

## SUMMARY OF THE ISSUE

### *Theoretical and Empirical Research*

#### **B.G. Rebzuev. Elaboration of the Construct of Work Behavior and Development of Extra-role Work Behavior Scale**

The aim of the article was to elaborate on a broad construct of work behavior and to develop an instrument to measure one of its three types – extra-role behavior. Final 12-item scale covered three dimensions of extra-role actions. They are: perfection of performance, overtime performance and helping one's colleagues. In addition a 4-item scale of work efficiency was developed to measure dimensions of quality of work and productivity of work. Reliability coefficients of scales were 0.84 and 0.76 respectively. Confirmatory factor analysis showed satisfactory fit of both scales factor structures to empirical data. Construct validation demonstrated that both scales had acceptable construct validity. The possibilities of both scales to be used in future empirical studies are being discussed.

*Key words:* work behavior, role behavior, extra-role behavior, anti-role behavior, roles expectations

### *Special Theme of the Issue. Centenary of E.I. Boyko*

#### **A.N. Zhdan. Scientific Psychological Schools in Russia: E.I. Boyko's School**

The article outlines the main directions of research of higher cognitive functions and their psychophysiological mechanisms in the framework of E.I. Boyko's scientific school. The fact that the achievements of the school are

not widely covered in our science is emphasized. The conclusion is drawn that it is necessary to master this school's studies more actively.

*Key words:* E.I. Boyko, scientific school, cognitive psychology, method of testing stimulus

#### **N.I. Chuprikova. Studies of Physiological Mechanisms of Conscious Verbal-Semantic Executive Functions in the Framework of E.I. Boyko's School and Modern Psychophysiology of Consciousness**

The results of E.I. Boyko's school's studies devoted to psychophysiological mechanisms of human verbal-semantic executive functions are examined from the standpoint of modern notions of psychophysiology of consciousness and central executive processes. Original psychophysiological method of testing stimulus is described. It allows to operationalize I.P. Pavlov's metaphor of presence of the «light spots of consciousness» in a working brain. It is shown that in the process of conscious goal-directed activity focuses of locally increased selective excitation do really appear in human's cerebral cortex. They are created as a result of synthesis and integration of two flows of excitation. The first one is from the active irritants and the second one is from executive influences of second signal system. It is shown that «light spots of consciousness» are often accompanied by «dark spots» in the form of cortical areas of locally decreased excitation. These areas appear in projections of irritants irrelevant to the goal-directed activity. It is shown that method of testing stimulus allows to measure

intensity of «light and dark spots of consciousness» and to follow its formation in the duration of time.

*Key words:* central executive processes, prior instructions, consciousness, method of testing stimulus, «light spots of consciousness», «dark spots of consciousness», cortical focuses of locally increased and decreased excitation.

#### **T.N. Ushakova. On the Mechanisms of Human Verbal Processes**

The directions of research outlined in E.I. Boyko's works and elaborated by a group of his followers under the scientific supervision of T.N. Ushakova are described. The article discusses the materials of verbal mechanisms research; which are studied not just with the method of testing stimulus (measurement of voluntary motor reaction) but also with non-voluntary reactions, EEG in the first place; functioning of principle of dynamic temporary ties in human verbal activity.

*Key words:* mechanisms of verbal activity, electrophysiological research of speech, model of choice of a word from lexicon

#### **N.N. Danilova. Noninvasive Reflection of Local Neural Networks Activity in a Human from the Data of Multi-channel EEG Registration**

A new experimental approach towards the study of structure and dynamic of cognitive processes based on the pacemaker hypothesis about the origin of high-frequency rates of EEG is proposed. To test the hypothesis a new method of micro-structure analysis of brain oscillatory activity has been elaborated. It includes narrow-band frequency filtering of event-related potentials (ERP), calculation of equivalent

current dipoles from the data of multi-channel EEG and their superposition on the structural tomographic magnetic resonance slice of an individual's brain. A new electroencephalographic index of local neural networks activity as frequency selective gamma- or beta-generators characterized by high discreteness of their activity in time and space and imaging pacemaker neurons activity in local networks has been revealed. Frequency selective generators integrate local neural networks into systems due to synchronization of their activity on a common frequency. It happens in case of its phase binding to stimulus and also as a result of periodically appearing bursts of joint activity of many generators working on different frequencies. Maps of spatial localization of equivalent dipole sources of activated frequency selective generators reveal types of interaction of focuses of activity and their changing in the duration of time. When localized dipoles of frequency-selective generators are projected on anatomic magnetic resonance tomograms of individual brain, accuracy of mapping of activated brain areas is increased. Micro-structural analysis of brain oscillatory activity compensates disadvantages of tomographic methods connected with their low time resolution. Efficiency of the suggested approach in revealing local neural networks activity in human brain is viewed within the framework of research direction earlier established in E.I. Boyko's neurodynamic theory.

*Key words:* frequency selective generator, synchronization of oscillations, equivalent dipole, pacemaker neuron, local neural network, structural magnetic resonance tomography

### *Work in Progress*

#### **T.N. Berezina. On the Existence of «Smell of Fear»**

The article analyses phenomenon of «smell of fear», data on toribons (pheromones of anxiety) secretion in insects and rats is provided. The studies which prove the existence of similar substances in frightened people vapor are described. Associative experiments data is cited: for majority of people fear is associated with a sour smell. The article describes an experiment conducted on dogs who were exposed to acetic acid smell with a rose smell as a control. Analysis of variance shows statistically significant increase of animals' behavioral reactions of fear under the influence of acetic acid smell. An interpretation of these findings is given in the framework of multimodal theories of emotions. It is suggested that evoking of fear reactions by sour smell is realized on the lower instinctive level, whereas higher level of emotion generation depends on learning and on individual experience of an animal.

*Key words:* smells, emotions, pheromones of anxiety, smell of fear, fear

#### **T.N. Kotova, A.D. Preobrazhenskaya. Role of Grown up's Intention in the Effect of Excessive Imitation**

The article examines a suggestion about a mechanism of the effect of excessive imitation. The essence of the effect is that when facing a new object demonstrated by a grown up children tend to imitate ineffective way of grown up's behavior, whereas control group of children of the same age which faces an object without grown up's mediation almost always find an effective way of using it accurately. Traditional points of view on the mechanism of this effect are

shared by adherents of social explanation (grown up's authority, stereotypes of situation) and by adherents of causal explanation (deformation of representation of causal structure of an object). The experiment held by the authors shows that the effect of excessive imitation to a large extent depends on intentions of a grown up whose actions are observed by a child. It means that deformation of causal structure has its reason, and this reason is, apparently, social by its nature, although not superficially, verbally social.

*Key words:* effect of excessive imitation, thinking in preschool age, intention recognition

#### **V.Yu. Stepanov. Reading Strategy as a Means of Attention Maintenance during Perceptual Task Solving**

The article presents a study of top-down influences on attention dynamics in conditions of brief successive exposure of visual stimuli (BSEVS, 10 st/sec). In the task of recognition of two target stimuli in the flow of BSEVS, recognition of the second target stimulus (T2) is deteriorated if it is exposed in the interval of 180-450 msec after the first target stimulus (T1). This temporary deterioration is called attentional blink (AB) (Raymond et al., 1992). If a sequence of stimulus constitutes a word, AB disappears. This advantage may be referred to a class of effects of word superiority (EWS) (Falkman, 2001). We have tested the hypotheses that mechanisms of EWS are strategy of reading and/or familiarity with a word. The results speak in favor of strategy of reading but leave a possibility of additional mechanisms.

*Key words:* attention, perceptual task, strategy, attentional blink, effect of word superiority