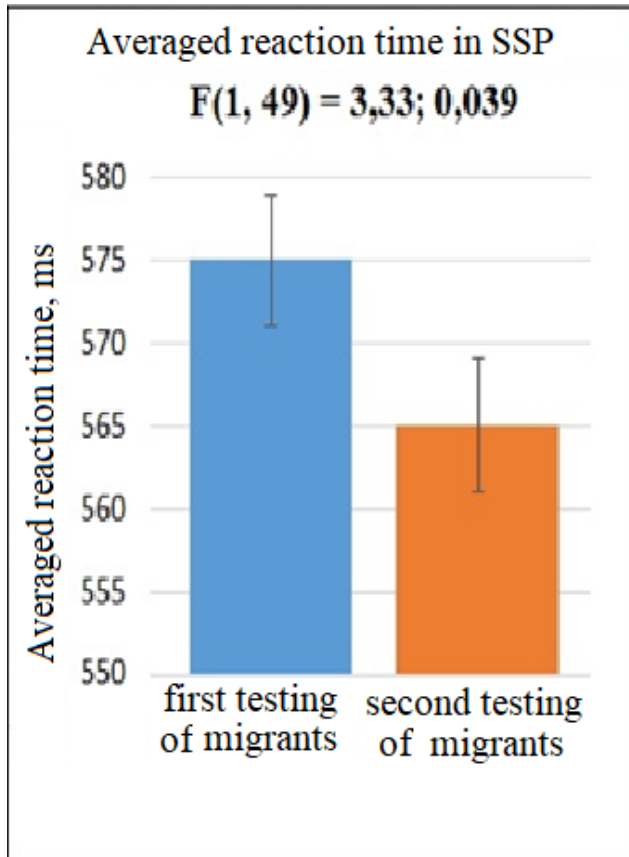
**LL** genotype – low reaction time and task performance. Lower motor control than **LS** and **SS**.

Local Mongoloids are performing better in motor control than local Caucasians.



# 1<sup>st</sup> and 2<sup>nd</sup> period of adaption in migrants

SS genotype adapts better to new conditions.





# Results: EEG

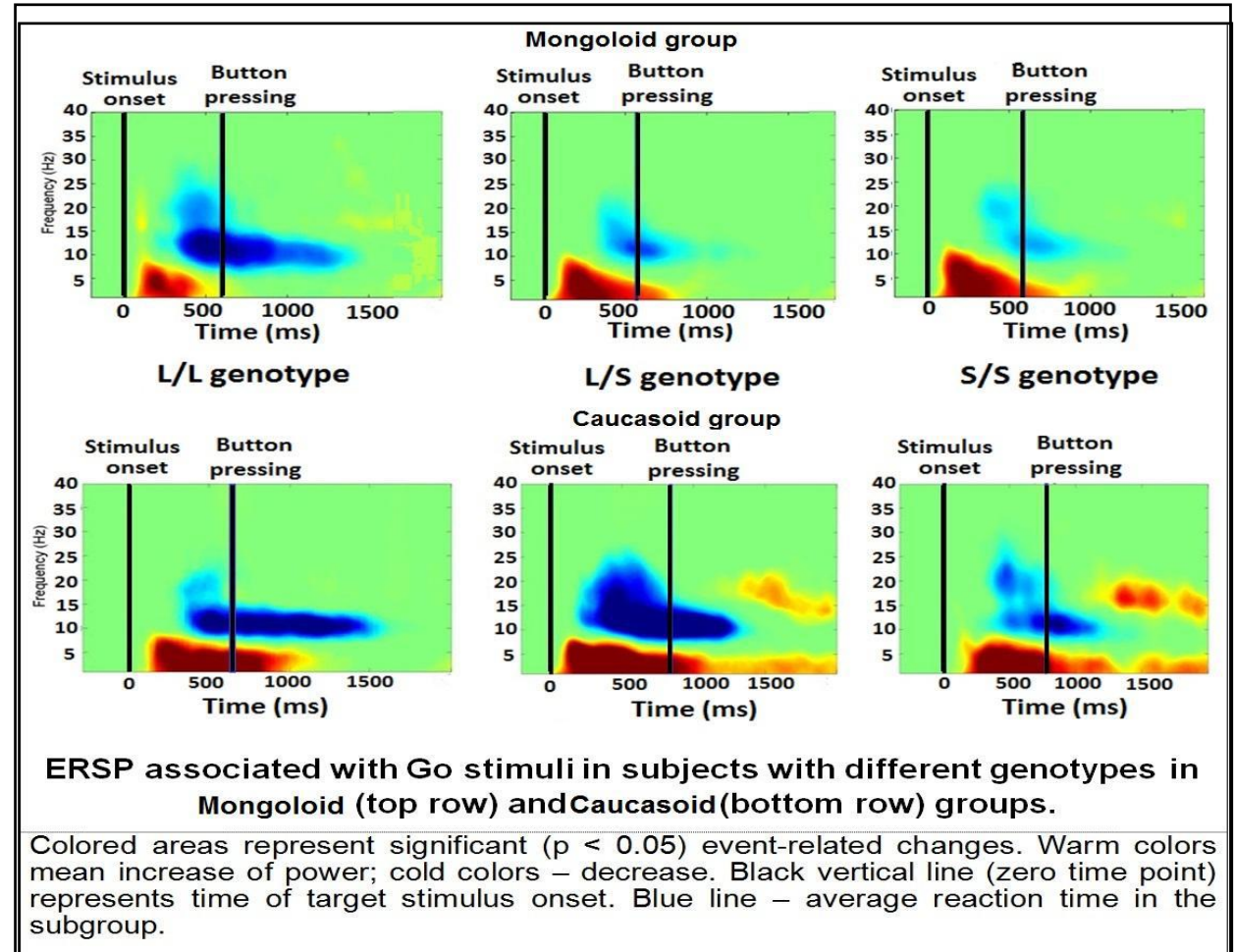
SS genotype is performing better than LL.

LL has longer attention concentration and performance.

LS genotype behaves differently depending on the location.

LS from cities behave like LL – slower reaction.

LS from Tuva and Yakutia – like SS, fast concentration and reaction.



# Conclusions

1. 5-HTTLPR polymorphism is associated with a set of psychological traits connected with behavioral control, however, some of these associations are different for different ethnical groups.
2. 5-HTTLPR polymorphism is associated with behavioral measures of motor control in Stop-signal paradigm, however, the social factors also modulate this association.
3. LL-genotype is associated with better ability to emotional control, but SS genotype is associated with better performance in a motor control task among all ethnical groups.
4. Alpha-desynchronization in the Go-condition of SSP is connected both with 5-HTTLPR polymorphism and behavioral indexes of motor control.
5. Amplitude of alpha-desynchronization in the Go-condition of SSP depends both with ethnicity and psychological traits of participants.

**THE STUDY WAS SUPPORTED BY RFBR GRANTS No. 18-29-13027 AND 18-415-140021.**

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Thank you for your attention!