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The Role of Gender in the Prosocial Behavior Mechanisms.

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ABSTRACT

Prosocial behavior is progressively being studied because of its enormous role in the changing conditions of the modern world. The behavior influences distant communication conducts Artificial Intelligent and causes psychological disorders, such as autism spectrum disorder or psychopathy. We study the prosocial behavior by analyzing the brain features mechanisms during the custom setting - empathy game "Stone-Paper-Scissors". Observed results for the cohort of 55 participants (28 women and 27 men) were obtained from the test questionnaires and EEG.

INTRODUCTION

Research on the development and correlation of prosocial behavior (i.e., behavior that is beneficial to others) has been an active area of research for the past three decades (Eisenberg and Fabes, 1998).

Given the importance of understanding the behaviors that benefit society, surprisingly little action is currently being taken to study prosocial behavior. In order for Artificial Intelligence to empathize with human emotions, artificial intelligence must have a way of learning about the range of emotions that we experience. With the help of empathy in AI Systems, artificial emotional intelligence can allow us to take the first step toward functional artificial general intelligence that will empower human-kind.

The present study has a considerable interdisciplinary background, linked with researching the psychophysiological mechanisms of prosocial behavior and comprehension in psychological concepts of altruism and empathy. To summarize, we present the factors of the prosocial personality by examining the intercorrelations among the measures. We created the model that highlighted the main brain structures involved in prosocial reactions and behaviors.

METHODS

To study the prosocial behavior we used the two methods:

- 1) Test-questionnaires of prosocial behavior: "Measurement of prosocial trends" (G. Carlo and B. A. Randall), the Altruism scale (F. Rushton), Method for the empathy study of I.M. Yusupov.
- 2) An electrophysiological experiment with registration of a Nineteen-channel Encephalograph (according to the 10-20% system on a Neuro-KM electroencephalograph) consisted of two series.

ENTER FINDING #2

According to the EEG experiment we found that the Hypothalamus is involved in the nonspecific regulation of the cognitive activity. Hypothalamus is more actively in tasks that cause increased personal experience, which are more pronounced in male due to their publicity and less emotional prosocial behavior, while the manifestation of empathy leads to its lesser activity. The same dependence is found for Insula, and for the Hippocampus, and other of the above-mentioned structures.

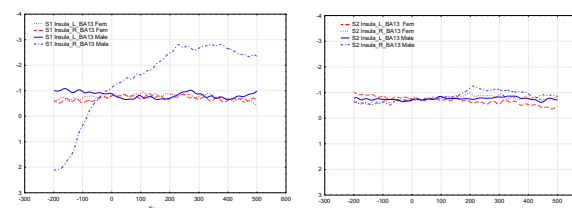


Fig. 4. Averaged evoked potentials virtually withdrawal from the Insula (13 BA) of the left and right hemispheres in the group of men (blue solid line) and women (red dotted line) in series 1 (left) and 2 (right).

ENTER FINDING #1

According to the questionnaires we found the six prosocial behavior factors: "Altruistic", "Publicity", "Emergency prosocial behavior", "Conformist prosocial behavior", "Anonymous prosocial behavior", "Emotional prosocial behavior".

ENTER FINDING #3

Certain activity was also found associated with the studied factors of gender and empathy in such structures as the Mesencephalon, Medula Oblongata, left Thalamus, Putamen, left Caudati nucleus, Ventral striatum. Moreover, we do not see any significant differences at activity in Amygdala and Cingulate cortex (BA 32) was most weakly expressed.

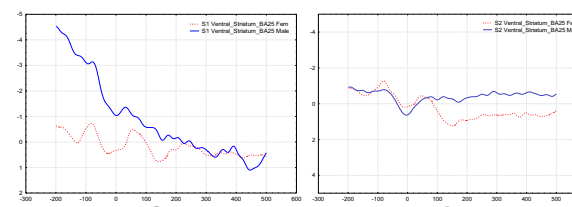


Fig. 3. The averaged evoked potentials virtually withdrawal from the ventral striatum (25 BA) in the group of men (blue solid line) and women (red dotted line) in series 1 (left) and 2 (right).

DISCUSSION

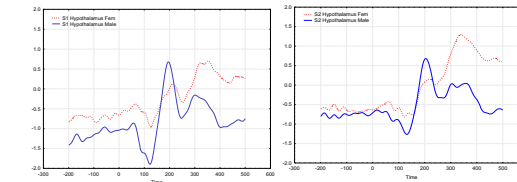


Fig. 1. Averaged evoked potentials, virtually withdrawal from the Hypothalamus, in the group of men (blue solid line) and women (red dotted line) in series 1 (left) and 2 (right).

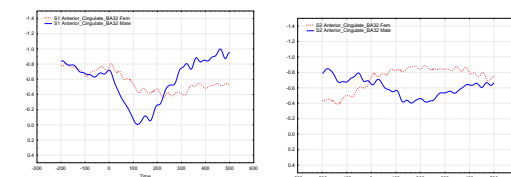


Fig. 2. Averaged evoked potentials that are virtually withdrawal from the Anterior Cingulate cortex (32 BA) in the group of men (blue solid line) and women (red dotted line) in series 1 (left) and 2 (right).

CONCLUSIONS

1. According to the questionnaires we found the six prosocial behavior factors: "Altruistic", "Publicity", "Emergency prosocial behavior", "Conformist prosocial behavior", "Anonymous prosocial behavior", "Emotional prosocial behavior". According to the EEG experiment we found that the Hypothalamus is involved in the nonspecific regulation of the cognitive activity.
2. The EP separately for the males and females' group in the experimental series. The statistically significant stimulus reaction (EP) was found in the hypothalamus (Fig. 1), which is more pronounced in the male group in the series requiring personal inclusion compared to the empathy series in time components N100, N250 and N400 (differences are significant, $p < 0.05$).
3. We also observed statistically significant differences ($p < 0.05$) in the female group. These components are less pronounced, but even here in the series for empathy their amplitude is significantly less ($p < 0.05$ in late latency) than in the series requiring personal participation. Potentials were also found in the right Insula (Fig. 4) and the Anterior Cingulate (Fig. 2).
4. At the same time, they are more pronounced and differ more strongly between the male's series. Certain activity was also found associated with the studied factors of gender and empathy in such structures as the Mesencephalon, Medula Oblongata, left Thalamus, Putamen, left Caudati nucleus, Ventral striatum. Moreover, we do not see any significant differences at activity in Amygdala and Cingulate cortex (BA 32) was most weakly expressed.

ACKNOWLEDGMENTS & REFERENCES

The research is financially supported by the Russian Science Foundation, Project № 20-18-00067.