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The Theoretical Analysis of the Phenomenon of Anticipation in Psychology

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At the modern stage one of the urgent tasks of development of psychology and pedagogy is the study of the basic directions, trends and developmental priorities of research of the specifics of psychological indicators of anticipation of people with whose mental development corresponds to age norms and persons with intellectual and mental disabilities. The aim of the article is to study the features of anticipational activity in conditions of normal mental development and its disorders. The leading approach to the study of this issue are the provisions of system-functional approach of anticipation as a phenomenon that permeates all levels of psychic reflection of reality and having a multi-level structure. All the analysis of studies on the anticipation shows that the problem of anticipation in conditions of disontogenesis, in different conditions of age-specific activities, in the structure of latent deviance remains understudied. Anticipation in preschool and school age in the conditions of a scarce type of mental dysontogenesis is not enough studied both theoretically and experimentally, although the magnitude of the problem is clearly understood. The practical importance of the undertaken theoretical research is that the described disorders of the forecasting process can be considered as a differential diagnostic criterion for assessing the risk of further violations of socialization and development.

Keywords: anticipation, probabilistic forecasting, anticipatory ability, theoretical review

INTRODUCTION

The revealing of anticipation mechanisms formation is important for the solution of applied issues connected with various branches of psychology.

Anticipation is an ability (in the broadest sense) to work and make these or those decisions with a certain temporarily – spatial anticipation on the expected (future) events (Lomov, 1980). Our understanding of anticipation as an immanent property of mental reflection process includes not only effects of temporary and spatial anticipation of events, but selectivity of environmental impacts, orientation of activity, and behavior as well (Abitov, 2013, 2015; Akhmetzyanova, 2013, 2014; Low et al., 2014; Mills et al., 2014; Minullina, 2014; Ran et al., 2014; Solobutina, 2012; Shvetsova, 2014; Vlasova , 2012; Kalimullin, 2014).

Upon the consideration of the adaptive character of probabilistic forecasting mechanisms, V. D. Mendelevitch's (2011) anticipatory concept of neurozogenesis is

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singled out. It runs about the so-called "potential neurotic" whose premorbid features are characterized by inability to anticipate the course of events and own behavior in frustrating situations, or, in other words, anticipatory inability. According to this concept, the personality inclined to neurotic frustration excludes undesirable events and acts from their anticipatory activity and always includes only desirable ones. Neurozogenesis is represented by the author of this concept as the result of anticipatory inability (Abitov, 2013, 2015; Vasilevskaya & Mendelevich, 2014; Frolova, Mendelevich & Solobutina, 2011; Mendelevitch & Bakhtiyarov, 2014).

The analysis of views on anticipation development in compliance with the increase of age showed that the process of maturing and anticipation consolidation in ontogenesis is carried out according to all laws of mental maturing, and at an adequate development the mechanisms of anticipation are formed, according to G.K. Ushakov (1996), by the age of 11-13 years. In particular, due to the author, it is possible to assume that one of the circumstances that negatively influences anticipation mechanisms is incorrect family upbringing (e.g. hyper guardianship) as it interferes with the processes of child's necessary skills development – psychological resistance, ability to anticipate these or those events.

The conducted analysis of anticipation phenomenon proves that the latter permeates all forms and levels of mental reflection of reality, has an adaptive – maladaptive character, and in case of intellectual or mental inability the anticipatory inability is observed.

Methodological framework

The methodological basis of the study was:

- points of system-functional approach of anticipation as a phenomenon that permeates all levels of psychic reflection of reality and have a multi-level structure laid down in the works of P. K. Anokhin (1975); N. A. Bernstein (1991); B. F. Lomov, E. N. Surkov (1980).
- basic points of cultural-historical theory of mental ontogenesis by L.S. Vygotsky (2005).

RESULTS

Analysis of the problem of anticipation and probabilistic forecasting

The issue of anticipation is indispensable to all range of problems of psychological science. When any phenomenon, any process, any mechanism of person's behavior is being studied, the issue of anticipation, advancing, forecasting, forestalling, expectation is inevitably raised. These terms are used by different researchers to define one and the same mental phenomenon, the same process (Anokhin, 1975; Bernstein, 1991; Brushlinsky, 1978; Mendelevitch, 2011; Neisser, 1981; Sergienko, 1997; Feigenberg, 1896; Akhmetzyanova, 2013, 2014, 2015; Artemyeva, 2015).

Due to the works of domestic psychologists (Bernstein, 1991; Brushlinsky, 1978; Lomov, 1980; Sergienko, 1997; Feigenberg, 1986), the issue of probabilistic forecasting and anticipation began to be actively elaborated during the last few decades.

Anticipation translated from Latin means "to see forward". According to B. F. Lomov (1980) definition "anticipation is an ability (in the broadest sense) to work and make these or those decisions with a certain temporarily – spatial anticipation of expected, future events" (Lomov, 1980).

E. A. Sergienko understands anticipation as "the universal mechanism of person's mental organization that includes selectivity and anticipation of events at interaction with the environment" (Sergienko, 1997).

Anticipation should be considered as a specific cognitive-regulatory process the basis of which is integral mechanisms of brain work. The range of anticipatory processes "resolution ability", their efficiency according to these or those criteria is always based on the analysis and synthesis of previous experience, continuous correlation with current events, and what is especially important, on a selective information extraction from memory. In this regard the most essential characteristic of anticipation as a process should be its advancing – time effect and maximum elimination of uncertainty in the course of decision-making. In other words, anticipation is not only spatial-temporary advancing, but this or that degree of completeness and accuracy of prediction (Lomov, 1980). The anticipatory effect is the result of the maximum increase of "the determined part" in decision-making act and continuous specification of "probable part of prediction". Hence, probabilistic forecasting which, in particular, is based mostly on the frequency of event occurrence is only one of the parts of anticipation process.

Past, present, and future events are connected together in the concept "anticipation". In this sense the psychological phenomenon of anticipation has a universal value for all forms of human activity.

There are no situations in human's activity where anticipation would not play an essential role. It is possible to tell that anticipation as a psychological phenomenon in its various forms has a universal value for all aspects of person's activity. Its universality is connected with the fact that it is typical for a human to reflect the present, to preserve the past, and to master actively the future prospect as well. Already at the beginning of any activity the person has a mental model (in the form of conscious or unconscious representation) of these or those results. It is expressed in a baby's shout demanding food, and in planning of actions for a day, and the prospect, and in ingenious predictions of the future. In this regard the anticipation may refer and extend to different parts of subject's activity that may equally concern both future changes of person's surrounding situation, and changes of their social position, various standards of behavior, self-checking and control of their actions and actions of other people.

The following elements are singled out in the psychological structure of activity: the goal, result, and process (Sergienko, 1997).

Thereby the goal of activity may be presented as analog of the future, the result is the analogue of the past, and the process is a link between the past and future by means of its actual realization in the present. Without having results of activity in the past, it is impossible to present the process of the goal realization in the present. The process when the past and the future are correlated does not mean a simple choice of already available ways to achieve the goal. In activity there is always a creative element of the goal achievement.

Among psychological processes connected with the prediction of the future there are three processes – probabilistic forecasting aimed to create an impartial mathematical model of the future; expectation - emotionally coloured and motivationally supported idea of the future with the attraction of characteristics "desired – undesired"; and anticipation that implies an activity aspect besides all abovementioned ones.

The term "anticipation" itself as a consistent psychological category was introduced by W. Wundt (2002). According to his understanding the possibility of anticipation arises due to the synthesis of mental elementary elements, when this synthesis is impacted by "creative derivatives" W. Wundt (2002). The phenomenon of anticipation was considered under various points of view and received different names: "anticipation" (Wundt, 2002), "the model of required future" (Bernstein,

1991), "an acceptor of action results, advancing reflection" (Anokhin, 1975), "probabilistic forecasting" (Feigenberg, 1986).

In the 50-60s of the last century there appeared new approaches in psychology, such as information, ecological, cognitive, system within which there was introduced the category of the future defined by the following terms: "apperception", "anticipation", "advancing", "prediction", "forecasting", "planning". The goal-setting, expediency also took the leading place in theoretical views as scientific concepts. E. Tolmen (1993) was one of the first who introduced the concepts "orientations" and "purposes" of behavior into psychology. So, expectation includes both the knowledge of signal and signaling processes sequences, and the reactions (movements) necessary for the goal achievement (i.e. knowledge of those forms of behavior which matter in the specific situation) (Sergienko, 1997).

In the description of subjective reflection there appeared a triad: the past, the present, and the future. It was promoted by the development of autoregulation theory in which cybernetics saw the basis of the goal organization for mechanical and biological systems as well. These systems are characterized by the fact that their operations are directed to a definite goal, a planned result.

I. P. Pavlov (1986) introduced the term "precautionary activity" as signaling (or advancing) about forthcoming events of the outside world. This feature of a conditioned reflex is the most decisive biological factor. Just because animals upon the signal have the opportunity to prepare for the forthcoming consistently developing events, the progressive evolution is possible. The opening of the future factor in physiology was I. P. Pavlov's (1986) great achievement.

B. G. Ananyev (2008) emphasized the variety of anticipatory mechanisms. It is anticipation that provides the formation and programming of behavior and activity; it joins the processes of decision-making, current control, and communicative acts since any act of person's communication with other people (from the most elementary to the most difficult forms of the joint activity arrangement) inevitably includes anticipatory processes. He emphasized that in the course of engineering and culture historical development person's cognitive and regulatory new formations are constantly evolving in different directions. It especially refers to a cognitive component of anticipation. In the researches of human's sensory organization conducted by B. G. Ananyev (2008) and his co-workers, it was revealed that anticipation plays the role of some "link" that provides transitions from sensation to perception, from perception to view, and from view to thinking.

The major stage in "anticipation" concept development was animals and humans' behavior research.

The further development of precautionary activity value for the evolution belongs to P. K. Anokhin (1975), his theory of functional systems. The whole history of animals' world development is a vivid example of this universal and most ancient regularity improvement which might be called the advancing reflection of reality (Anokhin, 1975). The conditioned reflex of higher animals as precautionary activity is only a special case of the advancing reflection of reality, i.e. adaptation to future, not yet accomplished events. Investigating the evolution of all living things, P. K. Anokhin (1975) came to the conclusion that "the universal principle of adaptation of all living forms to the conditions of the surrounding world is the advancing reflection of consistently and repeatedly developing events of the outside world, the "precautionary" adaptation to the forthcoming changes of external conditions or, in a broad sense, the formation of preparatory changes for future events" (Anokhin, 1975).

Thus, P. K. Anokhin (1975) defines anticipation as the forestalling of action results which is the brain general function the aim of which is to warn any mistakes, i.e. implementation of actions that do not meet the goal; he singles out the advancing reflection as a general property of live forms. The advancing reflection that arose

during the evolution is developing, becoming complicated, giving rise to more and more perfect forms of organisms' adaptation to the changing world.

Almost the same ideas about anticipation were announced by N. A. Bernstein (1991) when he studied the construction of movement. The author considered active behavior as the process of solving a certain task by the organism; the task acts as the "model of the required future". The task of the action "acts as something that has to become but is not present yet. Thus the task of the action is the reflection coded in this or that way in the brain or a model of the required future" (Bernstein, 1991).

N.A. Bernstein (1991) paid special attention to the role of the brain programming apparatus. Thanks to this apparatus the model of what is happening at the present moment and is to happen is built. He called this peculiar activity of brain "peeping" forward, or "extrapolation of the future", "anticipation".

In the late 70s of the last century U. Neisser (1981) formulated the idea about the universal principle of anticipation in cognitive psychology; it became the cornerstone of organism and environment interaction. U. Neisser (1981) singled out anticipatory, advancing schemes as the basic concept in cognitive activity of the individual. The scheme, action and object are included in a uniform continuous perceptual cycle of human's interaction with the outside world. Advancing schemes are included in any perceptual cycle. To obtain information the subject should actively investigate the surrounding world, but this research activity goes along the same advancing schemes which are kind of the plans of action and simultaneously the readiness to select parameters of the environment. As a result of schemes interaction with the available environment the received information modifies the initial anticipating scheme. The changed scheme directs its further search and is ready to obtain additional information. The schemes that provide the reception of information, direct its further search are not modal: visual, acoustical, tactile. They have generalized perceptual character and integrate all information U. Neisser's (1981).

U. Neisser's (1981) concept as well as P. K. Anokhin's (1975) theory considers anticipation as a universal property in the cycle of organism's interaction with the environment.

Then B. F. Lomov (1980) developed the issue concerning the place of anticipation in human's activity; they regularized data about anticipation processes on the basis of multilevel structure of these processes. As the authors specify, the concept of anticipation as an integral property of mentality, carries out three important functions in the course of the world's reflection. The first function assumes that anticipation is forestalling, foreseeing, and expectation of certain events. The cognitive function of mental reflection is revealed in this. The second function is a regulatory aspect of anticipation; it is exposed in the readiness for events, their advancing in behavior, actions planning. And the third aspect of anticipation is any communication, interaction between people, readiness to obey social norms, ability to immediate recognition of other people's emotional states; all this is the manifestation of communicative function of mental reflection in anticipation. Cognitive, regulatory and communicative functions of anticipation are indispensible, united in any act of human's behavior. The level of anticipation development testifies to the level of mental development in general (Lomov, 1980).

On the basis of task typology that defines these or those specific actions, and criteria which the person applies at their decision, B.F. Lomov (1980) singled out some levels of anticipation according to its complexity: 1) subsensor, 2) sensorimotor, 3) perceptual, 4) the level of views, 5) speech-thinking (verbal – logical). The names of levels reflect their cognitive function.

A subsensor level is the level of subconscious neuromuscular presettings and movements.

A sensorimotor level is the level at which the anticipatory effect is the expression of rather elementary temporarily – spatial detection, distinction, and advancings of the incentive.

A perceptual level is characterized by a particular complication of mental processes integration: local anticipatory schemes in the form of secondary images – views are applied here; they allow to present possible reactions, a result in compliance with the given criterion. It corresponds to the stage of the child's specific – figurative thinking.

And, finally, the most complex speech-thinking (verbal – logical) level of anticipation is the level of mainly abstract operations. It is bound to even greater complication of mental processes integration and the emergence of other, better forms of anticipation. This level provides deeper and wider generalization, and classification of situations that is connected with the strengthening of the semantic factor impact when external and internal speech is used (Lomov, 1980).

The authors of the suggested concept emphasize that it does not assume the isolation of one level from others, but their necessary interrelation. Anticipation is considered as spatially – temporary advancing, and the degree of completeness, and the accuracy of prediction. Therefore anticipation should not be reduced to probabilistic forecasting. Such understanding of two bound processes interaction of anticipation is close to N. A. Bernstein's (1991) point of view: "It is obvious that vitally useful or significant action cannot be either programmed or implemented if the brain has not created a guiding prerequisite for this purpose in the form of a model of the required future. Apparently, we have two bound processes N. A. Bernstein's (1991). One of them is probabilistic forecasting based on the perceived current situation; a kind of extrapolation for some interval of time ahead" (Bernstein, 1991).

But probabilistic forecasting is not an absolutely independent function, it is integrally connected with the process of current programming, therefore, the forecast of the future becomes more precise, and the level of its prediction increases. N. A. Bernstein (1991) designated the interaction of probabilistic forecasting with the current programming of the course of action or behavior as the process of extra– and interpolation. Due to this process, on the basis of adjustment according to the principle of feed-back, the "gap" between what is and that has to become in a future situation always decreases.

Many provisions of B. F. Lomov (1980) theory of anticipation have something in common with the ideas of anticipation process offered by J. Lingart (1970).

Considering the regularities of the human doctrine, J. Lingart (1970) emphasized that anticipation is the major moment of the doctrine cognitive function. The content of anticipation concept is wider in comparison with the content of the traditional psychological term "expectation".

J. Lingart (1970) also used the term "anticipation" speaking about the ability of an organism to act with a temporary advancing. In its genetically primary forms anticipation had, from his point of view, the character of preparatory processes to the reaction that will follow the expected incentive. Anticipation is an immediate component of orientation here. The development of anticipation as an issue is connected with the development of correlation between an organism and environment and, therefore, with issues of factors determining behavior. It is possible to speak about a new evolutionary stage of anticipation when reactions are made selectively and with a temporary advancing. When signaling information gains specific value, then there is the possibility for the transition from a prime anticipation to anticipatory processes the essential feature of which is the availability of a target view.

Considering the place of anticipation at various evolutionary levels of behavior, J. Lingart (1970) distinguished anticipatory reactions of the following types: a)

preparatory (the preliminary stage of anticipation); b) reactions with a temporary advancing; c) target views; d) cogitative plan of activity.

The types of reactions brought out by J. Lingart (1970) and their distinction at different evolutionary steps agree with the level hypothesis of B. F. Lomov (1980) anticipating processes organization.

Anticipatory processes act as the leading link of mental regulation mechanisms of behavior and activity. It is anticipation that provides the formation of the aim, scheduling and programming of behavior and activity; it joins the processes of decision-making, monitoring and communicative acts. For example, if to deprive a human the ability to anticipate events, the adequate behavior of the subject in the course of the event will be infringed. The concept of selectivity and behaviour orientation is introduced into the concept of anticipation. If the selectivity of behavior as a type of anticipation is the expectation of possible events, then there rises a question – how is it connected with effects of temporarily – spatial expectation of events, i.e. the chronological nature of anticipation?

The probabilistic forecasting based mostly according to the frequency of event occurrence is only one of the parts of anticipation process. The subject's modeling of the future significantly differs from modeling of the present: it cannot have the same degree of certainty. Relying on the data that are delivered by sense organs about the present situation and using definitely organized data on the past (memory), the subject can model the future only to a certain degree of accuracy. Thus, an essential feature of forecasting is its probabilistic character. The ability to compare the coming information on the current situation with the information about the previous experience kept in memory, and on the basis of all these data to hypothesize about the forthcoming events, attributing them this or that probability, was called probabilistic forecasting (Menitsky, 1981).

Probabilistic forecasting is among problems the development of which was started by N. A. Bernstein (1991). The main researches of probabilistic forecasting functioning were conducted by I. M. Feigenberg (1986), his co-workers, pupils, and his followers (Frumkina, 1984; Feigenberg, 1986).

Probabilistic forecasting may have various characters; that depends on what sides of "future" it concerns (Feigenberg, 1986). The nature of probabilistic forecasting is connected with such moments of the subject's activity as their demands, goals to impact the environment and the situation in it, their ability to influence the course of events, to plan and carry out purposeful actions.

Memory of the past provides the future - the forthcoming actions. From the point of view of I. M. Feigenberg (1986) there are no situations in a human's activity in which probabilistic forecasting would not play an essential role. The ability of probabilistic forecasting is the result of biological evolution in probabilistically organized environment. Forecasts of the living being are urged to optimize the results of their actions. The main function of probabilistic forecasting is the advancing of events taking place in the environment; it is reached due to preliminary preparation for possible actions, and in some cases due to implementation of necessary actions.

I. M. Feigenberg (1986) brought out two types of prognostic behavior. The first one is a conditioned reaction where the probabilistic forecasting is quite determined. The second type is an approximate reaction in the conditions of uncertain probabilistic forecasting. In the situation of uncertain probabilistic forecasting the organism experiences the reaction of "broad mobilization" which can be illustrated by animal's behavior at the emergence of an unexpected incentive. The animal takes a fitted pose intending to make further actions; all organs are in the state of increased readiness to receive information. The signal bringing indeterminacy of the forecast leads to mobilization of sense organs and action organs (there appears the readiness for a wide range of possible reactions, with the

receipt of specification from sense organs). Upon multiple repetition of the same signal the approximate reaction dies away, the indeterminacy of the forecast decreases.

The evolutionary-biological sense of probabilistic forecasting organization with the threshold availability is obvious: at almost boundless number of alternative situations the organism somewhat simplifies this complex picture of the environment. Some simplified model of the environment that has few alternatives, the probabilistic forecasting of which is higher the threshold, becomes actual for it. In I. M. Feigenberg's (1986) and other researchers' works it is shown that the approximate reaction, bound to probabilistic forecasting functioning apparatus, plays a crucial role in the organization of adaptive changes in the organism under conditions when the statistical structure of signal system is characterized by a big entropy (Feigenberg, 1986).

Behavior monitoring, being one of the forms of human's voluntary regulation, originates from the fundamental property of mentality - anticipation, i.e. advancing behavior. Thus, it is possible to consider the ontogenesis of behavior monitoring, according to S. L. Rubenstein's (1998) well-known thesis of "consciousness and activity unity", as an example of external reasons actions through internal conditions of the development (Feigenberg, 1986).

According to the logic of our research, the data about anticipation development in early ontogenesis of the person are of special interest. As genetic researches show, the formation and development of the ability to expect the course of events and to act with advancing is a long-term and contradictory process. J. Bruner (1976) determined that during the first 3-4 months of life the child develops elementary anticipatory reactions along with the development and mastering of subjects in a "small" space, and in connection with the development of eyes, head and body movement coordination in relation to visible things (Bruner, 1976). J. Bruner's (1976) researches testify that some elements of temporary anticipation are interwoven into the child' sensorimotor schemes of actions and they serve as one of essential mechanisms of their "unity" and coordination. At the same time, in H. Wallon's opinion, spatial and temporary anticipation in their more or less mature form are possible only at that stage of the child's development when secondary images – views start being used in their activity.

There was an interesting study which aim was to investigate whether and how anticipation affected the perception of facial expressions (Ran et al., 2014). A 3-way repeated-measures ANOVA on anticipation, orientation, and facial expression was performed on RTs and recognition accuracy in experiments 1 and 2. The results showed that anticipation reduced susceptibility to negative facial expressions. In this regard, anticipation might be considered as an effective emotion-regulation strategy. In addition, a decreased inversion effect for positive facial expressions was found in the predictable condition, which might reflect a switch from feature-based to holistic processing.

The analysis of anticipation in ontogenesis

The analysis of anticipation in ontogenesis focuses our attention on the fact that the process of maturing and consolidation of anticipation in ontogenesis is implemented according to all laws of mentality maturing (Sergienko, 1997). In E.A. Sergienko's (1997) works we find the theoretical-experimental analysis of anticipation elementary forms at early stages of human's ontogenesis. The author analyzed theoretical and experimental approaches to the issues of anticipation, revealed specifics of phenomena of anticipation in the early periods of the child's development.

So, according to E. A. Sergienko (1997), elementary forms of anticipation are already presented in the baby's perceptual behavior. They are displayed in the selectivity of perception, in forestalling effects of simple sensorimotor reactions, in advancing of perceptual events, in "views" of an invisible object existence, space metrics and laws of movement of an object. In the process of the baby's development there takes place the improvement of anticipatory processes that is connected with the fast development of opportunities of perceptual reflection. The fact of selectivity of the moving object and the advancing development of simple forms of anticipation in the conditions of continuous movement in comparison with discrete stimulation confirms the availability of common anticipating schemes of continual space through which the specification of perception takes place.

Anticipation is developing and complicating continuously during the child's ontogenesis; it appears in various forms. "There is no period in human's life when they would be completely deprived of anticipating schemes" (Sergienko, 1997).

At an early stage of ontogenesis – before 2-month – the activation of congenital programs of behavior, the analysis of the environment, preference of ecologically significant parameters of the environment are specified. For example, E.A. Sergienko (1997) pointed out baby's ability (36 hours of life) to distinguish and imitate a face expression (happiness, grief, pleasure). The ability of 20 – day babies to anticipate the emergence of a subject on the screen (in the form of heartbeat strengthening in case if the object does not appear for a long time) was found out (Sergienko, 1997).

According to J. Piaget's results of researches, the child at the age of two years, during the period of views formation, is capable to conduct the search of the disappeared object. According to the author's opinion, the child's anticipatory images already comprise a familiar situation or a subject and with various degree of accuracy anticipate events or objects that are not perceived directly (Sergienko, 1997).

With the development of the child's mentality the previous levels of anticipation do not disappear, but join a quality new integration scheme.

According to G. K. Ushakov's (1987) opinion, anticipatory mechanisms, in the form of the child's ability to forestall events, are created at adequate development only after 11-13 years. In particular, according to the author, it is possible to assume that there are some circumstances producing negative impact on anticipation mechanisms as, for example, inappropriate family upbringing (hyper guardianship, disturbing – suspicious) that hinder from the formation of child's necessary skills – psychological resistance, ability to forestall these or those events. The emergence of the ability to forestall events in adolescence and further expansion, consolidation of anticipation testifies that this process is implemented according to the general laws of mentality maturing. In that case the action of adverse internal and external circumstances at early stages of development causing the retardation of anticipation formation can lead to a total or partial asynchrony of mental activity due, in particular, to the insufficiency of anticipation (Sergienko, 1997).

C. M. Atance, A. Louw & N. S. Clayton (2015) explored 3-, 4-, and 5-year-olds' capacity to draw on a past experience that entailed the lack of a particular resource (in this case, toys) in one room, but not in another, to make an adaptive choice (i.e., place toys in the room where there were none) for a subsequent visit to the two rooms. Children's memory for which room had toys and which room did not was explicitly assessed. Children were then queried about where they should place a new set of toys for their next visit to the rooms. In experiment 1, where children were asked about the "distant" future, 4- and 5-year-olds, but not 3-year-olds, placed the toys in the "no-toy" room at a rate significantly higher than chance. In experiment 2, where children were asked about the "immediate" future, correct responses of 3-year-olds were still no different from chance, those of 5-year-olds were above chance, and those of 4-year-olds trended in this direction. The

discussion centers on the importance of assessing both "memory" and "foresight" on tasks purported to assess children's episodic foresight, the role of "temporal distance" on children's future-oriented behavior, and implications for future research.

There was an interesting study conducted by D. Green, O. Kochukhova, G. Gredebäck (2014). This study investigated infant and adult anticipatory gaze shifts during observation of self-propelled objects and human goal-directed actions. Six-month-old infants anticipated self-propelled balls but not human actions. This demonstrates that different processes mediate the ability to anticipate human actions (direct matching) versus self-propelled objects (extrapolation).

The study, conducted by J. Low, W. Drummond, A. Walmsley, & B. Wang, (2014), investigated whether humans have two mind-reading systems whereby the efficient system, unlike the flexible system, is naturally limited. There were two experiments and the first included adults as well as children (3- to 4-year-olds; total N = 128). In Experiment 1, all groups efficiently gazed in anticipation of an agent's beliefs about object location but not object identity (an ambiguous figure). In Experiment 2, children showed limits in anticipating a competitive agent's action in terms of his perspective on what is desirable. Flexibility in verbally predicting agents' actions across contexts developed with age. Convergence on signature limits across different ages and methods suggests that indirect anticipations involve minimal mind reading, whereas direct predictions tap a refined understanding of perspective.

DISCUSSION

The phenomenon of anticipation was viewed from different angles and received different names: "Anticipation" (Wundt, 2002), "model of a future" (Bernstein, 1991), "acceptor of action results, anticipatory reflection" (Anokhin, 1975), "probabilistic forecasting" (Feigenberg, 1973; Ivannikov, 1973), "nervous model stimulus" (Sokolov, 1967). In science, the following aspects of the problem of anticipation were studied in detail: neurophysiological, psychophysiological bases (Pavlov,1973; Anokhin, 1975; Bernstein,1991), the role of anticipation in providing cognitive mental processes (Brushlinskii, 1978; Feigenberg, 1973), pecularities of the probabilistic forecasting in health and disease (Feigenberg, 1973; Mendelevich, 2002), the development of anticipation in ontogenesis (Sergienko, 1997), the role of anticipation in the thinking process (Lisichkin, 1972). For today, the most studied are anticipational ability in schizophrenia (Mendelevich, 1988; Feigenberg, 1973), organic disorders (Skidanenko, 2003), osteochondrosis (Demakina, 2004; Mendelevich & Solovieva, 2002), nervousness states (Gromov, 2003; Mendelevich & Solovieva, 2002; Abitov, 2007), epilepsy (Skidanenko, 2003), personality disorders (Uzelevskaya, 2002), speech development disorders (Akhmetzyanova, 2004), motor disorders in children (Bernstein, 1991). Basic studies of probabilistic forecasting were conducted by Feygenberg, his employees, students and followers (Feigenberg, 1963, 1972, 1977, 1986; Ivannikov, 1977, 1978; Gurevich & Feigenberg, 1977; Zhuravlev, 1977; Kitaev-Smyk, 1977; Shiryaev, 1978, 1986; Akopov & Sluchevsky, 1981; Menitsky 1981; Peresleni, 1976, 1982, 1991). Anticipation of speech activity was repeatedly considered in the works of I. Zimney (1970), D. Fraya (1958), P. Dinza (1958), R. Frumkinoy (1971). In the framework of known psychological theories it is proved that the condition of successful adaptation of an individual is the ability to anticipation, as the ability to reflect the environmental laws in the structure of past experience, to form behavioral strategies, by that anticipating the course of events (Brushlinsky, 1979; Lomov & Surkov, 1980; Mendelevich, 2002; Sergienko, 1997; Zhuravlev, 1977).

CONCLUSION

The carried-out analysis of the phenomenon of anticipation shows that the latter permeates all forms and levels of mental reflection of the reality. It arises as a system integral process that is formed in person's actual activity and that is one of the most important components of the mechanism that regulates this activity (including behavior in general) (Lomov, 1980). Our understanding of anticipation as an immanent property of mental reflection process includes not only effects of temporary and spatial anticipation of events, but the selectivity of environmental impacts, orientation of activity, behavior as well.

On the basis of the theoretical analysis of the development of anticipation under normal and pathological conditions it is possible to draw a conclusion that probabilistic forecasting has an adaptive – maladaptive character, and at intellectual or mental inability we observe anticipatory inability. However, anticipatory activity of persons with deviant behavior is deprived of psychological researchers' attention.

RECOMMENDATIONS

The results presented in this article are of practical importance for speech therapists, clinical and child psychologists.

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REFERENCES

Abitov, I. R. (2013). Features of coping with stress in norm and at psychosomatic and neurotic frustrations. *Psychological magazine*, 34, 86 – 96.

Abitov, I. R. (2015). Model of Psychological Disadaptation at Psychosomatic and Neurotic Disorders. *Review of European Studies*, 7, 130 – 136. doi:10.5539/res.v7n1p136

Ananiev, B. G. (2008). *Personality, the subject of activity and individuality.* Moscow: Direct-Media.

Anokhin, P. K. (1975). *Sketches on physiology of functional systems*. Moscow: Medicine.

Artemyeva T.V. (2015**).** Child Concept of Comic Content Analysis**.** *The Social Sciences*, 10(4), 402-406, doi**:**10.3923/sscience.2015.610.619

Akhmetzyanova, A. I. (2013). The Specifics of Anticipatory Consistency in Children with Speech Pathology. *Middle East Journal of Scientific Research*, 16, 927-933. doi**:** 10.5829/idosi.mejsr.2013.16.07.11956

Akhmetzyanova, A.I. (2014). Spatial and temporal elements of anticipation consistency of children with general speech retardation. *American Journal of Applied Sciences*, 11, 1031-1035. doi:10.3844/ajassp.2014.1031.1035

Akhmetzyanova, A. I. (2015). Neuropsychological mechanisms of spatial anticipation in alcohol dependence. *Man and his health*, 1, 120-124.

Atance, C. M., Louw, A., & Clayton, N. S. (2015). Thinking ahead about where something is needed: New insights about episodic foresight in preschoolers. *Journal of Experimental Child Psychology*, 129, 98-109. doi: 10.1016 / j.jecp.2014.09.001

Bazylevich, T. F. (1988). Anticipation in the structure of actions of different sense. *Psychological journal,* 9, 121-131.

Bernstein, N. A. (1991). *About dexterity and its development*. Moscow: Physical culture and sport.

Burner, J. (1976). *Beyond the information given.* New York: Norton.

Brushlinsky, A. V. (1978). *The problem of development and psychology of thinking.* Moscow, Science.

Feigenberg, I. M. (1986). *To see, to foresee, to act*. Moscow: Knowledge.

Frolova, A.V., Mendelevich, V.D., & Solobutina, M.M. (2011). Anticipation at the semantic perception of speech and updating of speech communications in the condition of distress. *Neurologic bulletin*, 43, 47-53.

Frumkina, R. M. (1984). *The forecast in speech activity*. Moscow: Science, 1974.

Green, D., Kochukhova, O., Gredebäck, G. (2014). Extrapolation and direct matching mediate anticipation in infancy. *Infant Behavior and Development*, 37, 111-118. doi: 10.1016/j.infbeh.2013.12.002

Kalimullin, A.M., Gabdilkhakov, V.F. (2014) Tutoring of pedagogical activity and new ideology of teacher training in the higher education institution. *Life Science Journal*, 11 (SPEC. ISSUE11), art. no. 40, 183-187.

Korn, C. W., Sharot, T., Walter, H., Heekeren, H. R., & Dolan, R. J. (2014). Depression is related to an absence of optimistically biased belief updating about future life events. *Psychological Medicine,* 44, 579-592. doi: 10,1017 / S0033291713001074

Lingart, J. (1970). *The process and structure of the human doctrine*. Moscow: Progress.

Lomov, B. F. (1980). *Anticipation in the structure of activity*. Moscow: Science.

Low, J., Drummond, W., Walmsley, A., & Wang, B. (2014). Representing how rabbits quack and competitors act: Limits on preschoolers' efficient ability to track perspective*. Child Development*, 85, 1519-1534. doi: 10.1111/cdev.12224

Mendelevich, V. D. (2011). *Antitcipational mechanisms of neurogenesis*. Kazan: Medicine.

Mendelevitch, V. D.**,** & Bakhtiyarov, F. I. (2014). Anticipation of personal own experiences in norm and mental pathology. *Neurologic bulletin*, 46, 31-38.

Menitsky, D. N. (1981). Higher nervous activity of the person and animals in probabilistically organized environment (Doctoral dissertation), Leningrad.

Minullina, A. F. (2014). Research of Anticipation Consistency in the Families of Drug Addicts. *Middle-East Journal of Scientific Research,* 19, 1099-1103. doi: 10.5829/idosi.mejsr.2014.19.8.21042

Naysser, U. (1981). *Cognition and reality.* Sense and principles of cognitive psychology. Moscow: Progress.

Pavlov, I. P. (1973). *Twenty years of experience in the study of higher activity (behavior) of animals*. Moscow: Science.

Ran, G. M., Chen, X.., Pan, Y. G., Hu, T. Q., & Ma, J. (2014). Effects of anticipation on perception of facial expressions. *Perceptual and Motor Skills*, 118, 195-209. doi:10,2466 / 24.PMS.118k13w4

Rubenstein, S. L. (1998). *Fundamentals of general psychology*. Saint Petersburg: Peter.

Sokolov, A. N. (1967). *Inner speech and thinking*. Moscow: Prosveshenie.

Solobutina, M. M. (2012). The development of higher school students' anticipation abilities at verbal-cogitative and communicative levels. *Russian Psychological Society*, 3, 261-263.

Sergienko, E. A. (1997). *Anticipation in an early ontogenesis of the person*. Doctoral dis. of psychological sciences. Moscow.

Shvetsova, O. B. (2014). Scientific foresight as the highest form of anticipation and superconscious activity. *Applied psychology and psychoanalysis,* 2, 23-31.

Tolman, E. C. (1993). *Behavior and Psychological Man: Essays in Motivation and Learning*. University of California Press.

Ushakov, G. K. (1987). *Borderline nervous-mental disturbances*. Moscow: Medicine.

Vasilevskaya, E. A., & Mendelevich, V. D. (2014). Interrelation of anticipation, probabilistic forecasting, social intelligence and IQ of mentally retarded patients. Medical practice, *Nevrologicheski vestnik*, 50, 59-64.

Vlasova, V.K., Kirilova, G.I. (2012). Algorithms of monitoring and control of educational process in the context of electronic educational resources *Quality Innovations Education*, 7, pp. 36-40.

Vygotsky, L. S. (2005). *Thinking and speaking.* Moscow: Pedagogics.

Wundt, V. (2002). *Introduction to psychology.* Saint Petersburg: Petersburg.

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