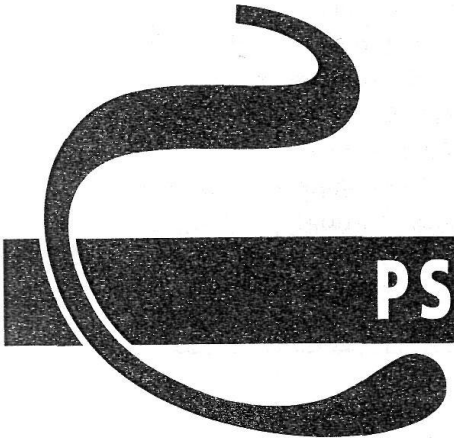
RUSSIAN
PSYCHOLOGICAL
SOCIETY



RUSSIAN PSYCHOLOGICAL JOURNAL

Vol.3 #2

Moscow

2006

Russian Psychological Journal

Founder – Russian Psychological Society

Address of the Publisher:
Nagibin Av., 13, of. 218a,
Rostov-on-Don, Russia, 344038.
Tel. (863) 243-07-67; fax (863) 243-08-05.
E-mail: rpj@psyf.rsu.ru

Founder Address:
Jaroslavskaja Street, 13,
Moscow, Russia, 129366.
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Dean of the Psychological Faculty of Yaroslavl State University, Doctor of Psychological Science, Professor Anatoly Victorovitch Karpov is fifty!

Dear Anatoly Victorovitch!

On behalf of Russian Psychological Society, the editors of «Russian Psychological Journal» and our readers we wish to congratulate you with such significant day. You are the famous specialist, your contribution to development series of main theoretical and applied spheres of psychology. You are the creator of new scientific direction metacognitive psychology of activity, the author of original recognized psychological conception, which had reflected in over 400 published works.

Many Russian and international conferences were conducting thanks to your enthusiasm. You are successfully combine scientific work and applied inculcation it's results to practice, that's why have prepared 20 authors of master's and doctor's thesis.

The editors of «Russian Psychological Journal» would like you, Anatoly Victorovitch, success in your scientific field and preparing higher qualification psychologists in one of the ancient and authoritative Russia's psychology faculties.

Belousova A.K.

Studying Principles of Combine Psychological System

Some of the general ideas of a new trend – the theory of psychological systems – are stated in the article. This trend is considered in the frames of postnonclassical paradigm becoming in psychology, as an attempt of synergetics development in the subject field of psychology. In the frames of the present theory the problem of people interaction is considered. The general principles of analysis, used in psychological systems investigation, are considered. Training is understood as a form of combine psychological system, it is shown that one of the basic mechanisms of its origin and existence is sensetransference, which is realized by a teacher. The result of sensetransference is the formation of a combine psychological situation as a combine sense field, in which participants of training act.

Key words: *selforganization, paradigm, synergetics, psychological system, combine psychological system, correspondence, sense, sensetransference, combine psychological situation.*

The recent time interest to the problems of "humanistic psychology", "Christian psychology", "existential psychology", "psychology with a human face" reflects general problems of psychological science, connected with the definition and the precision of its subject. The development lines of psychological science are expressed both in adaptive, evolutional paradigm and in development of synergetic paradigm, connected with an idea of plurality of development variants. If the first paradigm, "woven" from many philosophic ideas, is represented by general category of reflection and is fixed in traditional definition of psychology as a science, directed to the studying of evolution of psychical reflection. This line of psychological science development, connected with the study of "psychology of psyche" [28], nowadays, according to many scientists' opinion (Petrenko V.F. [22]), is the break of its development.

The second trend proposes the revision of psychological subject, the conversion to the problems of a man, signifying the "drift" of psychological science to "psychology of a human". If we examine the existing publications, the general line of psychological knowledge clearly expresses the anthropocentric character of the now represented researches: problems of a human become central in the development of psychological knowledge.

This trend, to our mind, just testifies that it is time to change paradigm lines of the science. In a number of scientists' researches it is shown that the science is developed as a change of methodological orientation, in the base of which there are changes of the psychological subject [12, 30]. The present definitions of psychology are built in general on empirical generalization of the subject that is psyche, which is only a part of the whole system – a human being [12].

At the present moment there is a situation in which the scientists, formed in the limits of one paradigm and connected with the understanding of psychology in the base of which there is a stable subject of the science, cannot research separate facts and phenomena of psychic life as before.

The transformation of oneself in science, which has become different, is necessary. This necessity is developing into the want in conversion from stable knowledge to new realities, discovered during the change of the paradigm. The readiness to accept the given changes just means the scientists' readiness to personal transformations, change of orientation in professional search, understanding the fact of changes in science that have already happened. To our mind, it just characterizes *the presence* of the paradigm in science. The change of a scientist's professional worldview, his professional consciousness and mentality is just displayed in a scientist's attempt to use new methodological orientation and principles in his professional activity.

The problem of psychological knowledge development is connected with the widening of notions about its subject, with the necessity of returning "the whole man in psychology" [17], with the conversion of psychology from the science about psyche to the science about human (A.G. Asmolov [3], V.P. Zinchenko [31], V.I. Slobodchikov [28], etc.) It's not occasionally that during the last time in a subject field of psychological science the following notions appeared: spirituality, morals, trust, senses. These notions are the characteristics of the whole human, who interacts with the world. At the same time the interaction of a human with the world, as a rule, is connected with the

interaction with other people (L.S. Vigotskiy [30], J. Piaget [23]), in this case interaction is one of the forms of such connection, thus it faces us with the necessity to study its mechanisms and peculiarities.

It's important to take into consideration that the modern level of science development supposes the using and development of new approaches to a human as a system phenomenon. It is stipulated by the general trend of science development, by the conversion to paradigms of " postnonclassical" science [2]. In science methodology a new level of a system mentality is being formed. Its subject is a research of development starting as the way of systems life (V.I. Arshinov [2], E.N. Knjazeva, S.P. Kurdjumov [13], I. Prigozhin [25], G. Haken [10], etc.). In this way the research of combine, open psychological systems self-organization, regularities of their development and function answers the actual wants of developing psychological science, which is converted on cognition of "psychological systems and their fates" [30].

A human's existence in the world is displayed in a complex phenomenology of his behavior and different psychological components. There is a big and unrevealed layer of psychological science, which demands new ideas, means for study of that how a jointed human's existence with other people is organized in the world, how communication, activity and interaction of people are regulated and determined, how community, converting into *combined system* that becomes *common* for participants, is developed and functions. The study of people interaction and psychological peculiarities of a human in it is one of the ways of solving the problem of dialogue ability of conscious. In the acts of interactions sense composition of conscious gets its revealing and exteriorization through the processes of senseformation, motiveformation, aim formation, represented in communication and activity of each participant of combined psychological system.

The logics of development of psychological science itself determines the search of answers on the questions, what are the mechanisms and psychological regularities of formation, development and selforganization of communication, activity and interaction of people. The necessity of this knowledge is supposed by life realities of the modern society, which is built on intersubjective interaction of a different level: interconfessional, interethnical, interstate, interpersonal; it sets the task before the science, directed to the search of regularities of these basis foundations of a human's life, which lie in the base of training, education and working activity of a human.

People interaction is a fundamental phenomenon that requires a deeper remake than it is researched in different subject fields of psychology. The given phenomenon touches various aspects of a human interaction with the world, making up the system in which we just can research simultaneous human discovering in himself and the world [20], and therefore in each participant. The latter means that a research of psychological mechanisms of people interactions like the whole psychological systems as an independent subject may lead to the understanding and sensibility of a man interaction with the world and other people, to the understanding of how the world comes to a human and dialogue ability of conscious is formed, how a human becomes "the subject of life" (S.L. Rubinstein) through assimilation of a cultural space, confirms his direct relation "the Universal Co-Existence" (V.I. Slobodchikov).

The regularities of psychological science development are largely being revealed, if you try to grasp their meaning in the context of displaying objective trends of the science development. At present time we can notice the antropologizing of psychological knowledge and it is displayed in that fact that in psychological cognition the accents are removed: from cognitive processes, which were recently in the center of science attention, psychology imperceptibly drifts to the side of a person problematic, conscious and a certain person behavior. First of all it is stipulated by the fact that a rather large research experience of psychic reality according to the principle of reflection and its role in explanation of activity and behavior self regulation has been collected in the science, but in spite of this fact the experience of studying them in a prism of new ideas that reflect the paradigm shift in the science is practically absent.

If formerly "psychology of psyche" prevailed in the development of the science, which was mainly based on the principles of reflection and adaptation, and adaptation was understood like the process of human interaction and environment in order to support the balance according to homeostasis, and behavior strategies were analyzed like behavior syndromes that are characterized by actualization of adaptive mechanisms of selfregulation; on the modern stage of science development the research shift to the plan of "human psychology" [28] paradigm is more typical, in which the principle of reflection is replaced by the principle of "giving rise a new reality" [29], and the research itself is built on the base of human selforganization mechanisms that is understood as open psychological system.

In the frames of a new, system paradigm the psyche is considered in its special role towards to selforganization of a human like psychological system and in its participation in production of newformations, at the expense of which selforganization is carried out.

The notion "system" in science methodology including psychological has old traditions and history. System approach, which has assimilated the notion *system*, has rather short, but very effective history. In native science an intensive development of different aspects of system and system approach took place in 70-80s years. At this period the basic methodological works of R.Akkoff, F. Emer [1], L. Bertalanf [2], N.V. Blauberg, E.G. Judin [6], A.A. Bogdanov [7], V.P. Kusmin [15], V.N. Sadovskiy [27] and of other scientists were formed and published. The notion system rather firmly occupies the place in notion device of the science and is used in methodological, theoretical researches as well as in applied researches of various sciences.

At the same time logics of scientific knowledge development has led to the discovery of new laws and to the development of the next coil of the system approach, which greatly influenced on the change of "methodological orientation, formed during the study of balanced isolated systems" [9]. The changes of system methodology are connected with the publications of basic views of representatives of synergetics as a new metascience, directed on the study of dynamics of systems starting [2, 8, 10, 13, 25 etc.].

The widespread well-shaped and popular theory of selforganization was illustrated by natural-science material (mainly from physics, chemistry, mathematics). Its theses have equally turned out to be applied to both social and psychological systems.

Further development of this conception, on the one hand, corresponds the modern course of time, when there is a change of paradigm in the science, and systems are becoming the subject of its research, it's proved by new scientific discipline such as synergetics – a science of system development. On the other hand, it's very important to determine the opportunities of synergetics and selforganization theory appliance in psychology, in which the question of psychological systems hasn't practically solved. Thus there is a problem of ways of systems development in connection with "the overripening paradigm of potential number of possible ways of development" [22, p. 19] in psychology. Since synergetics is a science of systems development, the question of what to consider as systems is one of basic in psychology.

Various attempts of systems emphasizing and system approach realization were used in psychology. B.F. Lomov considered that psychological phenomena are system by their nature and the basic task of psychology is the investigation of formation and function laws of psychic systems [18]. K.K. Platonov marked out the system of psychology, taking the principle of reflection as the base [24]; A.N. Leontjev considered that activity is "the system that has a structure, its initial conversions and transformations, its development" [16, p. 141]. Such great number of point of views on systems and bringing together of many phenomena of psyche to psychological systems made difficulties in subject understanding of psychological science and in system understanding as well.

Thus there is a problem of psychological system marking out, theoretical and methodological substantiation of their existence, peculiarities and specific of their development. L.S.Vigotskiy was among the first who tried to understand and to formulate in a new way the subject of psychological science, and was able to mark out one of the most essential regularities of systems development, which the modern science has recently discovered. The question is about peculiarities of systems functional development, according to which L.S. Vigotskiy wrote: "… all the matter is not in changes only inside the functions, but in changes of connections and in infinitely variety of movement forms, arising from there, and in that, that new syntheses, new central functions, new forms of connection between them appear on the known stage of development, and we must be interested in systems and their fates" [30, p. 13].

However it is difficult to follow the history of psychological systems because psychology during the times of L.S. Vigotskiy, as well as the general methodology of science, didn't have system knowledge. According to his metaphorical expression "now psychology is the psychology before "The Capital" [30, p. 422]. In the work "About psychological systems" the scientist says about it directly: "I'm lacking of theoretical force to unite all this" [ibid., p. 131]. It was connected first of all with the fact that the development of psychological knowledge didn't reach that level, when subject of the science is represented systematically and ideas about psychological systems are formed in it. But this knowledge is wanted; in it - there is a necessity and possibility to plan the ways of science

development, and L.S. Vigotskiy writes about it in his last phrase of the article: “systems and their fates – alpha and omega of our nearest work must consist in these two words” [ibid., p. 131].

And the second essential moment is the ways of synergetic knowledge using under analysis of psychological systems. In 1927 L.S. Vigotskiy wrote about the possibility of using the system method of K. Marx in psychology: “Beforehand we can look for not the solving of the question, even not the working hypothesis (because they are created on the grounds of the given science) of Marxism teachers’, but the method of its construction. I don’t want to learn gratis, cutting out a couple of quotations, what psyche is, I want to learn how the science is built, how to come nearer to psyche investigation on the base of the whole Marx’s method” [ibid., p. 421].

We consider the given notion is actual today in using synergetics. Facts and new categories, borrowed from other fields and applied to the psychological investigations, are not necessary for development of psychology. Rephrasing of L.S. Vigotskiy, we can say that psychology needs its own synergetics, which supposes the opportunity “to reveal the essence of the present field of phenomena, laws of their changes, the qualitative and quantitative characteristics, their causality, to create categories and notions, peculiar to them” [ibid., p. 420], and it means not simple mechanical application of synergetic notions (bifurcation, dissipative structure, parameters of order and etc.) to the psychological phenomena. The use of synergetic methods supposes the elaboration of its psychological notions, which reflect the specifics of dynamics of psychological systems development. In this fact we see the opportunities of synergetics development in psychology.

However this problematic was absent for a long time in actual field of psychological science, which chose other problems and categories as top-priority tasks. And rather recently on the crest of a new wave of interest to the system researches, which have coincided with the development of paradigm shift in psychology, a new trend, which is called *the theory of psychological systems*, or *psycosynergetics*, has been appearing [12]. This trend is among the others, which have gone out of the limits of the principle of reflection. In the frames of a new paradigm a human is understood as the psychological system, including him himself and the part of the world that corresponds to him. The theory of psychological systems allows

seeing the source of human selforganization, which is understood as an open system, not in acts of reflection that have interaction (a subject with an object, a human with the world, "alive" in general with its "environment") as their nearest cause; but in that, that lies much deeper and determines an opportunity of the interaction itself, that is its cause. In Klochko's opinion [ibid.], this is a correspondence of interacted sides. The correspondence is understood as an objectively existing relation between an open system (complication of any level) and elements of the environment that surrounds it, without which its stable existing is impossible. In the course of human interaction with the world a new system quality arises, which doesn't come to any reality, but bearing a new ontology – "many-sided world of a human", and it "allows us to imagine a human like a complex selforganized psychological system, producing newformations of the pointed out "combine" nature and which uses them in its selfmoving, selfdetermination" [12, p. 12].

We'll have to reveal the role of these newformations in the movement and selforganization of psychological systems but not "within" separate psychological system that characterizes, according to G. Haken [10], a micro level of perception, but coming from another, more complex system-mesolevel, in which the psychological system of an individual human represents only one of the constituencies of combine systems [4]. Thus, we can confirm that mesolevel is a level, which is adequate to functioning of combine psychological systems, including two persons as minimum. However, for determining the notion "*combine psychological system*", introduced as early as by L.S. Vigotskiy, but till now not gained a concrete psychological status, it is necessary to go to the level of a new methodology, deeper than classic, that is based on the principle of reflection. In our point of view just the support on the principle of reflection has become the reason of that the notion "*combine psychological system*" didn't take a suitable place in the categorical apparatus of the science.

We can stop on two basic principles of the theory of psychological systems, more important for the solving of common methodological tasks of psychological science development at the present moment.

1. *The first principle of interaction limiting* [11], confirming that the interaction is possible only between corresponding to each other phenomena. On the base of this principle the mechanism of combine psychological system origin is becoming clear. They appear in the result of people correspondence to each other towards the activity, the successful realization of which depends not on one person, but on many, for only the totality of people has the necessary energetic, material, informational, intellectual, etc. resource for effective realization of the activity. People correspondence is the base for their interaction inside the combine psychological system, which only in this "combine" appearance is able to interact effectively with an objective reality, making it the subject of reorganization or knowledge. Each of participants admits consciously or unconsciously in other that he is lack of.

In his individual activity a human appears as a polyfunctional system. He has to generate ideas and himself to be like an appreciator of their ethic unobjectiveness, intellectual and other work expenses, needed for its realization. He assumes functions of a doer and simultaneously of a controller for doing. He has a function of a motivational maintenance of the activity, sense safety, etc. All these functions turn out to be distributed in combine psychological systems; therefore it is the main characteristics of combine psychological systems.

2. *The second principle of causing interaction effect* [ibid.] organically emerges from the principle of interaction limiting and is one of the main in the theory of psychological systems. According to this principle it is confirmed that if an interaction has happened not only reflection is taking place, but production of a new – as the result of their interpenetration. For example, in this intertransference the "objective world" gains subjective dimensions, and a human, orienting on them, turns out to be able to distinguish that corresponds to him "here and now".

Applying this principle to the functioning of combine psychological systems, we can consolidate that psychological newformations, originating as a result of people interaction in combine psychological systems, are just joint distributed (interpsychic) functions. L.S. Vigotskiy pointed out on the primary of interpsychic functions towards individual psychic functions, which are

formed in the result of their interiorization. This just happens in ontogenesis. Combine psychological systems realize autonomic persons, who have the formed individual psychic functions, but now they have to turn them into combine, existed "between" people and distributed between them. However, this is not that genetically primary combine psychological system "mother-child", which was examined by L.S. Vigotskiy, but it is quality different.

In logics of the theory of psychological systems the process of psychological newformations production, such as senses, values, orientations, emotional and verbal estimates, motives, aims and etc, is understood as the mechanism of selforganization, and the formations – as its result and display. Not an object is transferred into a subject (image), but forming psychological newformations, mainly senses and values, are obliged, in their appearance, to the shift of subjective into objective, in which their co-existence goes on. It just makes up the mechanism of a multi-measured reality formation of a human – his space, in which he can act, realizing sense and value of his own actions, that is to live [4, 12, 14].

Towards combine psychological systems it can be said, that people in acts of interactions produce a special multi-measured space. In the base of this production there is their ability to transmit, deliver and receive, to personify values and senses of another. As a result value-sensible fields of each participant of combine psychological systems are transformed, and that's why they become closer, become relatively identical.

This mechanism lies in the base of any interaction forms of social practice including training practice. In the course of training there is a becoming of combine psychological systems, in which a teacher is both one of its components and a mediator, who joins students to the world of culture. Students build actively their life world but with the help of a teacher and other grown-ups in different activities that are in the base of their life. In different activities in cooperation with grown-ups, in communication, in the course of which grown-ups through themselves and by means of themselves transmit the world of culture to students, their life world is formed. Training comes out as a joint activity of a teacher and students, in the course of which with the mediation of a teacher students build, forms their life world and the world image [3, 4, 19, 21, 26, 28]. In the

course of training true combine psychological systems are formed and realized, the psychological science will have to understand their sources and regularities.

At the same time the creation and functioning of combine psychological systems, various forms of joint activity requires to solve a number of problems, the central among them are the problems of sensetransference [4] and entering of information into the world image and the life world of another person. In other words, transmitting of knowledge in the process of teaching agrees with the question of this knowledge "introduction" in the forming world image of students and with the question of coming information influence on the forming life world of a man. An educator, communicating with students, makes a step forward to the creation of combine psychological system; one of its activity directions is the search and discovery of new, unknown, contradicted. In the limits of combine psychological systems functioning there is a personal development of each participant, connected with the process of *personalization* – the transmitting of one's values to partners, and *personification* – the assimilation of transmitting values, and this fact comes out as the base of increase of participants' self-realization potential [ibid.].

Thus, interaction of corresponding, identical opposites is necessary for interaction with the world (including other people). It means that the interaction is possible, when participants' senses correlate to each other. In this case people start to interact in one sense space, where senses are partially crossed, coincide, forming *a common psychological situation* like a common part of combine sectors of the life world. Just for the forming of this *combine sense space,* or *common psychological situation,* which are the product and the base for interaction and development of joint activity, sensetransference is necessary, directed to the transmitting of its individual senses to partners. So the formation of common senses, and in this connection the realization of sensetransference function, is extremely important for communicating, interacting people.

Position of a teacher in this connection is exclusive in its saturation with sensetransference on the professional level. A teacher locks the world of culture, sociocultural experience and a developing human during the training process through himself, and he is a special mediator between the world of human values and culture and the

forming world of a child. He has a function of a mediator, at the same time being "an ideal form" for students [9, 30, 31], through the personification of which students adopt a valuable content of culture in their world image. But for supporting of this connection between a developing person and the world of culture a teacher creates a *combine sense space* with students, which has similar, common qualities of objects of the surrounding world. In these *combine sense spaces* only an interaction is possible, that is it's supposed, that a teacher's values, senses are grasped by students, correspond to their senses only in a common sense space, that is possible, if a teacher tries to transmit the significance of the experience, adopted by students for themselves, reaching to the active, saturate *sensetransference*.

By means of feelings and realization of actual information significance, a person transmits his sensation of its importance and value to another. The opposite process of transmitting senses and values adopting is also realized by emotional means, in estimates of significance and value of information, and verbally, too, in meanings and arguments, due to this fact other participants take up senses adequately. Thus, the knowledge, transmitted by a teacher, does not simply join to the present students' knowledge, but promotes their active formation, selection and construction. In the given case there is a kind of two flows that must correspond to each other: the first flow, going from a student, supposes the selection of information, adequate to his senses, meanings and values. The second flow – from a teacher and other participants of a training process – is extremely important in the plan of a human and his education formation, because a new knowledge for students can be brought to them my means of mediators, educators, who transmit information transmitting only its value, sense and meaning for themselves. Thus, a teacher is a principal channel of sensetransference, through his value-sensible peculiarities of conscious and psychological situations a developing person joins to the world of culture.

In other words, to transmit the importance of the matter, to initiate students' senses and an interest to knowledge are possible only if a teacher himself has an interest, feels the significance of the matter and realizes the function of sensetransference through his feelings and senses transmission. We consider that it is one of the principal ways of getting knowledge, culture by students to the field of clear conscious,

and it is possible when the world of culture in a person widens, changing a person, educating him.

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Preventive adaptiveness as a new formation of a personality

Preventive adaptation is a process of intrinsic changes, self-development and active extrinsic subjective accomodation to new conditions of existence, which origins in the anticipation of these conditions and equally to subjective potention, force and quality of protection of nature, what lead to subjective and objective positive results in the wide view of analogical situations. Preventive adaptativeness is a cognitive, affective personal new formation which develops in preventive adaptation's process and has definite structure. The authors analyze place of preventive adaptativeness among other psychological appearances. Authors finish that knowledge of dynamic regularities and adaptation's indicators in different social groups which provides ability of personal new formation's development and person adapts to change conditions of individual and social life.

Key words: *preventive adaptation, preventive adaptiveness, reshaping of personality.*

The formation of a new field – social pedagogical psychology, as well as the analysis and collection of experimental data, describing the processes of socialization, upbringing and development, allowed us to point out that there is a continuous link between adaptation and development [7]. If sociality is considered an inherent feature of an individual, the process of social adaptation should be defined as both an actively-developing and actively-adaptive process. In this sense the phenomena of adaptation and personal development supplement each other, forming various options for self-actualisation.

In spite of the fact that processual and productive aspects are still considered to be the key elements of adaptation, in recent years a lot of

attention has been paid to personality reshaping – developing a complex of actively forming personality features. Forming inside the first two elements of adaptation (processual and productive ones), these newly developed features form their own dimension of adaptation.

In accordance with our approach (method), fully-fledged adaptation always includes a whole spectrum of self-changes and the elaboration of new personality features. And as we are talking about an active adaptation of an individual, it also involves an active self-change, self-correction caused by the demands of environment. One of the most important factors in the process of adjustment to the environment is anticipation of certain conditions and changes which may lead to the necessity of adaptation.

On the threshold of certain changes in the living and social conditions, the first things to be activated are some unconscious regulators of activity which are driven by a subconsciously anticipated image of events and gained experience [6]. In spite of its evident biological determination, involuntary control of behaviour originally has potential for selectivity. This control limits possible variants of preparation for changes to socially and culturally acceptable behaviour, and also to some personal dynamic stereotypes and sets the mechanisms of adaptation going, even before the changes in the environment occur.

Following this, subconscious reasoning starts making a prognosis of possible consequences of events, and the person involuntarily begins to prepare for action on the basis of a certain anticipating scheme. This scheme is there only in case some precedents for adaptation to similar changes or to their elements took place in the past. However, it is not the memory about the events, as there was a change in the structure of the image of the stimulus influencing the person. This change is accompanied by generalisation and planning, providing an opportunity for "going out" of the present (actual) position [5]. That is, generalised image of further changes activates certain preparatory processes.

It is important to mention, that probabilistic prognosis made already on this level allows to use generalised self-change methods for adaptation to similar situations (extreme situations, stress, conflict, etc.). At the same time, the absence of precedents entails the inaction of unconscious regulators, as unconscious control doesn't catch signals-indicators of further changes in the environment, and

anticipation doesn't activate anticipatory preparation to adaptation to them. Here the anticipation of rational (verbal-logical) level of adaptation relieves: moving the frames of the individual experience, it makes the subject operate notions and logical methods, processing the information about forthcoming changes of external conditions, social environment, one's own mental state and condition, etc. Rational anticipation is not only asking: «What will happen?», but it also provides prevention – planning in general, the creation of a system of measures of preparation for possible changes, a modification of methods and means of adaptation long before the forthcoming changes. Rational anticipation also gives freedom to pass freely from present to future and past in the process of creating an adaptive resource. A. Bodalev pointed to the importance of anticipation (foresight), writing about preventing undesirable, cognitive, emotional and behavioural reactions in communication [3].

Preventive internal and external (behavioural) changes of the personality, described in the papers of P. Anokhin [2], B. Lomov and E. Surkov [5], U. Niesser [6], E. Sokolov [16], prove that adaptation begins already in the period prior to the impact, attracting attention of the subject. Here, the specificity of adaptation increases as the probationers get more information about possible development of a situation. This specificity corresponds to the expected conditions of action.

The famous formula of P. Simonov, determining the strength and quality of the emotion that the person develops, also takes into account the assessment of probability of needs satisfaction on the basis of experience and the information about the means predictably necessary for the satisfaction of current needs [15].

So, activation of adaptive schemes relevant to the changes in living or other conditions may already start in the process of receiving information about the first signs of forthcoming changes. And, if on the physiological level the dynamic of daylight hours, the temperature of the environment and other factors formed as a result of evolution, play the role of indicators of approaching changes, then on the level of imagination and abstract logical level of adaptation, the information gathered as personal experience of the individual or a social group may act as an indicator. According to the theory offered by N. Veaner, lack of information complicates anticipation of changes which a

person will have to adapt to, and it slows the process of adaptation [17].

As for the mechanism of social adaptation, i.e. the ability of the individual to anticipate changes in the society, then it is based on functional systems involving many factors, including abilities to shape social environment on the basis of both independent and, at the same time, integrated variables, as well as on the basis of identification of the individual with a certain extraindividual system positively evaluated by the person himself [1], on the ability to use the knowledge of historic and cultural regularities of the development of society for making prognosis of social life and social changes.

As social anticipation is ensured not only by information, but also by psychological conditions, the information blockade or distortion of the information influences the adaptation to the social changes in the same way psychological factors do, i.e. causing a change in activity and a growth of psychological and emotional tension, non-constructive reactions of adaptation and neurotic conditions experienced by social groups.

To summarise, active anticipation of events on the basis of the existing anticipation schemes, and a subsequent modification of these schemes in the process of data collection, the knowledge of the regularities of adaptation dynamic and the indicators of adaptation in the various social groups, provide an opportunity for timely internal and external changes, allowing the individual to adapt to the changing conditions of his/her personal or public life.

It is necessary to introduce a new notion, determining the contents of the above described process of adaptation.

Proceeding from the term prevention [< Lat. praeventio advance, prevention – prevention, preventive actions; and preventive that is a derivative from it [фр. preventif < Lat. praevetus] – precautionary, preventive, keeping ahead the actions of the opposite side, the notion of preventive adaptation is introduced.

Preventive adaptation is a process of preparatory internal changes, self-changes and active external adaptation of the individual to new constantly changing conditions. Preventive adaptation occurs on the basis of anticipation of these conditions, relevant to the potential of the individual, to the strength and quality of the

environment's impact, leading to subjectively and objectively positive evaluation of the results in many analogous situations.

The introduced notion differs considerably from the notion of adaptation that was used at the beginning of the article:

- Time frames of preventive adaptation are not limited by the actual/current conditions, they combine present and future, and that, in its turn, allows to have a preventive impact on social experience;
- The trigger of preventive adaptation is not a disparity of the individual and surrounding reality, stimulating action, but a sensible initiation of "the zone of the nearest development", i.e. the formation of a certain new cluster of features (reshaping of personality) of the individual, that will play a role in future;
- By virtue of this, preventive adaptation may be initiated both by the person himself and by others (for example, parents, pedagogues, social officials) - the people, who in this case, act as agents of adaptation;
- Preventive adaptation may be naturally involved in the process of rehabilitation, training and upbringing;
- Productivity of preventive adaptation should undergo two stages of evaluation: a) advance evaluation, i.e. according to the level of development of preventive adaptation and b) according to external and internal criteria of adaptation of the person to the changes, when they become acute.

Preventive adaptiveness as a cognitive-affective-personal reshaping is a result of this process. This adaptiveness comprises the following components:

1. Constantly altering adequate ideas about the coming changes in private and public life, that is the anticipation of life events taking into consideration the experience of adaptation (incorporation into new social groups, a change in working conditions, studies and other life changes);
2. Understanding the meaning of the forthcoming events;
3. Readiness for internal and (or) external actions to adapt to changes, and take on responsibilities;
4. Considering changes in private life and possible stressful situations as something temporary or necessary for achieving the aim;
5. Developing an attitude to adaptation as to an activity necessary for achieving certain results;

6. Transparency, flexibility and tolerance to the new;
7. Adequate evaluation of one's own actual and potential opportunities and understanding the significance of life events;
8. Communicative competence;
9. Social experience relevant to the situations predicted for the future.

Let us consider the above mentioned components of preventive adaptiveness in detail.

Ideas about future are formed as a result of a large variety of cognitive processes, image memory and imagination being the most important ones. They create an opportunity for abstraction, for identifying core goals as well as for setting tasks and performing conceptual operations. In spite of possible errors in abstract thinking, when some essential characteristics are not taken into account, the qualities of a future activity, a new social group, changing conditions and etc., allow not only "to see" the future, but extrapolate generalised methods of responsiveness on a large category of analogous situations, e.g. handling extreme situations, stress, conflict and etc.

It is impossible not to mention the fact, that the image unconsciously actualized by the person and enriched by individually determined meanings, may play a representation role. Such an image may contradict the actual information, rational logic, experience and knowledge. It may be built on both individual and collective myths, but it is extremely important for preventive adaptation because of its emotional intensity, personal significance and its connection with vital needs of the individual (self-image, that of an unlucky person, winner, leader, etc.). Illogicality and axiomatics of such representation may lead to inadequacy of ideas, aspirations, and self-evaluation of the individual, it may entail a break-down of adaptation. That's why, anticipation is among the primary objectives of prevention. Anticipation is forestalling of life events that will require adaptation in the form of supraliminal adequate representation, a reflexive model of the desired future, and also adequate estimation of the actual and potential opportunities of the person.

Anticipation provides aim setting, planning and programming of behaviour, as it implies, firstly, the anticipation of some events. And secondly, readiness to face these events and advance them by undertaking actions (cognitive and behavioural components of mindset).

Schematic generalised ideas about future constitute a “line map” of adaptation, the content of which is provided by the understanding of the meaning and significance of future events, i.e. the meaning for the society in general as well as for the individual undergoing adaptation. Herewith, the individual doesn’t only reflect the objective content of the coming events and phenomena, but also forms a certain attitude to them, experiencing emotions.

Positive emotional background of preventive, and also daily adaptation, is formed by means of experiencing personal changes and handling stressful situations, considering them as temporary or necessary for pursuing a goal of difficulty. Here, the cognitive affective mechanism of subjective evaluation of forthcoming stressful or frustrating situation comes into action. Rationalization changes the assessment of the situation, shifting it from negative, threatening and infringing upon the main needs, to useful, for example, from the point of view of gained experience, or the elaboration of new strategies of behaviour, incorporation into new social groups, etc. Significant contribution is made by an emotional component of mindset, an evaluating and expressive function of which may strengthen or, vice versa, weaken the emotional perception of the forthcoming adaptation.

As a result, preventive adaptation begins in rather safe conditions (before the situations, causing stress or frustration, occur). The above described evaluation and assessment processes help to form a mindset to adaptation as an activity, necessary for achieving certain results, as to a peculiar “game” (the trial) testing the development of personal features and life values. It helps the individual feel involvement in the process of adaptation and even enjoy it.

As it is apparent, that disposition to preventive adaptation is an important component of preventive adaptation. In this context it is also important to mention the readiness to take responsibility for internal and external actions of adaptation to changes, namely in locus of control under significant events in one’s life [10]. However, preference of internality, as it has been already stated in our papers, is not so one-valued, as it seems to be at first sight, as it is subject to the influence of other factors. It gives an additional specificity to this attributive pattern. Two of these factors are of particular importance for preventive adaptation. The first one is the link between internality

and existence: the more the subject believes that everything in life depends upon his own efforts and abilities, the more sense and aims he finds in life and it has positive influence. Attribution of responsibility will inevitably lead the individual to increasing his activity and developing a willingness to prevent threatening situations or their negative consequences. Taking into account the autonomy, pro-sociality and freedom of decision making process, peculiar to internals, the link between internality and understanding (imparting) of sense of adaptation as a part of the meaning of life creates a good psychological basis for preventive adaptation.

The orientation to total control over a situation, that is subsistent to internals, is the second factor. Under the conditions of uncertainty of the forthcoming changes, peculiar to prevention, the danger of psychological overstrain, growth of psycho-emotional "price" of adaptation, and refusal of adaptation, arises. A solution to this contradiction may be found in the structure of the model of "good internal control", where internality of achievements and failures combines with externality of reasons for failures. Such a pattern of responsibility will not provoke increased anxiety, disquietude, low tolerance to others, dependence on external circumstances and inability to regulate one's own business, thus making elaboration of anticipation programme of adaptation more complicated. But nevertheless, to our mind, internality-externality of control in itself does not testify to adaptiveness or non-adaptiveness. It just points out who will initiate preventive programme for adaptation to difficulties: the individual himself or an external factor/source.

At the same time, the following components of preventive adaptiveness – transparency, flexibility and tolerance of the new – are key elements its structure. As an indicator of the low degree of rigidity, the transparency of new information and flexibility of response to it allow for easier formation of new notions, reduce restrictions, set by social attitudes, habits and inertness of the judgments and thus, broaden the range of methods of adaptation to external impacts and changing life conditions (plasticity). This psychodynamic quality is in close connection with interpersonal factors of cognition, particularly, social-perceptive stereotypes: anthropological, ethnic and national ones, social and status, social and role, expressive-esthetical and verbal-behavioural. The impact of

stereotypes is particularly strong under conditions of information deficit, which could lead to the anticipation of internal and external transformation of the personality to the forthcoming new conditions of activity, inclusion into new social groups, etc.

As for tolerance as a phenomenon of preventive adaptiveness, it is dispositional tolerance of personality during social interactions based on altruistic egoism, a positive attitude towards life/ surrounding environment, positive vision of reality. The formation of the socio-psychological tolerance of a person is connected with the formation of corresponding attitudes and dispositions of the personality.

Using the above mentioned characteristics for preparation of adaptation to environment or efforts to adapt the environment to oneself is possible only under the condition of communicative competence – appropriate pragmatic use of social knowledge and social practice in context of relations with surrounding people [4, 18].

Social experience is understood in this case as a set of scenarios of reaction in standard situations and a set of methods of self-regulation in such situations.

The above mentioned components of the cognitive affective personality reshaping, i.e. preventive adaptiveness, indicate that preventive adaptiveness is one of the integral characteristics of the personality, as soon as it is created and displayed in various psychological spheres in certain social contexts. Differentiation was introduced artificially with a scientific purpose in order to simplify the psychological diagnostics and evaluation of the programmes for personality reshaping as a characteristics of personality and success of the preventive adaptation in general.

Position of preventive adaptiveness among other psychological phenomena.

Firstly, we should identify the difference between preventive adaptiveness and adaptiveness in its common interpretation. Adaptiveness is understood as a cognitive affective personal correlate of the generalized adaptability and represents an integral characteristics of the subject formed under real conditions and displayed in its effective adaptation to the occurring “here and now” changes in life and social environment. It does not require

reinforcement and can be activated in case of occurrence of standard situations, which require adaptation.

While preventive adaptiveness is the potential of the subject developed as a result of special preventive actions under relatively safe conditions of training and upbringing. This potential could be not activated in real life. If this is not a result of the natural development of personality and the anticipated changes are distant, then it will require regular reinforcement to preserve the unity and integrity of its components.

Analyzing the place of preventive adaptiveness among other psychological phenomena we should mention the obviousness of its connection with social competence. In general, they have the following features in common:

- both provide an opportunity for adequate adaptation under conditions of social changes;
- communicative competence, the capability to foresee consequences, the ability to choose social reference points and to organize one's activity in accordance with these points are structural parts of both phenomena;
- as the person becomes older, both phenomena become more complex in their cognitive aspect, more verbalized and more easily forecast;
- both have qualitative characteristics and levels, and can be measured.

Some scientists even consider social competence to be adaptation based on social and psychological readiness and communicational competence [8]. The difference is in informative characteristics, functions, mechanisms and ways of perfection.

Social competence in general is used as an operative definition, forming a system of social knowledge, skills, experiences and behaviour scenarios in typical situations, which provide an opportunity to adapt quickly "here and now". At the same time preventive adaptiveness corresponds to a systematic cognitive affective personality reshaping, the components of which are penetrated by emergent connections and are oriented to the future.

It is considered that such personality reshaping results from the crisis in the personality development. In this sense preventive adaptiveness in its ideal variant could be considered as product as personality reshaping which took place in early adulthood. But the analysis of the preventive adaptiveness components shows that it is better to considered it as a characteristic of the psychological and social age of the person, because

some components could be formed earlier and the chronological age is not determinative in the development of preventive adaptiveness.

Principal differences in the functions of social competence and preventive adaptiveness are conditioned by the differences between the processes of socialization and adaptability:

- a variety of functions of social competence is wide - social orientation, adaptation, integration of general social and personal experience, while the function of preventive adaptiveness is more concrete and consists of adaptation to the future, the creation of potential for adaptation to future changes of social and individual levels;
- social competence as an operative characteristic is a part of the universal adaptation mechanism to the new conditions "here and now", while preventive adaptiveness is a prospective characteristic and allows to spread the influence of this mechanism to the future, constructed in the individual's mind.

To sum up, it should be mentioned that preventive adaptiveness characterizes the personality as capable, on the basis of knowledge about social reality and the future, as well as on the basis of behaviour experience in typical situations and the anticipation of forthcoming changes and the individual's ability to adapt to new conditions of existence *in advance*. In other words, on the basis of anticipatory (preventive) adaptation.

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Frequency specificity of gamma-rhythm oscillators

The research is done under support of grant № 01-06-80202.

In this article, there is analysis of gamma-rhythm's issue, which provides foundation for appearance and wide expansion of the binding conception of different networks into united system via mechanism of gamma-rhythm synchronization. Author research own issue of activity's synchronization with narrow band gamma oscillators, adjusted to a certain frequency under conditions which stimulate gamma-rhythm increase. New research technology of gamma-rhythm which gets more precise data about brain localization of gamma-rhythm dipoles because of their projection to individual brain homographic section.

Key words: *gamma-rhythm, synchronization, gamma oscillators, communicative function of gamma-rhythm, intercalated neurons.*

Gamma-rhythm is high frequency activity of human brain, registered by Electroencephalogram, attracts researchers' attention more and more. This interest is caused by the fact that different types of cognitive processes are accompanied by activity intensification in the range of gamma-rhythm, which is from 30 to 200 Hz, according to some data can be even 600 Hz [30].

Connection between gamma-rhythm and reception and recognition of stimulus, illusion appearance and gestalt formation is noticed. [5,8,13,34,38]. Gamma-rhythm increase was watched not only at work with sensory, but also semantic information [24,29].

Gamma-rhythm is connected with motion reactions performance. Gamma-rhythm flashes appear in human motor and pre-motor cortex, additional motor field and parietal cortex before the motion starts, then continue during performance and appear additionally when the motion ends.

The hypothesis about relation of gamma-rhythm and motion reaction to stimulus was expressed [26,28,31].

In experiments with delay periods, during which information about previously given incentive for the following its recognition should be kept, gamma-rhythm relation to processes of information keeping in short-term memory was shown. In the research [39] the proof of the relation between gamma-rhythm activity and efficient remembering of information was given. During delay period with information about visual stimulus kept in memory the researchers showed stable increase of gamma oscillations power (24-60 Hz) in visual cortex and beta oscillations (15-20 Hz) in front cortex. With delay period increase oscillations weakened which caused parallel decrease of incentive recognition results.

Inclusion of gamma-rhythm into different sensor, cognitive and performing processes, its existence not only in human, but also in animal brain, mammals in particular, allowed E. Basar [1,2] to consider gamma-rhythm as functional building blocks used in integration of brain activity and psychic functions.

Major step on the way to gamma-rhythm participation in information processing processes was discovery of gamma oscillations phase synchronization in the range of 35-85 Hz, appearing between distant parts of cat's visual cortex [13]. Later this fact was proved by the existence of intercolumn synchronization of cat's visual cortex neurons spike activity in the range of gamma oscillations, appearing at visual stimuli perception (Gray et al., 1989). Spatially distant neurons possessing similar detector features, selectively adjusted to react to a certain direction and with certain speed stripe movement, in response to this stimulation there were synchronous and with no delay discharges repeated at 40 Hz frequency of gamma-rhythm.

This and following works are the foundation for appearance and wide expansion of the binding conception of different neuron networks into a united system via mechanism of gamma rhythm synchronization. At first, it was said that coherent gamma oscillations reflect visual cortex mechanism, providing different object features integration for its image recreation, gestalt formation [11,22]. Later, oscillation activity synchronization was considered as more universal and major communication mechanism between neuron networks,

which provided different kinds of interaction between sensor, performing and cognitive processes, memory included (E.Basar, 1999).

It should be noted that in many research works the conclusion about gamma oscillations synchronization as major connection mechanism was made on the basis of amplitude or gamma rhythm capacity measurements, without phase relations between gamma oscillations measurements. However, it is a mistake to refer capacity change to synchronization, as capacity and phase are two independent measurements of oscillatory activity. Synchronization deals with phase relations and has nothing to do with capacity. Phase synchronization of gamma oscillations can appear without any increase in capacity. Neuron discharge synchronization in the cat's visual cortex was observed without changes in discharge frequency [16,18].

Binding should be a quick process, and it is natural to expect it to use high frequency neuron networks activity. Characteristic feature of gamma oscillations which allows to consider it as the basis for binding is not appearance or increase of gamma oscillations, but rather the fact that oscillations in different neuron populations are frequency synchronized or phase bound [3,32,41].

Evaluation of gamma oscillations phase relations between different leads by coherency calculation on multi-channel EEG or MEG is one of the most successfully developed methods of gamma oscillations and brain processes binding and control interaction investigation. Another method is application of УВП calculations with further frequency filtration in the gamma-rhythm band [19,44]. Each of the mentioned above methods calculate different types of gamma activity synchronization.

Coherence calculation method measures phase synchronization appearing between different leads of brain electric activity, i.e. spatial synchronization. However, it ignores phase relations between gamma oscillations and stimulus.

With the GPC assistance gamma rhythm characterized by the phase relation to stimulus is investigated. According to classification of Galambos, it should be differentiated from inducted gamma-rhythm. The last in phase is not synchronized with the stimulus, as it is initiated by the other inner factors which do not coincide in time

with presented outer stimuli [17]. GPC method evaluating gamma oscillations phase synchronization with the stimulus does not measure gamma rhythm synchronization in space.

These method shortcomings can be overcome in gamma-rhythm research with the dipole analysis method. Dipole analysis considers the fact of spatial gamma oscillations synchronization, as at finding the equivalent dipole for oscillations information from a number of electrodes is considered. The decision about dipole source existence is made on the basis of gamma oscillations synchronized appearance on a number of electrodes. Combination of dipole analysis with the Generated Potential Control (GPC) method allows considering special synchronization of gamma oscillations as well as their phase relation to stimulus.

Besides, dipole analysis allows defining localization of their point sources in three-dimensional brain volume for any form of brain activity gamma oscillations included. Localization algorithm is based on the hypothesis that there are point sources of electrical activity in the brain locally distributed among its structures. Electrical activity in every moment of time registered by many electrodes from the scalp is considered as a result of spatial summation of electrical field of these sources, passively distributed in the brain as some kind of conductor. The solution of the reverse problem lets find with some kind of trustworthy approximation spatial location of equivalent dipole sources for chosen form of brain electric activity.

Under high frequency of EEG readings dipole analysis exposes temporary dynamics of gamma oscillations in GPC with high time dissipation. All the above allows considering GPC method and dipole method combination as one of the most prospective trends for gamma oscillations functions in the integrated brain activity research [5-8].

With great interest of the researchers to gamma rhythm that can be reflected in annual increase of the number of publications devoted to its investigation, many questions are still to be answered. Neither mechanism of gamma oscillations generation nor ways with the help of which synchronized gamma rhythm is included in different brain operations is clear. The very fact of gamma oscillations appearance in different frequency requires explanation. There are few works focused on oscillation frequency connection to brain structures and functions.

Only in a number of works connection of brain structures to certain frequency gamma rhythm range is mentioned. In locust olfactory system oscillations sensitive to the smell appear within the range of 20-34 Hz [23,37,42]. With humans similar frequency smell selectivity is found in the range of 33-44 Hz, registered from olfactory bulb, which is clearly correlated with subjective smell perception [20].

In visual system of vertebrates oscillatory responses appear consequently in retina and visual cortex. Their comparison shows that for their generation in each structure different frequency ranges are used. Simple and complex neuron-detectors of 17 and 18 fields with cats and monkeys oscillations in the range of 20-80 Hz with the peak at 40 Hz appear as a response to exposition of optimally oriented light stripe. Higher frequencies of 50-100 Hz are recorded with the same animals from the primary visual cortex as a response to more complicated stimuli: moving stripes and grids [4,12,15]. With monkeys these oscillations are recorded in multi-cell spikes and in the focal potentials of striatic (V1) and extra-striatic (V2) cortex with the phase difference close to 0 (Frien et al., 1994).

Ganglia cells of retina and LCT neurons, also grids react to flashing or moving stripes with the oscillations appearance with frequency 60-120 Hz, higher than in the cortex [27].

Gamma rhythm frequency selectivity, its different frequency ranges connection to stages of motion skill formation is demonstrated in the works of Dumenko V.N. and the others [9,10]. Based on the research of high frequency electrocorticogramm components (30-200 Hz) in the process of instrumentsl skill formation with the dogs, they concluded that gamma rhythm is heterogeneous. Dividing frequency ranges into stripes 15 Hz wide, the authors wrote that the energy of separate bands changed independently. With the dogs successfully developing this skill, as a response to conventional sign gamma rhythm capacity increased within the range of 80-200 Hz with parallel decrease of activity at frequencies of 30-80 Hz. This connection of gamma rhythm frequency with function was absent with the animals with poorly developed skill.

Considered above publications do not give the answer to the question of how far frequency dependence of gamma oscillations will reach. To highlight this problem we researched activity synchronization with narrow band gamma oscillators, adjusted to a

certain frequency under conditions which stimulate gamma rhythm increase. New research technology of gamma rhythm – GPC method connected with dipole analysis and anatomical magneto-resonance brain tomography – was used. The later allows getting more precise data about brain localization of gamma rhythm dipoles because of their projection to individual brain homographic section.

Gamma rhythm was researched in three experimental situations. In one of them the subject passively listened to sound clicks (indifferent series) and fulfilled sensor-motor reaction to switching off the sound (motor series). In other type of experiment the subject had to quickly multiply numbers, heard through ear-phones, pronounced by a woman's voice. In the third experimental situation there were visual stimuli on the monitor, among which the subject had to recognize target stimuli (bright light square spot) and respond with the motion reaction.

In series with passive listening to sound clicks and motor reaction to switching them off 120 stimuli were presented, 130msec long, at the interval of 1.5 sec. In these experiments 5 subjects participated (3 women and 2 men) at the age of 18 -24. Experiments with numbers multiplication were carried out with 12 subjects (women at the age of 24-27). 100 pairs of two-digit numbers were read through the headphones with a female voice, average sound stimulus length was 2.3 sec. The interval between stimuli was 8 sec. In the series with visual stimuli the subject had to press the button after a target stimulus – the white square appearing in the right or left visual field. Differentiating stimulus was a gray square appearing simultaneously on the right and left. Stimuli length was 1 sec. Experiment was carried out with 10 subjects at the age of 18 – 23.

In all these experiments gamma rhythm was researched as a part of average sound and light GPC, id est. induced gamma rhythm which was phase synchronized with stimulus. For gamma rhythm extraction from GPC method of frequency filtration was used.

EEG registration was done with the help of computer system "Brainsys", produced by the company "Statokin" (Russia). 15-channel recording of EEG was done according to international system 10-20% with taking away at, O1, O2, P4, P3, C4, C3, CZ, T6, T5, T4, T3, F4, F3, F8, F7. As a referring ear electrode was used. EEG frequency was

400 Hz. Signal bandwidth was 0.3-8- Hz. Turnoff filter was used to cut out fluctuations of 50 Hz, connected to grid induction.

Narrow band gamma oscillations behavior with the frequency tuning of 1 Hz was researched. To do this GPC, received for each series were passed through narrow band filtration of 1 Hz width in two frequency bands of 30-45 and 55-57 Hz.

To determine three-dimensional localization of gamma oscillations in the brain dipole analysis method was connected with anatomical magnet-resonance tomography. Equivalent dipole current coordinate calculation for gamma oscillator is carried out under Brainloc program (model of one movable dipole). Under numeralization EEG frequency of 400 Hz, dipole source existence was done every 2.5 msec. Calculated according to 15-channel EEG coordinates of gamma oscillations sources were projected to images of axial tomography brain sections of certain subjects, received with the magnet-resonance tomography TOMIKON S50 (BRUKER) at Moscow State University.

For structural magnet-resonance subjects' brain sections receiving the method of 3D-gradient echo was used, which allowed high spatial resolution of 1 mm in the whole volume of subjects' brain. Gradient echo application is alternative to object layer scanning in other researches. Due to 3D method it is possible to create undistorted images for thin layers of 1mm, that is impossible with layer scanning because of the artifacts caused by signal imposition from neighboring layers. As a result we can get complete 3D brain image in very short time (approx. 30 min.).

The level of summary gamma oscillator activity, adjusted to a certain frequency, was judged by the number of its dipole sources, received in a certain time interval at the dipole coefficient (DC) equal to 0.95. Dipole number calculation was done according to the whole brain no matter in what structures of brain they were found.

In earlier works induced gamma rhythm was researched with the method of wide brand frequency filtration, with the band width of 15 Hz in the range of 30 to 45 Hz. In the series with sound clicks reception wide brand filtration of sound GPC, received for 120 sound stimuli, finds out the so-called sensor response with all the subjects – gamma oscillation flashes in the interval of 0-100msec after the stimulus - which occurs practically in all the EEG readings. Gamma

rhythm sensor response can be seen both in indifferent and motor series [5,8]. Figure 1 presents gamma rhythm sensor response, received as a result of wide brand frequency filtration of one subject's sound GPC.

When using GPC filtration in the frequency narrow band the number of gamma oscillators dipole sources with sharp tuning in comparison with the results received under wide band filtration. Under narrowing filtration band from 15 to 1 Hz (frequency scale 30-45 Hz) all the subjects demonstrated number increase of actively working gamma oscillators both in indifferent and motor series. Figure 2 shows post-stimulus bar graphs (PSBG) as long as 1.5sec, characterizing distribution of brain localized number of narrow and wide band gamma oscillators in two series with one of the subjects. It is seen that the number of oscillators with sharp tuning is ten times more than the dipole number received under wide band filtration of average EEG. Meanwhile PSBG received by two methods shows significant similarity: activation and inactivation phases occur at the same time. Moreover, the activity phase of sharp tuning oscillators is more noticeable before the moment of stimulus application or anticipation reaction.

Research of 15 narrow band gamma oscillators behavior both as a part of a sensor response and during all GPC and even longer time for EEG of 1.5sec showed frequency selective gamma oscillators with sharp tuning activity.

Figure 3 shows GPC and the results of its wide band (in the range of 30-45 Hz) and narrow band filtration of 1 Hz within the same range. It is seen that narrow band gamma rhythm flashes have different amplitude.

Major contribution to the content of gamma rhythm sensor response is made by frequencies of 37, 38, 39 and 40 Hz. These frequencies oscillations appear before stimulus reflecting anticipation reaction that appears frequently under conditions of multiple sound repetitions with fixed inter-stimulus interval.

Frequency selective character of gamma oscillators' activity is seen not only on the primary part of GPC (0-100msec). It is present along all the averaged EEG as long as 1.5sec. Figure 4 shows typical bar graph of frequency-temporal distribution of narrow band oscillators in the structure of the averaged EEG received for series with indifferent sound clicks.

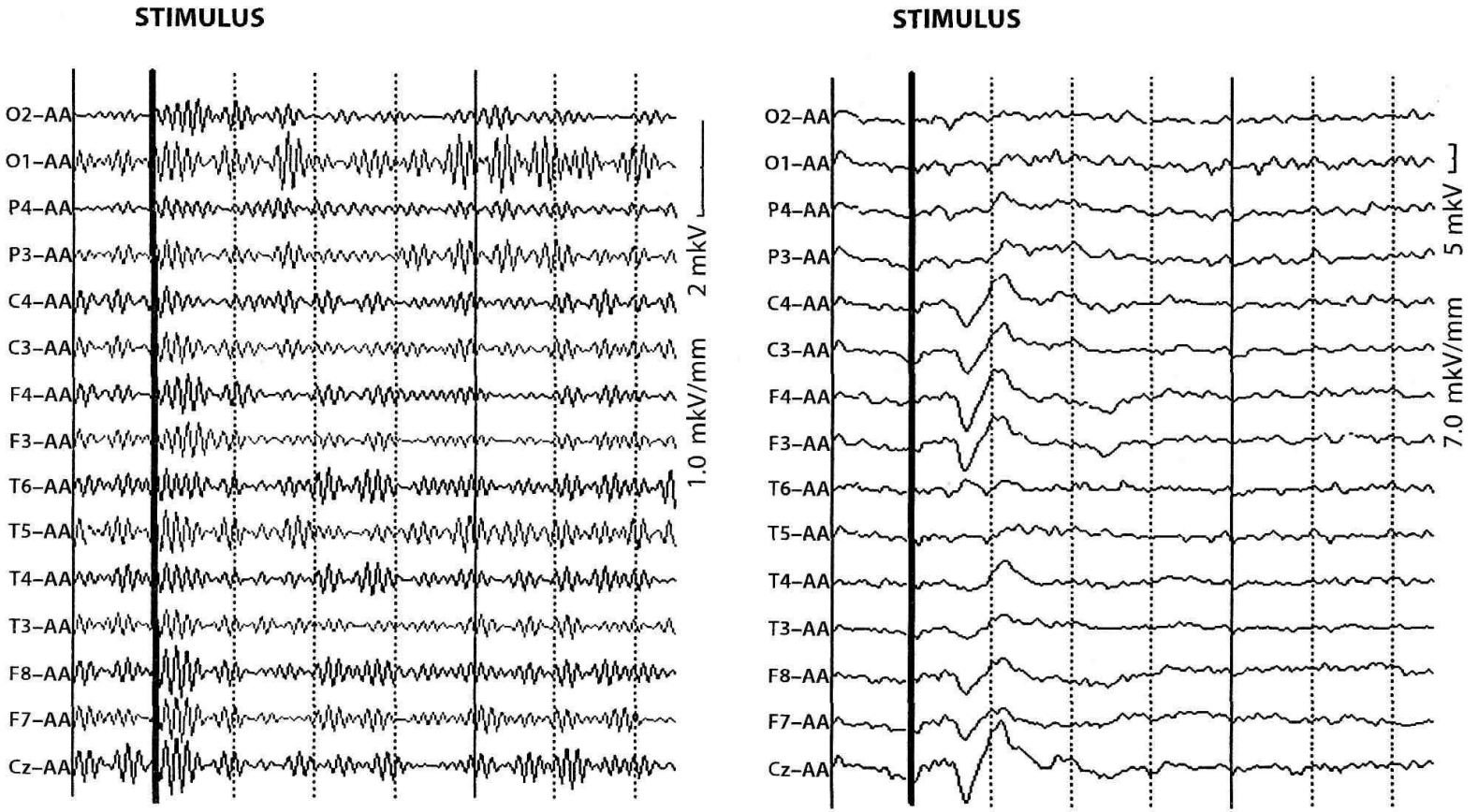


Fig. 1. Sound GPC using EEG 15 channels (left) and their wide band filtration in the gamma-frequency range from 30 to 45 Hz (right). Gamma-oscillation flashes are seen, the so-called sensor response emerging in the interval of 0–100 msec after the sound

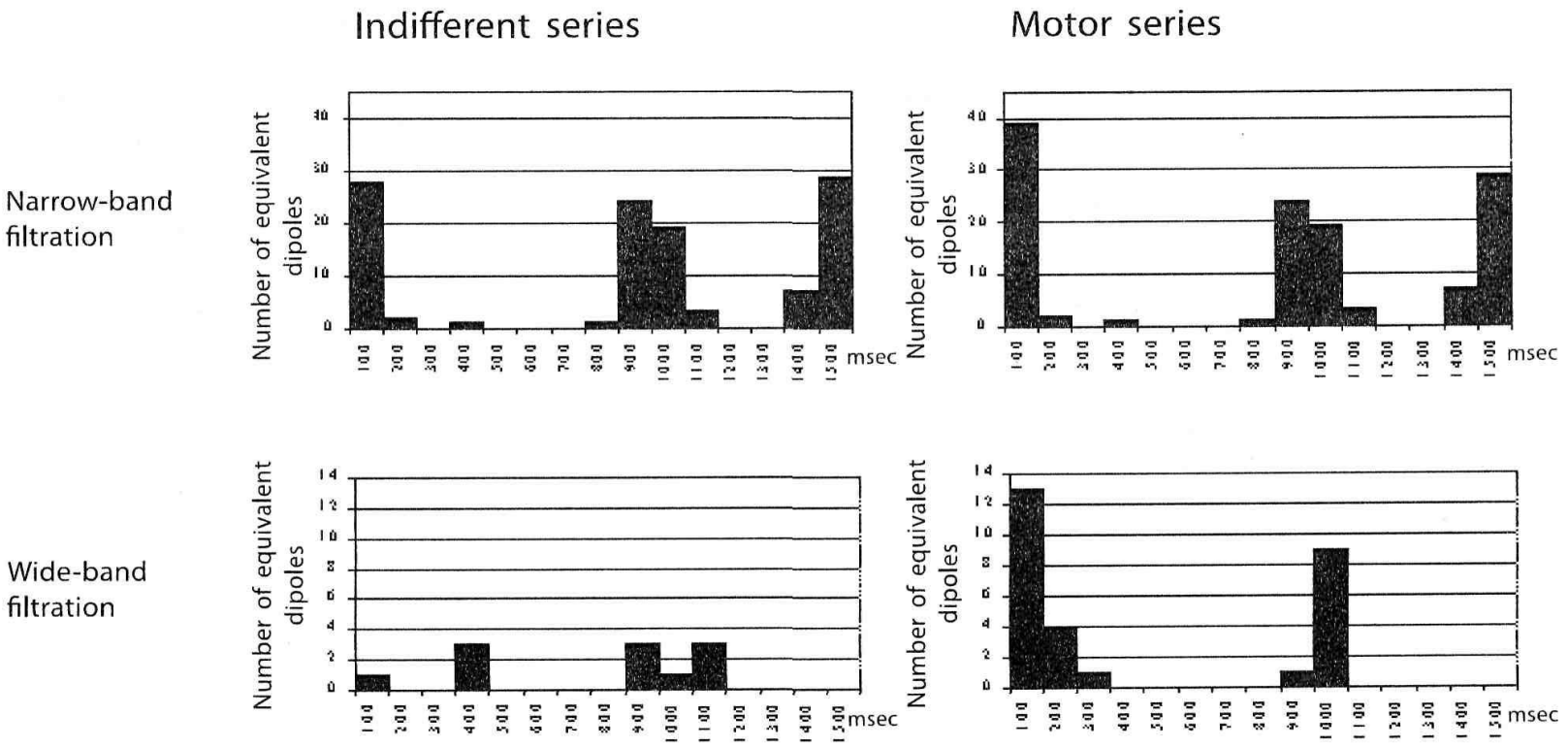


Fig. 2. Equivalent dipole gamma-oscillation sources number increase under narrowing GPC sound filtration band from 15 to 1 Hz within frequency range 30–45 Hz. Post-stimulus bar graph shows dependence of dipole sources number on time quant in structure of averaged EEG 1,5 sec long with subject M.S. The dipoles number is calculated for time quant of 100 msec.

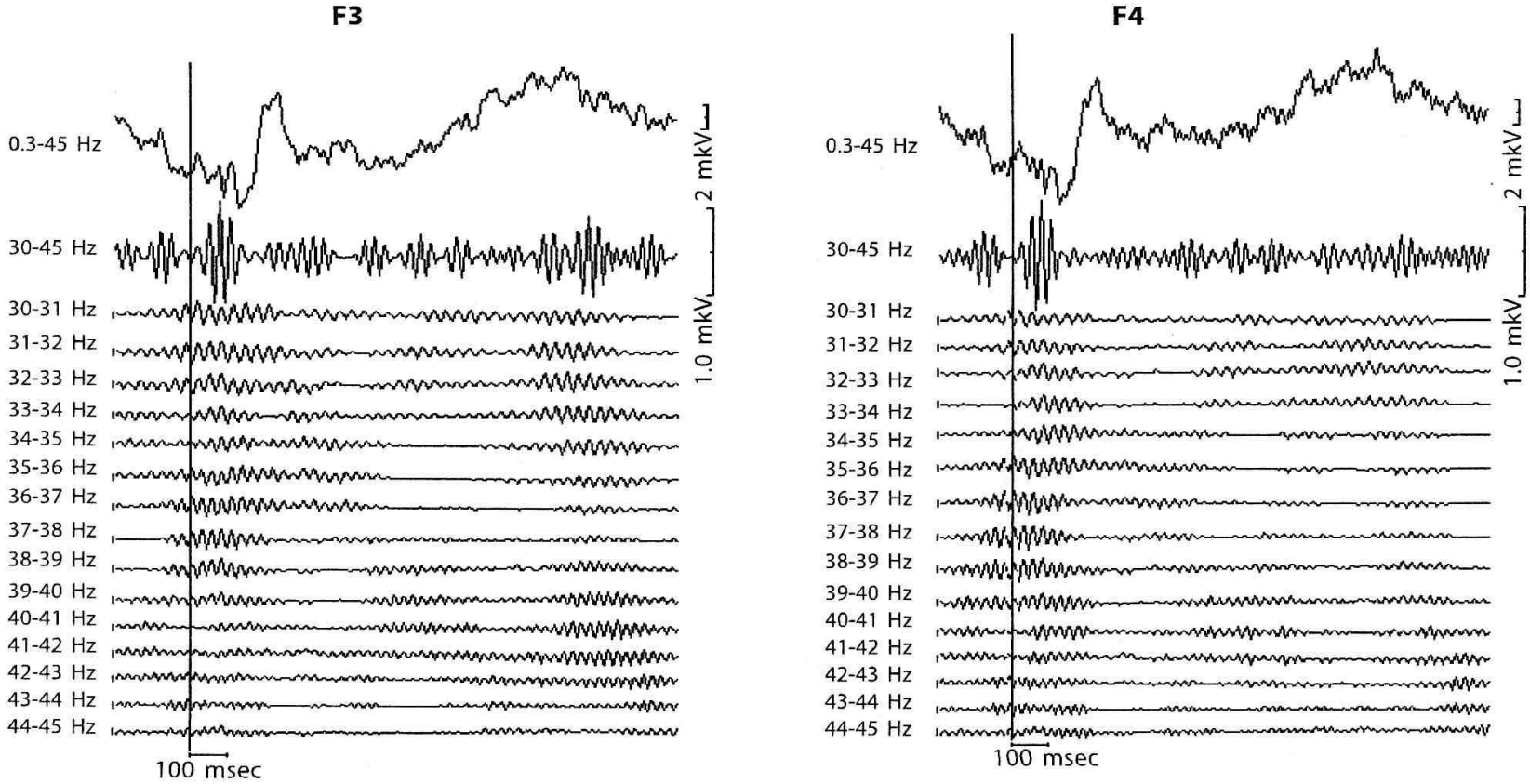


Fig. 3. GPC frontal leads left (F3) and right hemisphere leads (F4) received to 128 sound clicks presented. Below is the frequency filtration in wide band gamma-rhythm (30–45 Hz) and narrow band filtration 1 Hz wide at 15 different frequencies from 30 to 45 Hz. It is seen that gamma-rhythm flash maximum at the primary GPC section coincides with its earlier positive component. At separate frequencies gamma oscillation flashes are seen brighter. Sensor response reaction of gamma-rhythm in the right hemisphere surpasses the reaction in the left. Numbers in the left show GPC frequency filtration bands

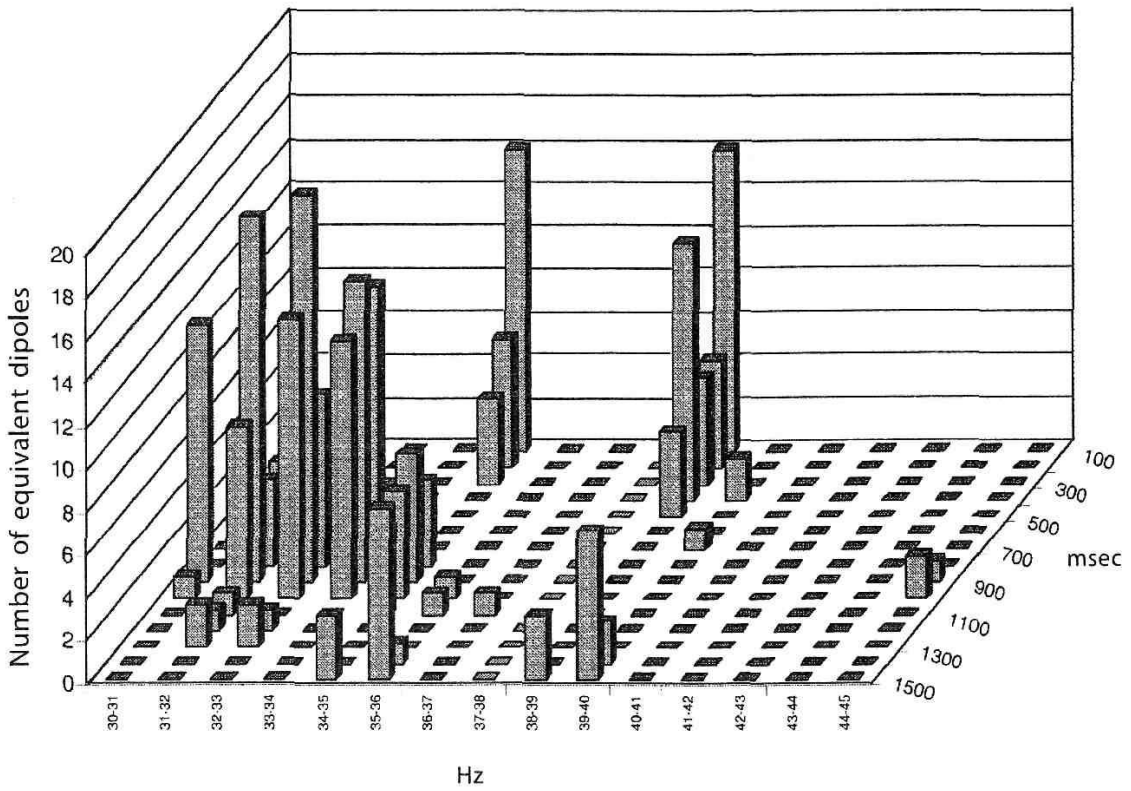


Fig. 4. Narrow band gamma-oscillator activity frequency-time distribution bar graph in the structure of averaged EEG in regard to sound click 1,5 msec long within frequency range from 30 to 45 Hz. Equivalent dipoles number is a measure of gamma-oscillator activity. It is defined for each time frame of 100 msec. *Horizontal scale is narrow band oscillator frequency*

Activity level of every narrow band gamma oscillator is measured by the summarized number of its dipole sources, calculated for each GPC time frame of 100msec with the dipole ratio of 0.09. Dipole calculation was done for the whole brain volume notwithstanding in which brain structures they were localized.

It is seen that on the primary section of sound GPC only two oscillators are activated working at frequencies of 38-39 and 34-35 Hz. At the same frequencies anticipation reaction is presented (in the time frame of 1400-1500msec). In the interval 800-100msec after the stimulus gamma oscillators of lower frequency are activated (from 30-31 to 33-34Hz). In every time frame only part of gamma oscillators tuned to certain frequencies work. With time frame change the

structure of active gamma oscillators changes too. Thus, narrow band gamma oscillators' activity in the GPC structure depends on its frequency tuning and time frame after the stimulus. This allows considering gamma rhythm activity as frequency selective process.

Narrow band filtration method application to higher range of gamma rhythm (55-75Hz) allows detecting frequency selectivity with gamma oscillators tuned to higher frequencies. Figure 5 shows individual bar graphs of frequency-temporary distribution of narrow band gamma oscillators' activity in the structure of averaged EEG received after multiple presentations of number pairs for their multiplication via head-phones. Bar graphs are drawn for two frequency ranges: 30-45Hz (A) and 55-75 Hz (B). It is seen that earlier gamma rhythm sensor response is represented with two low frequency oscillators' activity, tuned to 34-35, 35-36 Hz, and two high frequency ones working at 58-59 and 64-65 Hz.

Activated gamma oscillators groups at other frequencies are connected to later time frames (600-100msec). Selective character of narrow band gamma oscillators' activity is revealed and in the structure of averaged EEG received to a visual stimulus (bright light square on the monitor) the reaction to which should be a punch on the computer keyboard (Fig.6). In both frequency zones sharp tuned gamma oscillators' activation has selective character and connected to certain time frames of averaged EEG.

Imposition of equivalent dipole sources of narrow band gamma oscillators calculated coordinates on brain structural magnet resonance tomograms allows revealing brain structures involved in the perception process with great accuracy.

Combination of dipole analysis with method of anatomical magnet resonance tomography shows that dipole sources of each frequency specific gamma oscillator activated within the structure of sensor response appears in one or several brain local zones. Their location on tomography sections depends on gamma oscillator frequency. Gamma oscillators with different frequencies activity is connected to different loci.

Under performance of sensor motor reaction to sound switching off dipole of active gamma oscillators are found in two local brain loci. With activated gamma oscillators working at different frequencies two zones loci on brain tomograms do not coincide.

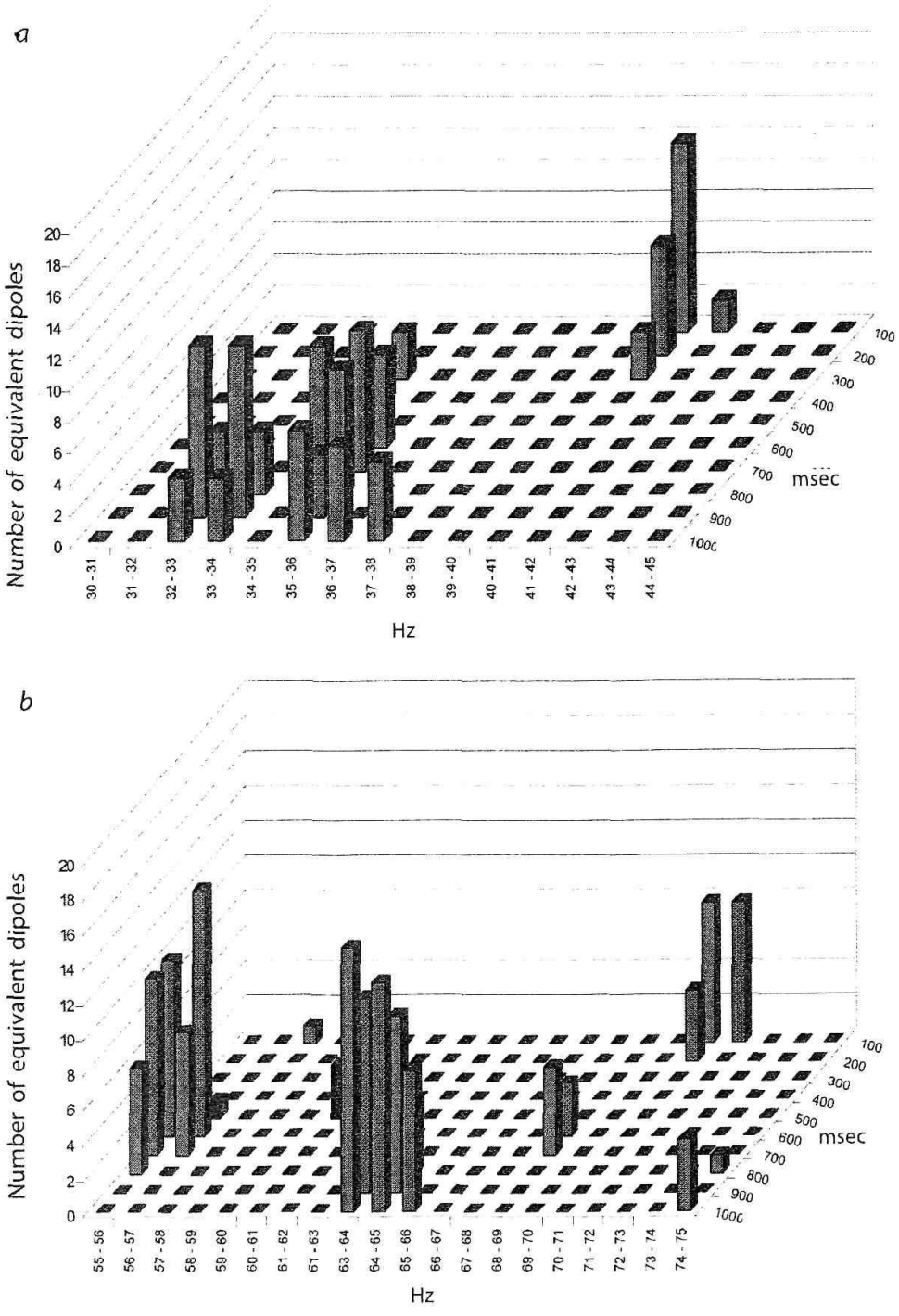


Fig. 5. Narrow band gamma-oscillator activity frequency-time distribution bar graph in the structure of averaged EEG as long as 1000 msec received to the multiple presentation via head-phones pairs of two-digit numbers for multiplication in two frequency ranges 3–45 Hz (*a*) and 55–75 Hz (*b*) (for the rest see Fig. 2)

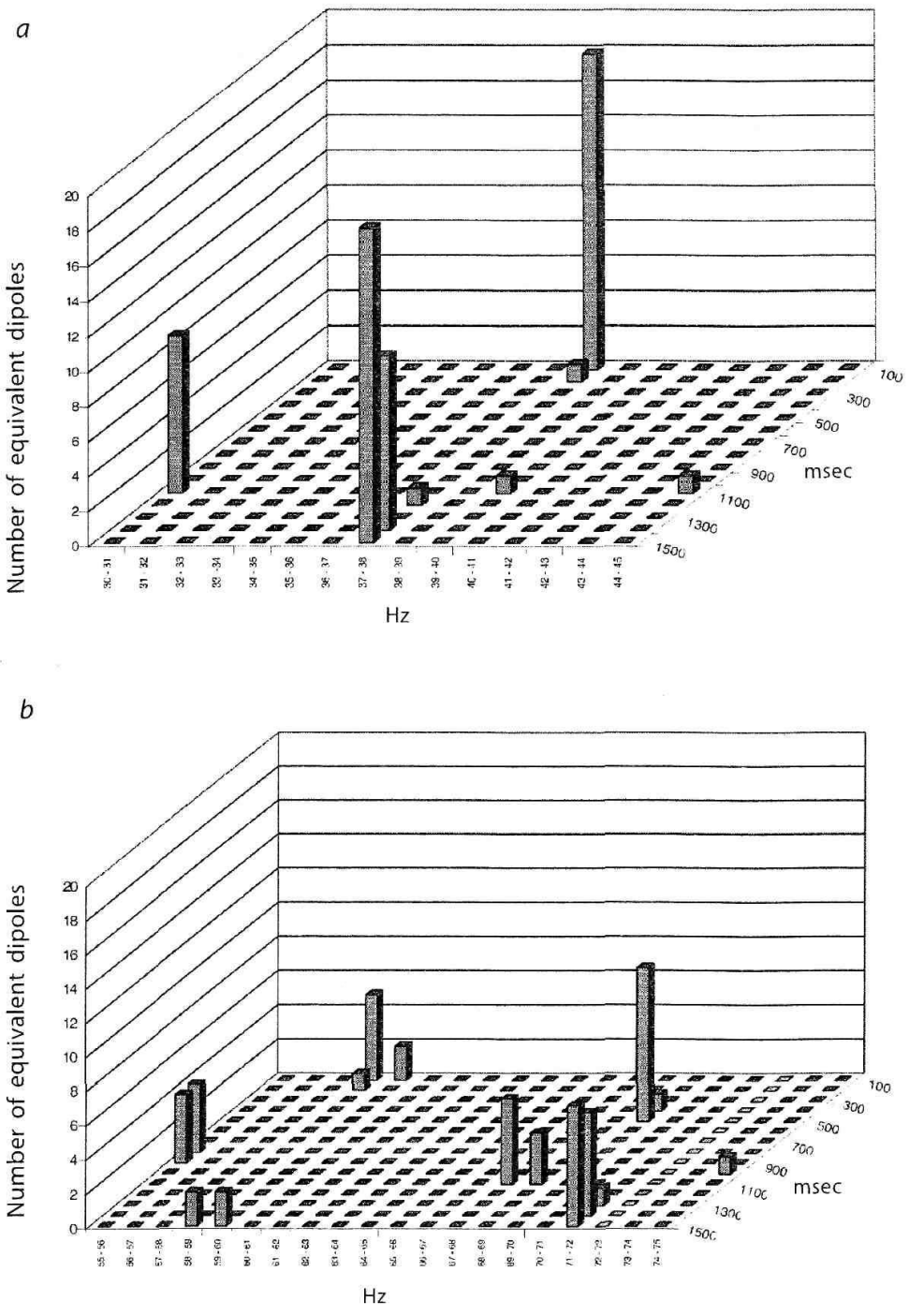


Fig. 6. Narrow band gamma-oscillator activity frequency-time distribution bar graph in the structure of averaged EEG as long as 1500 msec received to presentation of visual stimulus in two frequency ranges 30–45 Hz (*a*) and 55–75 Hz (*b*) (for the rest see Fig. 2)

Figure 7 represents dipole source localization of two gamma oscillators with frequencies of 34-35 Hz (A) and 33-34 Hz(B) on brain tomography. It is seen that positions of equivalent dipoles of two gamma oscillators are biased one toward another. Gamma oscillator sources with the frequency of 33-34Hz in great degree are represented in the left hemisphere, but in case of the oscillator with frequency of 34-35Hz they appear in the right temple and lower frontal cortex, closer to medial surface.

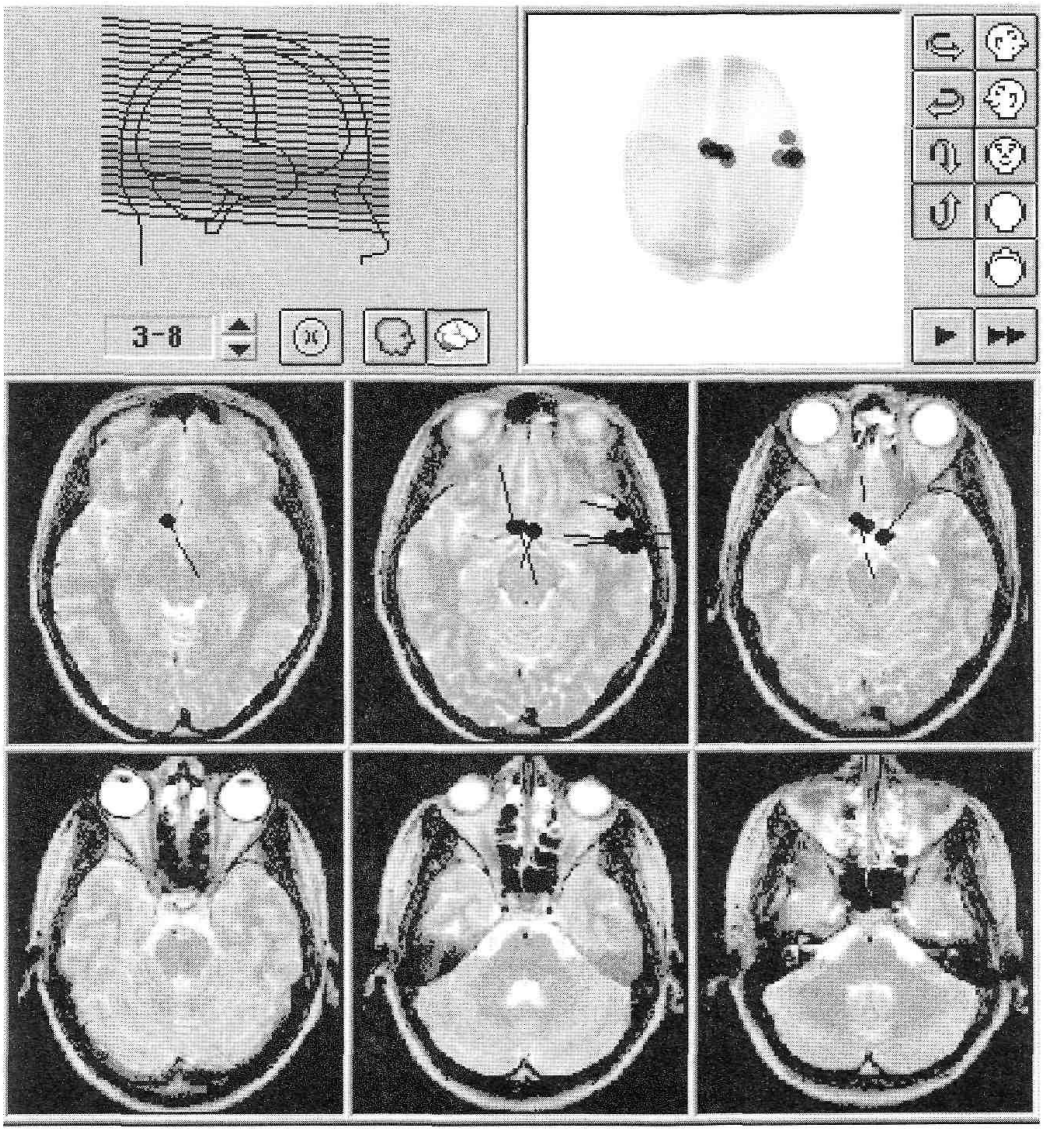


Fig. 7*a*. Localization of equivalent dipoles of two narrow band gamma oscillators on structural magnet resonance tomography images working at frequencies 34–35 Hz (*a*) and 33–34 Hz (*b*). Each of the two gamma oscillators with sharp tuning was activated on two spatially separated brain zones during 100 msec.

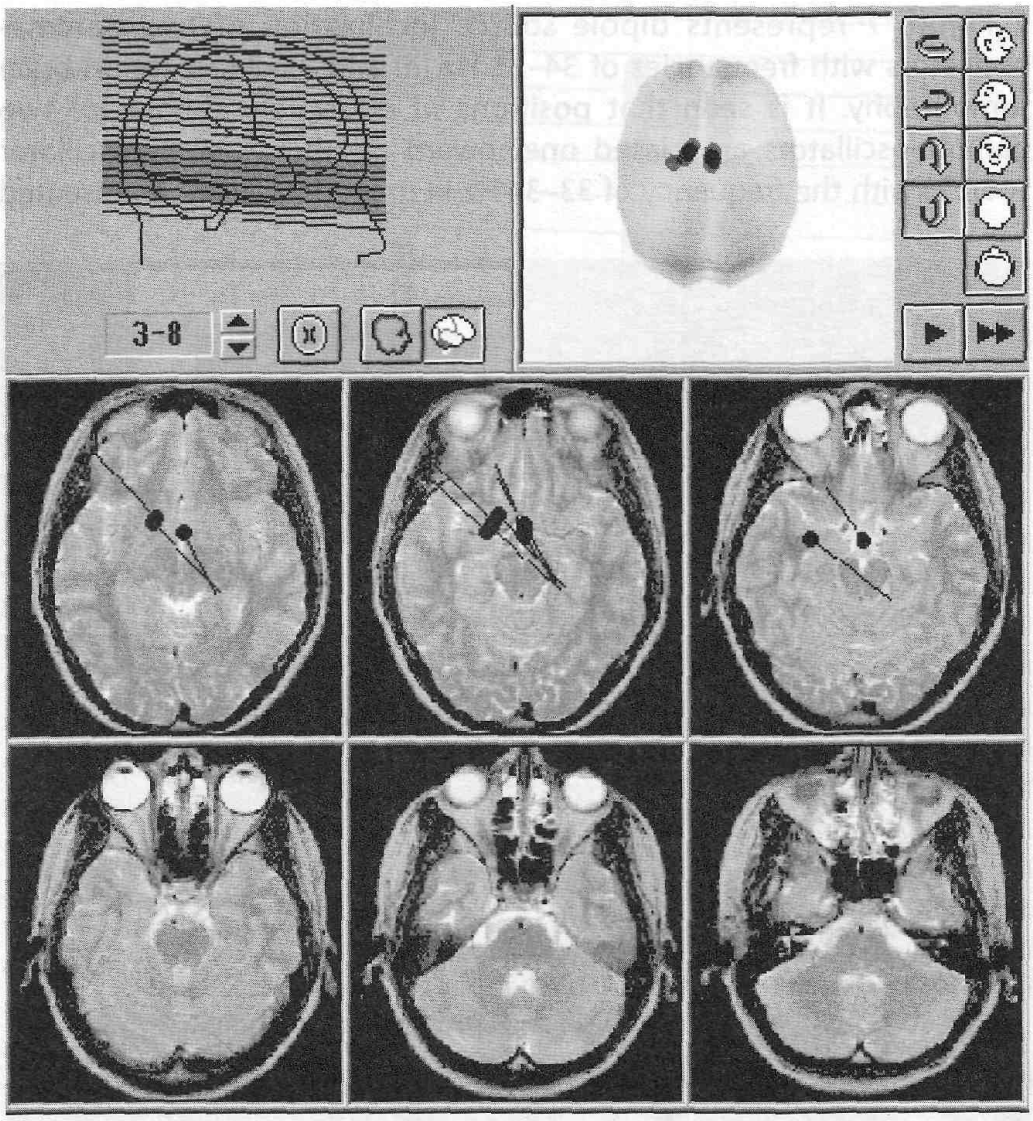


Fig. 7*b*

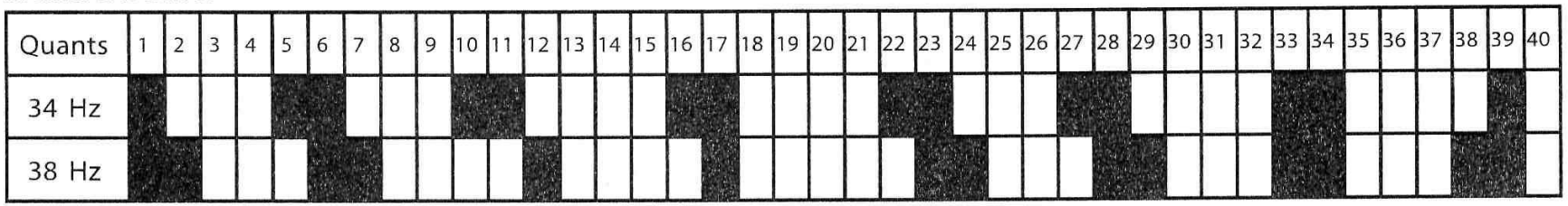
For various frequencies interrelation research of gamma oscillators their time dynamics at the primary GPC section was researched. All the subjects during the whole sensor response (in the interval of 0-100msec) were characterized by the gamma oscillators' activation periodicities, common for various frequency oscillators. Due to time synchronization of gamma oscillators flashes working at different frequencies, common rhythm of their mutual activity in the

way of alternation periods of activation and inactivation. Figure 8 shows one subject's periodical appearance of dipole sources in brain structures for each of actively working narrow band gamma oscillators at the primary section of sound GPC (0-100msec after the stimulus). Equal dipole existence is the index of gamma oscillator activity. It is seen that two gamma oscillators activated in a subject in indifferent series are stimulated periodically. Narrow band oscillators activity is time synchronized. In the interval of 0-100msec 8 flashes of gamma oscillators mutual activity appear creating rhythm at frequency about 120Hz. In motor series periodical synchronization of various frequency oscillations forms 6 periods of activity and pauses between them.

For the first time results supporting discrete character of gamma oscillators activity, tuned to very narrow frequency bands not more than 1Hz were received. Their activity discreteness was shown both in frequency scale and time. Data received about frequency specificity of gamma oscillators with sharp tuning as a whole agree with other researchers' results, announcing about heterogeneity of gamma rhythm on the basis of gamma rhythm separate power specter sectors independent changes [9,20,42 et al.]. Thus present research results highlight the importance of rather narrow band gamma oscillators than wide band oscillators in realization of sensor and cognitive processes. Thus statement is proved by the fact that gamma oscillators discrete character is better expressed with narrow band rather than wide-band oscillators, and the number of activated gamma oscillators with sharp tuning (1Hz wide) ten times greater than the number of oscillators at frequency filtration band increasing up to 15Hz.

Given results about the narrow band gamma activity with the sound clicks operation, perception of pairs of two-digit numbers given for multiplication, and also target visual stimuli, shown their common feature. Narrow band gamma oscillators perform as frequency specific and independent systems. They find out their activity modulation in time, which appear in our research in a result of dipole analysis application as their activity discreetness during the whole GPC. Oscillators' activity is present within some time frames and is absent in the others. Besides, frequency specific gamma oscillators' activity is connected with different loci in brain structures working at different frequencies.

Indifferent series



Motor series

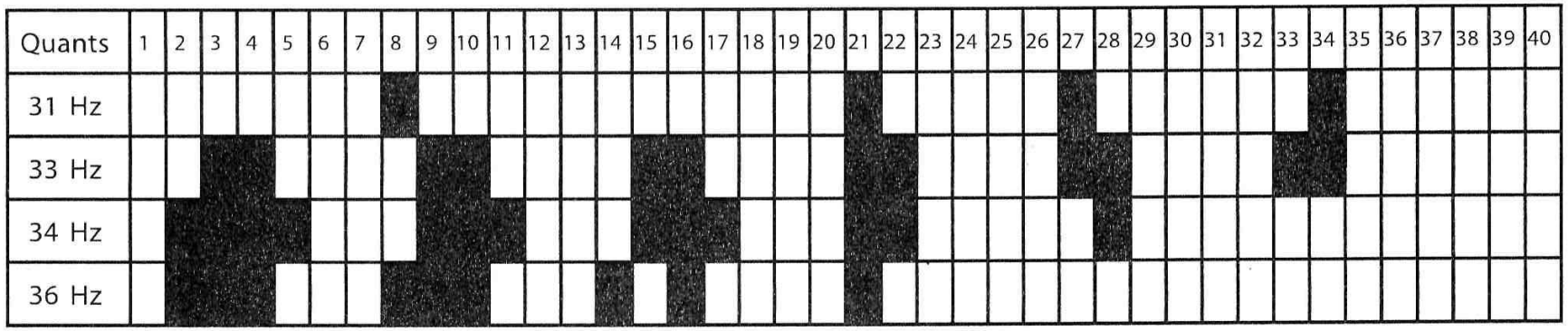


Fig. 8. Periodicity of narrow band gamma-oscillator dipoles appearance during 100 msec after the stimulus in the structure of sound GPC in indifferent and motor experiment series. For each time quant in 2,5 msec presence or absence of dipole was defined at S.D. of 0,95. It is seen that gamma-oscillator group tuned to different frequencies is activated synchronously to each other and forms common activity rhythm. On the left frequencies to which gamma-oscillators are tuned are shown. Horizontally there is time scale in quantum. Black squares show time quantum for which presence of dipole source was found, showing gamma oscillators activity

Gamma oscillator dipole sources appearance selectively tuned to a certain frequency in two loci on tomography images can be considered as expression of two brain zones interaction, involved in common function via mechanism of synchronized gamma oscillations at the same frequency. As our results show, similar interaction process is present at the earliest stages of sound stimulus perception – in the interval 0-100msec after its presentation. Supposition can be made that narrow band gamma oscillators perform communicative function, providing memory participation and pre-frontal cortex function involvement on the sensor coding process [7,8]. They connect sensor processes with memory ones already in the structure of sensor response providing merging of two information flows "bottom-up" and "top-down".

Two forms of gamma rhythm communicative function are found: combining brain structures into a single functional system is done both with the help of gamma oscillators' common frequency activated in connected brain structures and via mechanism of time synchronization of various frequency narrow band gamma oscillators activity creating common rhythm of activation and inactivation periods alternation.

What is a mechanism defining frequency selectivity of gamma oscillators' tuning? The important step on the way to gamma rhythm generation study was intracellular registration of identified intercalated and pyramid neurons of hippocampus. Clusters of intercalated neurons were found generating synchronized high frequency commissures simulating condition of pyramid neuron, with which they are connected. Synchronized discharges of intercalated neurons coincided with focal potential fluctuations which are considered as summarized characteristic of local group of functionally interacting neurons condition [43].

As focal potential fluctuations frequency is relative to frequency range of gamma rhythm [33,34], we can suggest two models explaining narrow band gamma rhythm generation. According to one version, the signal coming to intercalated neurons puts into action their interaction process which in its turn creates resonance effect to a group of neurons involved in common function. Interacting intercalated neurons cluster frequency is defined by the potentials frequency of dominated intercalated neuron action. According to the

other version, intercalated neurons have pace-making qualities. Signal coming to them switches them into pace-making activity mode simultaneously causing commissure discharge launching that provides a group of intercalated neurons activity synchronization effect which causes certain frequency gamma rhythm in local cellular ensemble [35].

Thus, frequency specific mechanism of information coding based on frequency selectivity of intercalated neurons pace-making activity causing binding of brain structures for brain functions realization seems to exist.

Different brain zones are characterized by different frequency of intercalated neurons pace-making potentials which can be separated from caused potential via frequency filtration method. Intercalated neurons pace-making localization in different brain zones is achieved by calculating frequency specific location of equivalent dipole.

Experimental research of human brain equivalent dipoles narrow band gamma oscillators activated in the GPC structure brought in a conclusion that oscillators' frequency structure combines a discrete series, but not a solid specter. Equivalent dipole at a certain frequency appears consequently in time frames certain intervals apart from each other. In one and the same brain zone and within the same time frame different frequency dipoles can appear. We can suppose that every frequency selective dipole has a corresponding group of pace-making intercalated neurons giving a stimulus by their activation on a certain time line. One-stage appearance of several frequency selective dipoles in brain local zone proves that several groups of intercalated neurons function there. Dipole position bias means new brain structure involvement.

Combination of GPC method, dipole analysis and anatomical magnet- resonance tomography for narrow band gamma oscillators study allowed finding out two forms of communicative function performance caused by gamma rhythm. Brain structure connection into a single functional system is done because of the common frequency gamma oscillators are tuned to; they are activated in connected brain structures, also with the help of various frequency gamma oscillator group time synchronization mechanism, forming common rhythm of alternation of activation and inactivation periods.

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Phases of the paradigm. (a draft of psychological and historical epistemology) Part1

The paradigm is defined as a contrast of a narradigm. The narradigm is a transformation from potentials of creative individuality into a set of cultural models in textual and narrative terms, and paradigm is quite the reverse, it is a displacement of the "subjective" by the "objective" picture of the reality using the instruments and the rigorous scientific research procedures.

Historical period of the paradigm is divided into lengths which are called the phases of the paradigm: heuristical, magical, philosophical, scientific and the phase of astroregulation.

In the first part of the article we describe the heuristical and magical phases of the paradigm.

Key words: a *paradigm, a narradigm, the phases of the paradigm, heuristical, magical*

Present theoretical reanimation of the psychology of our country brought joyful news to humanities that psychological science exists and even wins. But the new fear immediately springs up, it is the fear that a pendulum of humanities could rotate about pseudo-science [12]. Frankly speaking, the active researchers say that rumours of the sunset of the paradigm of natural science have been greatly exaggerated. As regards the world science it is just the opposite. Concerning our science they will disappear when the expensive research equipment floods the laboratories [2]. But the humanitarian paradigm in psychology, according to the adapts' words, it is not obligatory occult science*;* it can be a cultural analysis [5]. However, there are different points of view about interrelation of natural science and humanities in psychology, it can be considered as a break-down of a pendulum or dragging the rope or maybe on the lines of Beethoven final "Hug

millions" the word "paradigm" flashes through the mind automatically. I must admit that I can not use this indicated term easily that's why this article will be devoted to cultural and historical analysis of the structure of the paradigm.

The attempt of the periodization of psychological science according to paradigms was made by Madsen K. [7]. The Dutch scientist separating a structural unit for analysis of psychological history, firstly has limited the history to contemporary knowledge, secondly he has put down the standard concept out of the brackets of his construction. In this article brining to your notice, we are dealing with historicism of the science in the context of the paradigm.Besides I think that, paradigm process (legitimization of knowledge in a certain light) is larger than science in the full sense, and includes the latter as its historical moment. Historical period of the paradigm is divided into lengths which are called the phases of the paradigm.

To put it briefly, I'd like to explain how this idea was conceived. Since 1994 I have been elaborating a model of the narradigm. I propose it to counterbalance Koon's concept of the paradigm, and in addition to it. The definition of the narradigm is given together with the description of its phases, I distinguish five of them: apocrypha, canon, humanism, humanitarianism, humanities. (see Shkuratov, 1994). I seek to show that the cycle of humanities is specific and different from the cycle of natural sciences proposed by Koon T. [6].

I suppose that these indicated cycles are built in respect to a man and his world in different way: the narradigm is a transformation from potentials of creative individuality into a set of cultural models in textual and narrative terms, and paradigm is quite the reverse, it is a displacement of the "subjective" by the "objective" picture of the reality using the instruments and the rigorous scientific research procedures. Now I have to infringe upon Koon's concept and modify it adding some phases. This transformation will be made in order to juxtapose the two concepts in a certain light. I have no possibility, right or desire to intrude into the history of particular natural science. The sense of juxtaposition consists in finding two psycho cultural vectors of knowledge-personal and extra-personal.

The first marks the trend of socio-cultural consolidation of integral human being and the second one is the transformation of human knowledge into reality cleared from "subjective" (The

other).(Details about juxtaposition The other- Self see [10]).One trend is called the narradigm, another – the paradigm.)

I distinguish five phases of development for both the paradigm and the narradigm as well.I think such a coincidence is not occasional. I tried to compare them and draw a parallel between development of experimental-empirical and narrative series of knowledge.I won't deny that thinking over phases; I couldn't prevent half-intentional adjustment of the paradigm phases to the narradigm ones. Now it is a question of the hypothesis, when we start verifying initial model, this symmetry, perhaps, will disappear. Thus the phases of the paradigm are the following: heuristical, magical, philosophical, scientific and the phase of astroregulation. The discussion is mainly held about material of Modern history**.** Though I didn't aim to describe the course of European knowledge from the late Middle ages till the 20th century, I believe it is better to introduce the general science schema, using coherent and homogeneous material, besides it is well-known to the most of readers from the school course of physics. The chronology of the phases is tentative (don't forget that it is the first presentation of the model): heuristica- the 14th century, magical- the 15th-16th centuries, philosophical-from the beginning of the 17 th century till the end of the 18 th century, scientific- from the beginning of the 17 th century till the end of the 19 th century. The phase of astroregulation is assigned for the edge of New European paradigm.

Philosophical and scientific phases are following in parallel, they adjust each other, all the history of European knowledge-it is a dialogue of philosophical generalizations and theoretical and empirical scientific discoveries.

However, firstly, philosophy precedes the science logically. Secondly, I do not plan to cover all New European science; I try to trace how its paradigm core is forged. The scientism of European culture of the last three or four centuries is supported by a small group of physics and mathematics, gradually, turns touching, embracing all natural sciences and beyond them.

Every time pioneers' discoveries are consolidated into contemporary production of knowledge,using prepared by the philosophy ground in advance.

The wavy development of particular paradigms makes impression of the parallel existence of philosophy and science.

However, if we examine particular paradigm lines it turns out that there is a definite sequence of the phases. It, obviously, follows in outline the sequence of maturing central mechanics and mathematics paradigm, making corrections for specific character of the material.

Progressive European science of Modern History is nature-oriented; its ideal is mathematical knowledge. I will permit myself another image. Planetary system of scientific bodies is kept in its place by the sun of physics and mathematics. The standard of precise sciences can not be complied with some other sciences, and even approaching these standards would signify their destruction. But there is no question of resemblance between peripheral bodies and the sun. We mean only leaning towards the sun in the knowledge system.

High standard of scientific work of Modern History includes experimental research, mathematical verification of data, and the existence of the subject under consideration in the form of the hypothetical quantitative models. It is desirable to do without a priori profound definition of the explored phenomenon, giving the possibility to empirical research to outline its nature. These are Newton's winged words "I do not advance hypothesis" and the main law of nature-the law of gravitation. Instead of law definition we find the order of its measurements, in other words, we face the paradigm center of knowledge of Modern History. Classical mechanics, formed after appearance of "Mathematical principles of natural philosophy" (1687), do not lose scientific priority till the end of the 19th century in spite of sophistication of architecture of organized thought. At the end of the 18th century Kant I. set up the gradation of sciences, taking as a reference point Newton's natural sciences. Critical philosophy shows the architectonics of scientific intellect, and its interrelation with spheres where imperatives of freedom and taste operate-moral and aesthetics. So philosophy finishes the career as a creator of gnosis basis of New European knowledge and goes along with Newton's paradigm a special professional science ("science building", "gnosis", "the theory of knowledge"), a scientific phase of Newton'paradigm. Kant's trend of philosophy becomes instrument of normal research practice (according to Koon), improving its category apparatus and methodological consciousness. It doesn't relate to parallel philosophies joining the sciences of lower status than mechanics and

mathematics have, for example Hegel's philosophy which serves historiography.

They are placed outside the central paradigm of Modern History, they have their own autonomous lines, conjugate to the main direction of European science.

Thus, the border of "count-down" of New European paradigm is more or less clear. Regarding the movement from the past to this border, it is Middle Ages science of the 14th century. Her principal paradigm is Aristotle's paradigm. It means that scientists are looking for hidden forms of phenomena inside these phenomena or in the notions of these phenomena (universals). To put it otherwise, they discuss what to learn first- abstract words: a circle, whiteness, a cat, a frog or objectively existing entities of the circle, whiteness, cat, and frog. The first are called nominalists, the second ones are realists. Though both of them are scholiasts, this is the last nominalism that was starting point of New European paradigm.

Up till now there was a tendency to look for roots of New European discoveries in the antiquity,rejecting Middle Ages a fruitless, obscure period. It still exists thanks to popular-science publications. A closer look at the material shows that there is no gap between ages. Scholastic physics can not give rise to Newton's physics, of course. These are absolutely incompatible ways of knowledge production. They are divided in phases entering the paradigm, but they do not meet the definition of science (scholastic, experimental or some other).

I denote the beginning of the paradigm cycle by heuristical phase of the paradigm.

It is the period of productive conjectures and thoughts about knowledge problems when instrumental or logic-theoretical solution doesn't exist. The specialists of heuristics advise to stimulate intellectual activity, allowing paradoxical, illogical, fantastic ideas, and choosing, consolidating, developing perspective solutions to cut down the way between "zero" heuristical state and mental product.

Interesting thoughts coming to mind and the beginning of European science are the phenomena of different order.

But they are similar because they are characterized by intellectual indeterminacy and basis absence. Principal difference consists in the fact that the intuitive beginning of European science

developed into well-known results, that the science historians consider a starting point and an individual's ideas fade away without consequences. However, we can omit this key moment while we speak about general picture of experience in a state of epistemological indeterminacy.

It is not true that an ordinary thinker can only "contrive a bicycle" or "discover America", some original ideas occur to them. But they are lost for the sciences, because inventors forget about them, do not keep notes, do not formulate them well and, of course, they do not spread their ideas. Everyday knowledge do not possess a special instrument, procedures to acquire something new. There are few people who will advance ideas observing rules: formulate a hypothesis, find facts to verify it, to find a theory for explanation. Besides, it is necessary to meet corporative requirements of the leading science; nonprofessionals deprived of professional status and who dared to declare about themselves, lead a solitary life and become victims of knowledge. Organized knowledge rejects ruthlessly conjectures made by "strangers" and helps forward selected discoveries on the stages of their legitimation. People who are doing researches according to their profession and know their technology have the best opportunities to grow their conjectures up to recognized discovery. The beginning of the paradigm is tabula rasa, we mean that this new direction doesn't have at the disposal a technology, formulated problems, social status and a psychological portrait of the researcher.

Therefore we can compare an individual's conjectures with the beginning of European science: it is a development from a "zero", heuristical state. Certainly, the new grows through the old in the real life. I have to sacrifice difficulties of formation in order to give characteristics of paradigm phases from the standpoint of logical and historical succession. This succession is isolated from retrospective review. When we know what we want to find we can omit the context and start from some "absolute beginning". We take for that starting point heuristical conjecture, to put it differently, amorphous problem without structural task and without dividing into subject, object and knowledge facilities. I call this very period by the heuristical phase.

The history of the discovery starts by the case of the private researcher, demonstrating universal human curiosity, when he faces mysteries of the universe.

At the heuristical phase the universe and the subject are merged in the individual's thinking process. Clear separation between individual and universal doesn't exist, but the creation leaves a trace.

Heuristics is a series of mental conjectures, existing till the "right" answer is found.The inventor has to find the answer out off the norms of intellectual intelligibleness adopted in a certain culture. Of course, heuristical statements are more universal, than a correct logical reasoning. It is like a habit of people to see dreams than to study scientific treaties. We also need to add dream interpretations which arevery unsteady and local.

Heuristics are a kind of day dreaming, the new flashes through the mind of the inventor in the form of the fleeting images. The first conjectures take the form of pictures, signs, fragmentary sentences, sketches and so on. They look like unintelligible words, but they are adequate to the first specification of creativity in a mental culture. The thought is too original, Self is dissimilar. These ideographs, hieroglyphics are not the formulas, tables or diagrams, they represent an idea rather than a particular word. When the mind makes the first step to intelligibleness, its exercises are pretentious and remind poetical imagination, schizophrenia delirium or mystical revelations. You can perceive future formulas, designs, definitions through these hieroglyphics and ideograms. We'd better to say it is a registration of particular states. Judging by their contents, these are mystics, emotional sufferings from merging the universe. It is put into a frame of symbolic and image mental activity of a man. Heuristical phase of the paradigm corresponds with apocrypha phase of the narradigm. As a matter of fact, the first symbolic artifacts are not easy reading. To a certain extent, apocrypha is heuristics, treated as a note, and scientist's sketches from the point of view of contents volume are apocrypha.

Every fact can be placed into different appreciation and interpretation coordinates.

I am not willing to say that we'll be able to interpret pencil notes made by Mendeleyev as poetical conceptions, or pieces of Poushkin's archives as a preparation of scientific discovery. We know who they belong to. Division in the paradigm and narradigm during the lifetime of these people was made before they produced any creative works. This point of division is socially fixed as a famous cultural type. The way of description is not predetermined for common creativity by

personality reputation, that's why it varies. Psychoanalytical interpretations, capability tests, pathopsychological diagnoses assume social and cultural vague position of the respondent. Artistic or analytic mentality, evocative or logic thinking, a schizoid or hysterical person and etc. These are not simply psychological characteristics, but sketches of socio-cultural profile of the respondent. Though the starting points of the narradigm and paradigm are close, vectors of their development point to different directions.

I'd like to move on to organized European science. Its historical debut is a transitional mentality from mythology to philosophy of pre-classical Aeolia. (4-5 centuries B.C.) there we'll find a lot of hints to all doctrines of latest science in the form of speeches and fantasies. To a certain extent all the antiquity is a heuristical phase of European science if we try to generalize its development during more than 2,5 thousand years as an unique paradigm. If we take the main paradigm of Modern History-classical mathematical sciences-here the period of primary conjectures without adequate instrument, logic and theoretical basis dates back to 14th century. At this time the ideas which will be used by all natural sciences appear among scholiasts and nominalists from Oxford and Paris. Among them we can mention the notion of impetus proposed by Buridan G. To put it otherwise, It is a jerk under which the body moves, until the resistance exceeds starting impulse. This dynamic idea is alien to Aristotle's physics that was studied at the universities. According to Aristotle, scientists of Middle Ages divided things in these which are able to move themselves and in those which move under external action. He attributed living beings to the first class, and inanimate nature to the second class. Objects, without soul, move, if they are pushed by somebody or something, for instance, the air. The division had a hierarchy and qualitative character, because physical objects were classified as the lowest world, according to their entity, they were deprived of the power of moving given by the God to animated world. Dynamics proposed by nominalists from Paris were beyond explanatory means of contemporary physics. It was static and qualitative. These dynamics corresponded neither to dominating world picture, nor accepted research apparatus.

Though successor of Buridan, Nicholas Orem tried to use right-angled system of coordinates to demonstrate the fall of the body, this

procedure seems to be pretentious,on the background of correct scholastic reasoning about qualities and entities. When new physics ideas were translated into the language of "qualitative" mathematics of that time, as it was made by a group from Merton's college, it was something intelligible. "the absence of geometrical representations of these "movements", like getting dark, cold, thickening, made Merton's scientists to limit their research by measurements of the range of corresponding qualities. This produced the puzzling apparatus which is widely spread in their works and which the other scientists complain of." [1, p.134-135].

Mathematics of that time can not give anything for solution of dynamic problems, it was busy with the search of soul entities, archetype figures."It was the question of the existence of spiritual world and behind the figures the adapt saw the entities out of the phenomenon. Mathematics in its full volume of semantic perspectives were equal to science where the specifications didn't exist. It was an exceptional kind of science initiation, not into "one branch" and then to another, but into everything immediately. Its authority wasn't based upon opinions, but upon things nature." [11, p. 42].This qualitative mathematics will be eliminated from circle of exact sciences only at the second part of the 17^{th} century.

Ideas reminding European natural studies of Galileo and Newton are in the air of Universities in 14^{th} century but all attempts to formulate them fail. New learning object wasn't possible to be described in comments to Aristotle or solving any practical problems. This fact casts a doubt on what forerunners of new European science had been doing: discussing main points in a modified way or trying to find new key categories of future physics. It seems "that either "calculators" or Orem didn't "give birth" to new science understanding, but tried in absolutely new conditions and with totally new content to use antic meaning of the Form as a Form of hidden substantial qualities" [2, p. 135].

A pass from Middle aged system of scientific knowledge (Aristotle's paradigm) to new European system (Newton's paradigm) symbolizes such a total change in all cognitive means and methods that allows, instead of formulating substantial forms of speculative objects, to build the universe experimentally. According to R.Rorti "hylemorphic epistemology which considers understanding of

universal ideas by a concretized display in a human's mind of what is concretized as a frog in her alive body, due to the development of mathematical physics was replaced by law-event structure that explained "being frog" state as a simple nominal essence" [8, p. 46]. The difficulty of such a change has to be carefully evaluated. Law-event that the American philosopher speaks about is created not by a simple discourse but by manipulations with tools and calculations. "Hylemorphic epistemology" of aristotelism is equal to thought-speculative growing of meaningful forms from substance of the universe. A Middle aged scientist combines logical scrupulosity in determining scholastic types and species with admirable pray in front of the God-made first structure of the universe. The subject of learning in neutralized in him by believing. A new science researcher in his actions is only linked to the rules of experimental procedure and to the properness of the application to the theory. A direct pass from Aristotle's configurative research to Newton's one is impossible. Beforehand we have to pull religious and ontological subordination of subject-researcher to the real Subject of the universe out of researching procedure. The definitions of a science and a paradigm have to be separated. Newton paradigm changes Aristotle paradigm but Aristotle's science doesn't touch Newton's: there are several paradigmatic phases between them that can't be described in the frame of science as a research system. Inside the middle aged science "physicians" and "calculators" of 14th century belong to the late scholastics. They give to essence-forms rather unusual, arithmetical and geometrical specifications. Inside the Modern History paradigm there can be found some authors of perspective physical ideas that in their times had been left unrealized because of lack of language, tools, workers, social order and other conditions of modern new European science.

Between the sciences of Middles Ages and Modern History appears the transformation of a Scholastic using his abilities to think and to examine as a creature and slave of the God into a subject-researcher free of religious and ontological matters but obliged to be précised in laboratory procedures and description of hypothesis. It takes time to happen. In the next phase the autonomy of learning is growing because of adding a Thinker some prerogatives of the Creator. It puts his self-assessment, social measure of powers and

abilities of a human's learning into an adequate side. This very phase can be called Magic.

Magic phase of the paradigm.

A step from heuristics to magic determines the appearance of action-will mediation. A cognizing Man makes an effort to display the Other. Two sides of paradigmatic relations are closely linked. Heuristic pictures are developed in movement activity. In a very simple way a researcher in order to catch the bright idea, "executes" it with psychophysical actions. To present the Other reality the closest tool is used – a body. Spasmodic and strange movements, muscles strain and even convulsive is an external picture of mental work to possess wage world allusions. In modern knowledge they are hidden under strange and extravagant behavior of creative personalities. Child's expressive body movements, manipulations, self-made words and gestures, spellings are usual attributes of intellectual development sometimes understood as ontogenetic reproduction of primitive magic. As for ancient magicians, their intellectual presentation of external reality with the help of improvised means is done in complex receipts with numerous ingredients and accessories. A magician blocks his personal reflexive Self, performing in extremely active, single-minded and individual way. His psychophysical nature is an instrument and base for displaying the Other which in heuristic phase is syncretically combined with Self. Saying "to display the Other" I assume that Self is the Other's mean, that my efforts only reproduce the reality in several psychophysical movements and object-oriented actions. I accept that magic can have two phases: esoteric and exsoteric. On the first phase magic manipulations are covered by mystery and are beyond understanding, on the second one they are already open to discussion.

Magic phase of new European paradigm (15-16 centuries) is chronologically and contently matched with Renaissance. "To evaluate the importance of magic in the beginning of Modern History, we should consider that being a widely developed motive in Middle Ages, it is coming out of cultural underground and getting a new appearance. It becomes common for all great thinkers and scientists being sanctified by them" [4, p. 332].

There is a big gap in the history of European science. This gap is a break in physico-mathematical development between 14^{th} and 17^{th}

centuries. It is about late nominalism. This tendency of high scholasticism in the first two third of 14th century foresaw the most important ideas of Modern mathematical science. Galileo and Kepler started from the point where Buridan and Orem had stopped. Francis Bacon declared the beginning of experimental science more then 300 years after his compatriot and namesake Rodger Bacon had done it. What is the reason of that 2-3 centuries loss? Why did the experimental European science appear in 17th, not in 15th century? Late nominalism can't be rejected by referring to Ancient Ages routs of new European science. Ancient knowledge can be taken as an overall premise of new European science. And according to historical chronology the 17th century follows the 16th but not the 4th BC. Classical ideas came to New times through Middle Ages. Probably the reason is in Centenary War, in Black death of 1349-1350? But peace times in Europe were rare, so why the violent growth of Renaissance started in the frame of Italians wars and awful devastation of Rome in 1527? European science also started in bad times – Thirty-year War. I will try to answer this question not from the point of view of Science historian, but on the basis of suggested above historical and psychological epistemology.

The common sequence "Middle Aged scholasticism – Renaissance knowledge – Modern science" gives a poor explanation even together with précised Middle Aged ideas of Copernicus, Galileo and Kepler. The mechanics of 17th century is closer to Paris occamists than to High Renaissance. New Science has to be cleared not from strict scholastic logic, extremely modern principle of intellectual economy and well-prepared experimental theory, but from so-called advanced ideas of Renaissance. At least from some of these ideas. Renaissance isn't homogeneous. It consists of dying Aristotle's, i.e. Middles aged scholasticism, and renaissance "new" model – Neo-Platonism of 15-16 centuries. This new model is based on anthropocentrism, on glorifying a human. There is no doubt, it is very useful for the science as it opens up man's enterprise and helps to find out proves for heurists of late Middle Ages. Humanists didn't' make so many scientific discoveries. The renewal of Ancient Greek ideas refers mainly to the art and literature. As for main ideas in natural science - they were known by humanists' rivals – middle aged scholastics. Though humanists did not have many new ideas, rose a

Man and his fantasy, broke logical discipline that was very strong in late scholasticism. The magic culture was introduced to science by humanists as well. This fact revealed the art of occultism and covered for a long time the complex ideas of Paris and Oxford scientists. The capital of European science moved from Paris to Florence. There at Medici's court reigned Marssilio Faccino – the translator of Platon and Hermes Trismegist, the creator of charming "Platon's theology which is according to specialists' opinion had nothing in common with Christian science of Middles ages and with Christianity itself. The syllogisms of Sorbonne and Oxford professors step back in front of mysterious fireworks of Egypt priests or Jewish Cabbalists! These flashes light up the gallery of new Italian art. A protestant broom, violent work of contrereformism, grammar-mathematical Jesuitical schools had to appear to clean among this amazing carnival a place fro more prosaic scientific knowledge. Fantastic and hot heads like a martyr of occlusive science Giordano Bruno wasn't of any use to them.

Introducing the magic phase of paradigm we fill in the 300-year gap between physical ideas of nominalists and Galileo's mechanics which is usually hard to explain. "If a book-printing was invented two centuries earlier, the impetus doctrine would have speeded up the general development of science history and wouldn't wait for so long to step from Jean Buridan to Galileo", Svassian suggests [11, p. 44].

But the book-printing by itself doesn't explain much. It explains the cultural influence of Renaissance. But Renaissance as it was aid above brought an incredible fashion on magic into the scientific world.

In rising queer superstitions one could always see a strange aberration. A zigzag in forward march of science, a spot in a good reputation of Renaissance. On my opinion, there is neither aberration nor zigzag, but a choice of language to write down the Other as well as methods to learn it. What seemed suitable was already occupied: language – by the art, method – by the magic. The latter as a way to learn the external world describes the idea of this paradigmatic phase. The accepted meaning of magic is an influence on the subject combined with a show of this influence. To separate the manipulative and art components of archaic pseudo-action is impossible. This "being together" arises from the "concept' of magic: to influence on something, you must have this something in front of you. A hair, a part of nail, a piece of clothes according to the principle *pars pro toto*

(when a part represents the total); a picture or a puppet according to the principle of similarity. Magic is invented by a body culture to get physically what is out of the contact. It can't be made without a prove of presence. As the art connotation isn't an end in itself and is included into an action, it can reach the sufficient level of elaboration and even autonomy being projected either on art description, or knowledge. In the first case there appear magic stories, in the second one – a set of secret tools, magic knowledge. Sometime "almost a science" but hidden. Art-mimetic connotation is drawn in this case towards magic concept, reality covered by Izida's veil. Even in archaic etymology this potential of secret art is hidden. For example the old Russian lexical group "obaviti", "obavlenie", "obavliati" has two fixed meanings: 1) conjure; 2)to make visible, to show, to announce [3, p. 8,12]. The meanings are neighboring, the words are formed by adding prefix "ob" in the meaning of special rapprochement.(the archaic meaning of "ob" – to go round) to the base "aviti" – to show. Under this archaic use of words the print of an action to get the object is seen ending up in a magic circle. This very action appear, shows the object. We can suppose that further in history – the more shows of different kind, and appearance has a magic color. The magician first makes the object of his influences appear. He forces it with several hand-actions. The object is called, caught and put to further pressure. If we stop the manipulation on the first phase, we get a possibility to learn the appeared object. Magic "obavlenie" of the object is done not for the research reasons of course. Nevertheless we should consider the inertia and self-sufficiency of technical moments in secret art as well as its growing speciality. If we follow the historical traces of magic up to Renaissance and Modern Ages, we will see the on object is called not to change it, but to learn it itself. Technical operation moved towards an objective. But first scientists found difficult to prove such non-interested attitude to this kind of manipulations. The whole magic phase of paradigm represents the basis of research side of magic. In Modern History the technical preparation and the experimental stage is firmly separated from the scientist's motives which can be very exotic. The "presentation" of an object follows the rules the most important of which are: public opinion, reproduction, checking, and performance. They lost the individuality but became commonly accepted. The object has to be

presented in the best way open to anyone who wants to check the researcher's results. In ancient magic this phase is covered and maximum hidden.

In magic the closeness is prior. That's why in Old Russian "announcement" the manipulation is underlined that lacks in the modern word. Old Russian "announcement" has lots of meanings: the appearance made by a person: announcement of comedies, performances: judicial prove. From this semantic bunch while being influenced by books we've got oral reading, announcement of a document as well as influenced by science – appearance as a present of something supported by the research.

Renaissance gives us a picture of movements from magic esoteric to exsoteric. Magic having come from cultural underground in Renaissance times starts to spread also by legal books and studies. In 15th century the universe is presented to educated people in secret books "Poymandre" according to Hermes Trismegist. In the beginning of the 17th century magic is understood as practical occupation and gives basis to the science under Bacon's motto: "knowledge is power". Experimental science is first called natural magic. Together with the methods of nature knowledge, it describes the ways of possessing the supernatural power of spirits.

The magic phase of European paradigm in Modern History is not equal to the magic in pre-history when secret studies are really universal and play the same role as science and engineering technology nowadays. In Middle Ages the recognized (paradigmatic) science is a commentary research from the Bible and antic works of Platon and Aristotle. Magic is seen as a cultural underground, solid power against official book-knowledge because there still exists an untouched level of popular myths and magic chthonic. The latter supports magicians, prophets, healers (persecutions to them s\in 15-16 centuries have an episodic character), as well as that fraction of scientific culture which doesn't go together with orthodox studies. The practitioners of black magic are supported by popular magic indirectly – they remain being book-readers, interpret the texts out of antic and Bible's canons. All magic practices: primitive, before written language and bookish, are similar having as a base the domination of physical and muscles power in domestic, pre-industrial production. Nevertheless they are culturally different from the main information technology – pre-printed written language. Popular magic didn't have any attention to the written language in the beginning, it stayed in the

frame of body culture. Practitioners of black magic are the marginal level between book-knowledge and manipulative practice of wizards, magicians and sorcerers. Alchemy and astrology are two hybrids that equal methods of direct influence with book and symbol interpretation. Renaissance gives a start of quick bookish transformation of magic. It is an era when printing houses and growing literacy push book knowledge into mass. Book education together with censorship (including inquisition that also burns unlicensed books and their authors) turn very fats the primitive, chthonic magic into a palliative of book culture. People cite versions from black magic books in front of the inquisitors. But scientific black magic books are also in the process of changes. From one side Renaissance increases the value of magic scientists. Demonologist, astrologist, alchemist, spelling doctor are fashionable and necessary professions of that time. Occult revolution of 15-16 centuries brings into public the magic canon – Hermes Trismegist's corpus. For some time being supported by Platon's fichinism he is being put by scientific elite on the same level as Aristotle's canon and with this he pushes out scholastic science. Nevertheless magic doesn't become a universal world base. On the contrary it is being defeated. Magic of 15-16 centuries is just a phase in paradigmatic knowledge development in Modern Ages where the main role is given to rational and empirical nature studies. Exoterism of Renaissance let the nature learning intuitions of late scholastic enter the ideology of changing the universe (which also has a magic color) and meet them with operations of experimental science.

Magic is rebuild by Renaissance together with anthropocentrism as magician is demiurge taking some prerogatives out of God. In Middle ages the above mentioned tendency was limited by Theo centrism. When a person tries to give the nature his orders, he first become Man-God, not researcher. This collision can be reflected to appear the categorical couple subject-object. Philosophical attitude becomes clear as the research activity changes significantly. And this is the science line. Middle aged science about immovable universe with immovable Earth and fixed hierarchy of main points made studies on movements the most inert and not up-to date part of arisotelism. The bright ideas of late nominalists shine inside the doctrine of stable forms firstly, due to directing a movement into the

category of quality essence, and secondly dew to rather practical calculations. The occult idea of Renaissance was turning movement into a magic force; it had nothing in common with theoretical mechanics. Nevertheless at that time an important process of separating pseudo magic and real magic started. This discussion doubtful from empirical point of view was of great importance as it described the axiological status of research studies. The rite magic is false, from devil. The real magic is natural. Real magic is the first name of experimental science. If a Man wants to reach God and creates beautiful objects, it is pleasing to God even if the man uses secret spelling and addresses spirits. He only has not to address unpleasing to God spirits and to serve evil. The frontiers between good and bad in magic are unstable. And the division of good and sinful things is very problematic while it is done under secret, in the shadow of secret practice and doesn't go out to public understanding. The discussion of secret studies, the move from esoterical, spelling magic to its esoterical public analyze is already a progress. Final uncharming of the universe will happen only with appearance of rational, accessible and completely explained science. Until now even real scientists prefer to be half in rational knowledge and half in the world of mysterious spirits.

to be continued…

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Discussion

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Ethnopsychophysiology. Perspectives of formation

The perspectives of human sciences systems isolation into a separate trend - ethnopsychophysiologies are debated. The timeliness and urgency of the study of psychophysiological peculiarities of people groups, bound by kinship and compactly dwelling under specific conditions in the same territory are determined by three reasons. Firstly, the presence of the hypothesis, needing proof, that the genotype and the national way of life of various ethnic groups define with its complex interaction a set of morphological, physiological and psychological attributes of the concrete person. Secondly, lack of common views about forming, development and preservation of health of the individual within the framework of separate ethnic groups. Thirdly, lack of convincing model conceptions on the mechanisms defining morphofunctional and psychophysiological originality of various ethnic groups.

Keywords: *psychophysiology, ethnos, individual, heredity, adaptation.*

Polyethnity and polyculture of the modern Russian society, intensifying migratory processes put forward a complex of theoretical and practical problems for political science, sociology, psychology and biology. Considering mankind as a unified system of interacting personalities, it is necessary to expect dominance of the integration processes defining mechanisms of this community maturing. At the same time integration should not be perceived unambiguously as a path of peculiarities blurring and forming of amorphous mass. Processes of systems maturing, passing the paths of affiliation, presuppose a specialization of components comprising them, development of particular peculiarities. In this case – the idealization

of interethnic interactions development is seen in affiliation of peoples on the basis of common economic and political problems while preserving their psychological and cultural originality, i.e. in a combination of internationalism and nationalism trends [8]. Substantial interethnic integration in the modern world is represented in the form of fusion, removal of language specific forms and cultural traditions deeply integrated in the natural conditions and people history, bound with national arts, traditions of children bringing up, etc. [20]. The attention is drawn e.g. on thorough workout of development of the concept of national Kalmyk school on the basis «ethnocultural connotation», i.e. on the basis of language signs development, the basic concepts lying at the heart of the national culture [21,22]. At the same time authors emphasize the importance of tolerance development in the sphere of interethnic relations, as the base of fruitful integration within the framework of the multi-national state. But, contradictions remain… reality or illusiveness of integration ideas, with preservation of specific ethnic properties. Despite of attractiveness of nations' integration concepts with ethnic originality preservation, in the recent years the real life is shaken by interethnic and interconfessional conflicts, various opposition forms development.

Undoubtedly the problem of correlation of integrating state factors and local peculiarities: historically stable people's way of life, their specific cultural and even psychic peculiarities is one of the most complicated. The years of irrational state policy and modern state building on the territory of the former USSR caused a number of serious problems, connected with loss of population's national identity. It should be noted, that the scale of national problems discussion is rather wide nowadays, but the dominance of the voluntaristic, simplified approaches based on, as a rule, on force methods is obvious. Is the natural scientific ground of the perspectives of integrating steps possible at all?

Probably, one of the most variegated and complex regions of Russia is its Southern region, more than 55 peoples and ethnic groups, more than 100 ethnic minorities, populating it, differ in languages, dialects, anthropological attribute, ethnogenesis, beliefs, culture, mentality, etc. [7,25]. U.M.Umaev emphasizes, that historical analysis allows to distinguish unique for Eurasia, despite of above mentioned

complexity and mixed character of the national structure, a centuries-old intrinsic tolerance of peoples of Caucasus [26]. Nevertheless, in opinion of N.V. Tuzova flourishing of such specific manifestations of antagonism as interclan, interkin, interteip hostility is characteristic for the region's modern history [25]. Apparently, the majority of social problems has its roots in nonabsolute political and economic solutions, in group and individual ambitions regarding the power and money.

The human personality is the major component of the social processes, and the person appears not only as an object of social transformations, but also as the active subject possessing a complex of individually - typological biological and mental attributes. The set expression «individually - typological properties», widely used in the psychological and physiological literature reflects dual character of the human personality, on the one hand its unique morphophysiological nature, as a function of genetic originality and concrete life experience. On the other hand, the personality of the person is largely typified regarding stable biological and basic psychophysiological properties including such widely debated concepts as type of temperament [23], mental archetype [28], ethnic constants [19], etc. In domestic psychology the term "personality" occupies one of the leading positions, but, however, with worked out approaches to its structure study, the modern views on the factors defining processes of its forming still have, to a great extent social and economic, politicized character [2]. At best the question is the ethnocultural effects showing, in particular, in the character of psychopathologic symptomatology [12]. But, at the same time nowadays human being having not only universal specific properties, but also conscious, and spiritual peculiarities related to population, including ethnic and patrimonial properties is apparent enough.

The modern psychophysiology emphasizes, that physical part in the human being, synonymous to the hereditable, is, above all, neurodynamic properties of his central nervous system defining peculiarities of knowledge processes and temperamental attributes. Heredity signs of central nervous system properties have been studied to the fullest extent within the framework of domestic differential psychophysiology, first of all, using the parameters of integral bioelectric brain activity [9,24]. The considerable amount of studies is dedicated to detection of the cogitative activity style forms stipulated,

in particular, by patterns of the functional interhemispheric brain asymmetry [6,17]. Problems connected with genetics of specific behavior forms are widely debated. Fundamentality of these works is vindicated by the considerable number of publications, both domestic, and foreign, enveloping phenomena of animal behavior [16] and human intellectual abilities [10]. Despite of an urgency of similar studies and scientific interest to the problems, the fact of the works in the field itself causes today a whole set of ethical and legal problems and still is extremely scrupulous in respect to the social and political relations (Borisov, 2003).

The modern domestic psychology following L.S. Vygotskiy [27] and A.N. Leontiev [18] widely educes the central thesis of Russian cultural - historical school about the fact, that the structure and development of human mental processes are generated by historically evolving practical activity, and known domestic geneticist N.P. Dubinin (1983), working with material factors of the living, wrote about formation of personality features as mankind history function, which defines science, morality, and culture. Nevertheless, in the sixties of the past century L.S. Vygotsky emphasized the complex interaction of influencing on the child’s psychics forming "natural" factors, and not just "cultural" and "social" ones [27]. The apparent dualism of the situation, which remains until now could be seen in these two opinions.

Some authors adhere to the point of view, that basic properties of the human personality, alongside with peculiarities of his biological properties, are defined in a broad sense by ecological factors. Ecological factors participate in forming of antropobiogeocenose as an aggregate of biological properties and demographic characteristics, defining adaptive possibilities of the human population [14]. Researchers from the academician T.I. Alekseeva [1] group come to similar conclusions, who have been researching ecology and an ethnogenesis of the population of the Central - Asian and Northeast regions of Eurasia for a number of years. L.N. Gumilev states, that ethnogenesis processes are defined by three major factors: history, geoclimatic factors, genetics [11]. The author emphasizes, that ethnos, being the dynamic formation with unique internal structure and original stereotyped behavior, cannot be simplified to sociological, biological, or a geographical phenomenon. Despite of the depth of

author's understanding of ethnos forming roots one can't to a full extent agree, that he removes from the context of ethnos analysis such basic from our point of view parameters as genotype and psychotype, and brings some humanistic construction – "cultural traditions" on the foreground. And moreover, analyzing the significance of forces affecting ethnos forming, the author very softly leads to conclusion, that natural forces (biological, geoclimatic, etc.) is not much of a factor, but only a background of ethnic modifications.

Group peculiarities of people extend and on such biosocial category as well, as health (health of the population, society, human health). Health of the population is defined as the resultant of the process of sociohistorical development of biological and psychosocial life activity of the population in a generations' row and under certain conditions. Quality of the population health is directly connected to its capability to efficiently adapt to habitation conditions (geoclimatic, biocenotic, political), forming behavior stereotypes and psychic attributes, the ways of overcoming a limited circle a stress factors, forming an optimal way of life. A.B. Kogan emphasized the importance of the ecological approach for working out certain problems of hygiene and medicine, availability of development of such trend as "health geography" [15].

The modern ethnopsychology rely on conceptions about the constancy of ethnic culture as an aggregate of the optimal behavioral models which are largely formed in the process of ethnos adaptogenesis [19]. Apparently, that in the given context the question is not only about stable behavioral forms, language and art originality, but also definite biological constants defining an originality of neurodynamic properties of the central nervous system, cognitive personality peculiarities, feeding behavior, etc.

Achievements of the modern psychophysiology allow to state, that "national character" has the objective features defined not only by sociocultural factors. The sufficient amount of the data has been accumulated, allowing to speak of specific peculiarities of morphology, physiology, psychics of group of people (ethnos, ethnic group), dwelling self-contained enough under certain specific ecological conditions, including, within the framework of certain sociocultural stereotypes.

Thus, generated social inquiry on the one hand and the essential amount of theoretical buildups and empirical data in respect of the human nervous system basic properties heritability and archetypic behavioral forms define the necessity of forming of a new scientific trend of human knowledge - *"ethnopsychophysiology"*. Psychophysiological approaches are actual in various areas: from fundamental speculations about dualism of the mind and body to practical problems of health securing and fighting against functional distresses and diseases, to solution of problems of preservation and development of national culture crumbs, solution of problems of sociopolitical relations. Nowadays there are no studies uncovering individually - typological properties of the personality as an ingredient of a definite ethnic group. Practically there is a lack of the works to include of neurophysiological mechanisms analysis, defining human mental peculiarities as the representative of the certain ethnos. The basic and perspective direction of ethnopsychophysiology development is the study of specific peculiarities of the age periodization and a determination of the proximate development zones in the forming of children physiology and psychics. It is impossible to find a school In Russia with mononational composition of pupils, but, nevertheless, all of them study under the unified curriculum by virtue of what children of various ethnic groups appear isolated from their culture [3,21,22]. a The psychophysiological originality of representatives of different ethnoses, for example, figurativeness or analyticity of initial thought processes, as a rule, is not taken into account in educational process.

The wide spectrum of means of the modern anthropology, physiology, psychology, and psychophysiology is considered as the methodical arsenal of ethnopsychophysiology. Carrying out of description of the originality peculiarities of forming and functioning of organism basic systems is relevant: central nervous, cardiovascular, respiratory; the highest nervous activity (somatotype, systems typological properties, profile of functional interhemispheric asymmetry of a brain, personality structure and psychological properties).

In particular, the relevancy of carrying out of similar studies is defined by several principal reasons.

Firstly, by the presence of the hypothesis needing confirmation, that the genotype and a national way of life of the various ethnic groups residing, for example, on the territory of the Southern Federal District, Russian Federation, define at their complex interaction a peculiar set of morphological, physiological and psychological properties of the concrete person, specificity of ontogenesis age dynamics.

Secondly, by lack of common conceptions on forming, development and preservation of health of the individual within the framework of the isolated ethnic groups, residing for a long time under concrete ecological conditions and experiencing the effect of the typical limiting factors. Development of this trend is based on theoretical conceptions about flexible, not absolute character of the "human health" category. Qualitative and quantitative health parameters depend on stable hereditary factors, psychophysiological peculiarities of the individual, from ontogenesis stage, from specificity of relevant and a social role which he plays.

Thirdly, by absence of convincing model conceptions on the mechanisms defining morphofunctional and a psychophysiological originality of various ethnic groups of the Southern Federal District, Russian Federation, that essentially affects organization of adequate measures of health management, and work out of the "regional component" of the educational establishments curricula.

There are all reasons to hope, that long-time, laborious work within the framework of ethnopsychophysiology will bring positive results for organization of reasonable political, economic, pedagogical activity, directed at interethnic integration.

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Critique and Bibliography

Dikaya L.A.

Review on the book Bogoyavlenskaya D.B, Bogoyavlenskaya M.E. "Psychology of talent: notion, types, problems" (Issue 1. M.: MIOO, 2005.176 p.)

Studing psychology of talent is one of the prioritative trend in modern psycological science. Development of the society depends on people, who own high level of abilities and creative thinking. Today, the problem of progress talented children founds in modern notions about natural development of talent and eleborate psycological methods to help talented children. Many of indecisive problems in determing the phenomena of talent, its diagnosis, psycological participation of development talented children, psycological correction ect. Talent is mystery for most children, teachers and parents.

The most important problems for public at large are scientific foundtions of talent, it's real examples, diagnostic methods, progress and social realization. There are some ways to diagnose such children, eleborate programmes to help them in the realization their abilities. There is a problem diagnose and develop talented children.

The most popular questions of discussion for psycologists, pedagogs, scientists in the modern psychological thinking of talent's phenomena is questions of talent's notion, it's types and problems of talented children.

The issue of such problems have written by Bogoyavlenskaya D.B. and Bogoyavlenskaya M.E. in their book "Psychology of talent: notion, types, problems" published in 2005.

There many issues of this authors for last years of their science activity. First is "Inttelectual activity is a creative problem" have written by Bogoyavlenskaya D.B. (Rostov-on-Don, Publishing House of Rostov State University, 1983); second is educational textbook for university's students "Psychology of creative abilities" have written

by Bogoyavlenskaya D.B. (M.: Publishing House “Academy”, 2002) and other books; third are science articles from journal “Talented child” (2003 – 2005); fourth are separate articles from the second international conference named “Practical conception of talent for practical education” (Moscow, 29-31 of March 2004). For netherist in this book are materials of “Practical conception of talent” (1998, 2003), which is a reference book for Russian pedagogs and practical pstchologists about ten years. The materials of this issue are same as classical music in modern view.

The book consists of three chapters. The first and second chapters tells about some psychological points of phenomena of talent and pays rearder’s attention on it’s nature, theoretical author’s points of notion of talent, it’s diagnostic methods. The third chapter includes analysis of problems of talented children, description and illustration, necessity of practical psychological work with them. Especially for this issue, the book is very intactive for it’s contects and composition.

The scientific basis of notion of talent gives an account of the first chapter. The analysis of talent’s development is the whole reason in the composition, which scientists include to this notion.

Founding in definition of talent, it’s signs, which include in “Practical conception of talent” authors underline systematic method in understanding talent.

There are many important aspects of notion of talent such as: undevelopment of talented children’s arbitrary, necessity in self-actualization and it’s satisfaction with “progressive discomfort’s” method (V.S. Urkevitch); phenomena of “fear before creativity” (U.D. Babaeva).

Classification of talent looks like text in “Practical conception of talent” and readers have written it yet. “Creative talent” is absent as type of talent because authors consider that “talent” and “creative talent” are synonyms.

The second chapter tells about comparison of theoretic foundations and diagnostic methods of talent in foreign and Russian psychology.

There is author’s understanding of contects, which confirms creativeness. Author underlines no validity of creative tests, which contents of creativity is not coincide to meaning of creativity in Russian psychology.

After description of two types of motives belong to cognition – extrinsic and intrinsic, there is a two-phases model of activity. The first is a syperficial phase. It is an activity, which decides concrete tasks. The second is a deep phase. It is an activity, which reveals latent regularities. “Style and method owns new activity in the experiment, time and dynamics follow to second phase, giving detail analysis the whole process, it’s operational and motivic structure” (p. 73). Method called “creative field”, named by Bogoyavlenskaya D.B., which uses for thirty-five years and what reveals subject ability to develop activity in the phase of regularities (second phase) and it is follow to learning process side of cognition in the second chapter.

Unfortunately, method “creative field” is not vailable for using psychologists. They look forward special systematic textbook, which reveals creation of new product. Of course, method is very difficult to use. If you will own it, you should study specially. Follow it, validity of the method “creative field” have proved. The wide circle of psychologists should use this method in practical activity.

Analysis of talented children’s problems in their behavior, communication and education is in the third chapter. This chapter is one of the issues in modern Russian psychology, where analyses problems of talented children in the scientific point of view. Authors underline special problems of talented people, such as: difficulties in the social and psychological adaptation, emotional unsteady, perfectionism and low self-assessment, ect.

For optimal way of practical child’s need, authors consider that psychologists should determined: Are there special problems of talented child or not? If it is special problem of talented child, so it’s direct characteristics of talent. If it is no special problems of talented child, so it’s extrinsic mechanisms and it is no attitude to talent.

Authors take part in a science discussion and discuss ideas of Kudrayvzchev V.T, Babaeva U.D, Urkevitch V.S. about special and common abilities of talented children. Authors said: “Problems of talented children is not always resulted in their high abilities, but problem of growing his personality” (p. 94).

Creators of the book pay reader’s attention on the fact that disharmonic way of development don’t characterize all talented children. Talented children, who develop in harmonic way, must have problems in the education, behavior, communication; “but this

problems are not firm disabilities and aren't influence in development of abilities and interests" (p. 158).

Reasons of founding problems in behavior, communication and education talented children may be extrinsic, such as: disabilities of ontogenetic development, functional immature in development of high psychological functions, unadequatable going to aged stages, unforming of cognitive motivation; or intrinsic, such as: unadequatable educational environment, disabilities of child-parent relationships, parents' explotation of child's achievements, ect.

Results of empirical issue, which tells about reasons of disabilities in behavior and education talented children are very mostly interested for scientists in the third chapter of this book. There are three experimental groups of talented children: children under school, junior schoolchildren and senior schoolchildren. Authors use neuropsychological (system of Luriya A.R. in the modification by Semernichzkaya E.G.) and general psychological methods ("creative field"). Follow it, authors reveal structure of talent and "factors of blocking it's grow process".

This topic is accessible for analysis of wide reader's audience thanks to examples of talented children. Description of children life's stories tells about interests of fate, love and care about theirs, despite this question: safe they our talent or not?

Beside diagnostic stage, which characterizes common problems, revealing talented children, there is a correct stage. "Many parents refuse from correct need because they afraid of disappearing high abilities of their children"(p. 129). as a result: "If it is a real talent, the correction is used for this. Correction of difficulties create conditions of stability and development of talent" (p. 162). Especially for this book, this issue have written by competent scientist and professional specialist.

Application "Revealing talented children" is good need for teacher in his observation from child's activity at lessons. This application is in the supplement to this book. Peculiarity of the "Psychology of talent: notion, types, problems" is discussion with foreign (J. Gilford, P. Torrens, Aisenk and others) and Russian (Urkevitch V.S, Babaeva V.D, Druzhinin V.N, Dorfman Ya.L, Kudryavchzev V.T.) best scientists of talent and creativity. Bogoyavlenskaya D.B and Bogoyavlenskaya M.E. create own

scientific point of view about theoretic and practical questions of creativity and talent. Readers may compain own possession for this questions. The truth born in the argument!

The book have written easy scientific language and have systematic structure.

Edition (3000 copies) of course, is small for many scientists, working with talented children. There is creating good social conditions for development of child's talent. There are many special and professional schools, and also separate educational centers for universities, city's and state's centers for talent children. As a result, there are many and many specialists, who work in this institutions.

It is one of the theoretic and emperic book about problems of talent for many scientists, teachers and students.

"Psychology of talent: notion, types, problems" have written by Bogoyavlenskaya D.B. and Bogoyavlenskaya M.E. is for practical psychologists. K. Levin said: "No nothing practical than good theory".

Russian Psychological Organization
Yaroslavskiy State University named P.G. Demidov
Ministry of Education and Science RF, RGNF
Administration of Yaroslavskiy region
International Academy of Psychological Science
organize 12-14 of October 2006 in Yaroslavl
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Main problems of conference are progressive experience of scientific schools in solving applied psychological problems in the main spheres of professional activity and social practice, and rising of professional competence practical psychologists.

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– Organizing psychology and management
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– Problems of perfection system in psychological education

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– Systematization professional and educational activity
– Psychology of general and professional abilities: theoretic and applied aspects. Circle's table dedicated the memory of V.N. Druzhinin
– Cognitive psychology: from theory to practice
– Psychology of professional's practical thinking

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– traditions of St. Petersburg's psychological school and it's experience in modern psychological discuss;

– prioritative trends of St. Petersburg's psychological school;

– the succession ideas by V.M. Behterev, A.F. Lazurskiy, V.N. Myasischev and B.G. Ananev and it's influences on the psychology of development and differenciated psychology, medical and special psychology, social adaptation and psychological correction of personality, behavior's anomalies, pedagogical psychology, professional activity and management for staff, personal and professional development, social and political psychology;

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– Business and professional communication
– Actual psychological problems of communication in the management, politics, business and advertisement
– Communication in the system of Mass Media
– Communication in religious and informal organizations
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– Difficulties of communication, it's psychological nature and ways of correction
– Neuropsychological mechanisms of normal and no normal communication
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