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## **INTERCONNECTION BETWEEN FUNCTIONAL ASYMMETRY OF BRAIN HEMISPHERES AND TEMPERAMENT IN THE STUDENTS**

*In the left hemisphere the mechanisms  
of abstract thinking are concentrated, in the left one  
there are the mechanisms of concrete figurative thinking.  
(B. Sergeev).*

Nowadays left-handedness as separate problem is the subject of the attention of medicine, neurobiology, psychology and other sciences. This fact is explained by big amount of theoretic paradigmas that are based on research of right-handed people. In spite of cardinal turn to the problem of left-handedness in different fields in the last decade but we can't name any solved problem connected with this phenomenon.

Functional asymmetry of hemispheres expands the possibilities of the brain significantly, makes it more perfective. However the phenomenon of asymmetry is not so simple: some features are typical for one hemisphere only, other for both but in different way, and all of this has difficult interdependence and interaction<sup>1</sup>.

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<sup>1</sup> Батаршев А. В. Темперамент и характер: Психологическая диагностика. – М.: Владос пресс, – 2001.

The right-handed people prevail among the inhabitants of the Earth on all the 5 continents of our planet without reference to nationality and race. That rested part of the humanity is divided into two unequal groups. The bigger group consists of left-handed people that have the dominative development of left hand.

There are different utterances, opinions related with phenomenon of left-handedness. So there is one opinion that indexes of neuropsychic activity in the left-handers are worse than in the right-handers. Also there is the point of view about connection between left-handedness and lower mental abilities of these people although the specific psychophysiological researches didn't prove it. Really, there are facts of big amount of left-handers among mentally retarded children, among children with problems of teaching writing and reading but in many cases left-handedness itself is the result of pathology in the development of the brain, as well as mental retardation and learning difficulties, and not the cause of these violations. It is easy to protest to those people who think left-handedness and low abilities, low talent, inferiority are related<sup>7</sup>. So there is another point of view that left-handers have higher than right-handers indexes of total neuropsychic activity and adaptation abilities. The left-handers were painters Raffaello Santi and Pablo Picasso, composers Ludwig van Beethoven and Carl Bach, writers Mark Twain and Lewis Carrol, famous commanders Alexander III of Macedon, Gaius Julius Caesar, Napoleon Bonaparte, scientists Ivan Pavlov and James Clerk Maxwell, tennisers John Patrick McEnroe and James Scott "Jimmy" Connors.

The amount of such people is 5–12%. They have stronger, faster and more reliable left hand. The smallest third group consists of ambidexters, people who have both hands developed equally<sup>1</sup>.

Systematic investigation of movement asymmetry gives the opportunity to explorers to find out a lot of interesting things. Two hands are equivalent in the newborns. The prevalence of one of the hands changes often during the first few years of life. The right hand begins to perform all the difficult work in future right-handed people only on the fifth year of life<sup>2</sup>.

But the main thing is that during the performance of exercises not the extremities improve but the brain that manage them: right hand is left hemisphere, left hand is right one<sup>3</sup>.

A person is born an individual. He/she has its own peculiarities determined by the nature that is called genotype. Individual genotypic features develop and transform during his/her life, become phenotypic. People as individuals differ from each other

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<sup>1</sup> Овчинников Н. Д., Егозина В. И. Концепция оздоровительной работы среди подростков и педагогическая коррекция их эмоционального состояния. Метод. реком. СПб., – 2001.

<sup>2</sup> Брагина Н. Н., Доброхотова Т. А. Функциональные асимметрии человека. – М.: Медицина, – 1999.

<sup>3</sup> Березина Н. А., Чепиков В. Т., Чеховских М. И. Основы психологии и педагогики, 2-е издание, учебное пособие, Минск, – 2008.

not only with morphological peculiarities such as height, constitution, color of eyes, hand possession (right-handers or left-handers), type of nervous system, but also with psychological features: skills, temperament and emotionality.

Psyche of every person is unique. Its soleness is connected with peculiarities of biological and physiological structure and development of the organism, unique composition of connections and contacts. Temperament is related to biological determined substructures of personality.

Temperament is the biological base on which the personality forms as a social being. It reflects dynamic aspects of behavior, mostly of congenital nature that's why temperament features are the most stable and constant comparing with other psychical peculiarities of the human<sup>1</sup>.

The main types of temperament are the same four types to nowadays that were divided by ancient science: sanguine, choleric, phlegmatic and melancholic.

The conception of the temperament type of the person usually is formed on the base of some typical psychological feature to the person.

Composing psychological characteristics of four popular temperament types there are the main features of temperament.

Sensitivity is determined by minimal force of the external influences that needs to form any psychological reply.

Reactivity is characterized by the size of impulsiveness of reactions on internal or external influence of monotypic force. They are unpleasant words, coarse tone, loud sound, criticism.

Activity determines the intensity of the person's influence on the environment and fight with barriers to the achievement of the goal. The features are purposefulness, concentration of attention and assertiveness.

Concordance of activity and reactivity sets dependence of the person's activity in some sense – accidental internal or external factors (state of mind, accidental phenomenon) or goals, intentions, beliefs.

Rigidity and plasticity determine suppleness of the person's adaptation to the external factors or in some sense his/her behavior is stagnant and inert.

According to the peculiarities of the temperament people are differed not by the final result of actions but by the methods of the achievement of their results. The professional suitability of the person to the different branches of life is determined on the base of determination of temperament features and peculiarities of the character.

Psychological researches and pedagogical practice show that temperament changes a little on the influence of the life conditions and education. Temperament can

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<sup>1</sup> Виленская Г. А. Роль темперамента в развитии регуляции поведения в раннем возрасте // Психологический журнал. – 2001. – № 3. – Том 22.

change due to self-education. Even an adult can change his/her temperament to the determine side.

Now it is researched interrelationship between the temperament different individual characteristics of the person and style of the activity, interrelationship between the temperament, character, abilities, emotionality and interrelation between people.

The purpose of our research was to determine interrelationship between functional asymmetry of hemispheres of the brain and temperament. We observed 420 students of both sex of medical and dentist faculties of the second year of study of our university to determine it. In all the students we researched functional asymmetry due to Annet's questionnaire and temperament type due to Eysenck's method.

Only 7% from this quantity – 29 persons – were left-handers and most of them were born in the second half of the year (the end of the summer, autumn).

– 89% – 374 persons – were right-handers and we determined 4% – 17 person – as ambidexters.

Analyzed the gender index we determined:

– right-handed: women – 262 persons (70%), men – 112 persons (30%);

– left-handed: women – 19 persons (65,5%), men – 10 persons (34,5%);

– ambidexters: women – 14 persons (82%), men – 3 persons (18%).

Psyche of every person is unique and unrepeatable. One of the features of psyche is temperament. It is the base on which the person is formed as a social being<sup>1</sup>. In our researches we determine it due to Eysenck's method. We got such results:

- Most left-handed women were melancholic and in the same time there were no phlegmatic practically between them;
- left-handed men had sanguine type of temperament, less often phlegmatic, choleric persons were very rare between them;
- right-handed men were mostly phlegmatic and choleric;
- ambidexters had all the types of temperament equally.

We should say there are features, typical for left-handed persons: self-distrust, pessimism and frustration but at the same time excessive insistence and desire to achieve his/her goals.

Totally temperament as A. Shtangle said “is thermometer for measure of excitability during the activity, for “life tempo” of the person”.

Among right-handed women

the most were sanguine – 90 persons (34%) and the less were choleric 21 persons (8%);

– respectively melancholic were 86 persons (33%);

– phlegmatic – 65 persons (25%).

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<sup>1</sup> СИМОНОВ П. В., ЕРШОВ П. М. Темперамент. Характер. Личность, изд. – М., «Наука», – 1984.

Among right-handed men the most were:

- Phlegmatic – 41 persons (36%);
- The less was melancholic – 20 persons (18%);
- Respectively choleric – 30 persons (27%);
- Sanguine – 21 persons (19%).

Among left-handed women:

the biggest group was melancholic – 12 persons (62,5%), the smallest was phlegmatic (0%);

- respectively sanguine – 5 persons (25%);
- choleric – 2 persons (12,5%).

Among left-handed men:

- The biggest group was sanguine – 5 persons (50%);
- The smallest group was choleric (0%);
- Respectively phlegmatic – 3 persons (33%);
- Melancholic – 2 persons (17%).

Among ambidexters prevalence of one of temperament types didn't find. So functional asymmetry is the most universal rule that doesn't have exceptions.

It is known the base of gender differences in the creative activity can be biological differences in brain structure and functions in men and women and also social cultural stereotypes that determine style and field of activity preferred by every sex<sup>1</sup>. Gender stereotypes can be considered as stable forms of behavior and as schemes managing the data processing<sup>2</sup>.

So in the changeable socio-economic situation in women we should expect big flexibility in getting new forms of behavior and perhaps in effectiveness of creative thinking.

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<sup>2</sup> Берн Ш. Гендерная психология. СПб: прайм-ЕВРОЗНАК, – 2001.

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