

## Neurolinguistic Aspects of Verbal Activity Research of Bilingual Children with Speech Dysfunctions

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### Abstract

*Theoretical and applied aspects of bilingualism draw attention not only linguists now, but also researchers in the field of speech and language pathology more and more. This interest is caused by the relevance of perspective of bilingualism around the world. In the article the purpose - to give a theoretic-methodological justification of the need of studying of the neuropsychological syndrome as the mechanism of violation of verbal activity of the children having speech dysfunctions is set. In this connection the author solves the following problems: the principles and conditions of carrying out diagnostic studying and correction of speech frustration are defined, the role of neuropsychological syndrome is shown in structure of pathogenesis of Lalo pathology.*

**Keywords:** integration, neuropsychological syndrome, self-control, apraxia.

### 1. Introduction

One of the major tasks in definition of strategy of studying and formation of speech activity of children with system underdevelopment of language means, is the analysis of features of formation and development of the highest mental functions of children of this category. Traditionally, in domestic logaoedic's' diagnostic approach to studying of verbal activity of children with speech pathology that assumes research of various parties of the speech enjoys exceptional popularity. Essential minus of such approach is an estimation of the condition of language means without features of deficiency of the highest mental functions whereas speech violations never proceed is isolated, and involve breaches of mental processes. The speech acts as indicator of the formation of the highest cortical functions. The problem of localization of the highest mental functions belongs to number of interdisciplinary problems that are developed by a number of disciplines: neuropsychology, neurolinguistics, neuropathology, neurophysiology, etc. In domestic neuropsychology "localization" of mental functions is considered as a system process. In other words, mental function, as well as physiological, corresponds to brain as multicomponent system which links are connected with work of certain structures of brain, especially brightly it is shown at bilingual children (Karabulatova, 2013; Karabulatova & Polivara, 2013; Polivara, 2014; Karabulatova & Polivara, 2015 & Polivara, 2015). But diagnostics of level of mental development of children with speech pathology very often has formal, superficial character that substantially complicates definition of etiopathogenetic mechanisms of speech violation and adequate strategy of correctional work (Karabulatova, Polivara & Zamaletdinov, 2013; Yusupov F.Yu. & Karabulatova, 2014; Polivara & Repina, 2015 & Zamaletdinov et al, 2014).

### 2. Materials and Methods

The complexity principle traditionally takes the leading place in theoretical domestic researchers' approaches defectology and special psychology. At the design of the diagnostic model L.S. Vygotsky, R.E. Levina, T.A. Vlasova, M.S., Pevzner, V.I. Lubovsky at all offer system studying of speech processes through the prism of various scientific approaches interdisciplinary directions. A similar approach is certainly scientifically justified on a number of factors of biological, social and psychological character has an impact on the development of the child. The integrated approach assumes studying not only speech and intellectual-mental activities, but also the affective and regulatory sphere. (Polivara & Repina, 2015). When collecting anamnestic data needs a thorough analysis of ontogenesis analyzer functions (vision, hearing, motor areas), self-realization and self-regulation of the child in its surrounding social environment (in the family circle, in the children's group of peers, friends). Violations of any of these parameters may be symptoms of maladjustment syndrome in and have a negative impact on child development. It is necessary to consider condition of all system of mental activity

(operational interrelation, technical and basal structures, personal installations), i.e. definition of level of development of complete system informative and emotional and personal spheres (Repina, 2008).

One of basic in the methodology of domestic psychology and defectology is the principle of system studying that has been put forward by L.S. Vygotsky and has gained further development in R. E. Levina's works.

The system analysis in the course of psychological diagnostics assumes orientation not so much on identification of separate symptoms of violations of mental development, but, first of all, on definition of etiopathogenetic mechanisms of their emergence, communications between them, deviations hierarchical system establishment. Therefore, system approach to studying of the child has to be defined by the accounting of interrelation of deviations in its abnormal development. However, as practice shows, experts not always give updating of this principle due consideration.

We believe that within complex studying of speech dysfunctions with high degree of efficiency can be used neuropsychological and the psycholinguistic approaches differing in high informational content and assuming use of the syndromic analysis A.R. Luriya, E.G. Simernitskaya, T.A. Akhutina, Z.A. Repina, Z.V. Polivara et al.

### 3. Discussion

Unfortunately, it should be noted that at research of speech functions at children with system underdevelopment of language means, in most cases, brain functioning regularities are not considered crucial for obtaining full and reliable diagnostic data. These include, above all, the interdependence of language and the brain, the dynamic changes of higher mental functions during childhood. Modern psycho-pedagogical research on speech dysontogenesis children are mainly specialized and require the creation of original works of authorship, or modification of traditional speech therapy techniques, which are aimed at the specific speech competences formation. It is important to realize that the choice of children language function strategy formation with speech dysfunctions is not possible without appeal to physiological and neuropsychological mechanisms of the speech, psycholinguistic aspects of the language analysis. Analyzing the essence of the oral and written language prerequisites and conditions organization, first of all, necessary to rely on scientific this psycholinguistics, neurolinguistics, neuropsychology, and pathophysiology. In connection with told, the problem solution of competent diagnostics of children speech development assumes radical restructurings in scientific views on approaches and structure of technique of diagnostic testing. Complex studying of the child demands on mental processes and functions formation assessment, therefore, their underdevelopment reasons identification is carried out at the phenomenological level (Polivara, 2012).

Still L.S. Vygotsky pointed to that fact that any activity of the child has unique ability to keep social functioning way on all way of development (Vygotsky, 1983). Therefore, it is necessary to remember that along with biological prerequisites, successful functioning of the highest mental functions is always connected with certain social conditions.

For child speech and mental development, reliable results diagnostics level receiving necessary to consider that fact that the speech represents the sophisticated functionality hierarchical system consisting of number of the links having various localization. Each link violation leads to frustration and reorganization of all functional system in general. Each change has own specifics: it depends on what function carries out the affected site of the brain, what thus secondary system violations were caused by a primary defect and what compensatory reorganizations have arisen. As functional systems always rely on activity of separate sites of brain, defeat of this or that zone of brain leads to emergence of primary symptoms and secondary system manifestations of defect influencing all functional system in general (Polivara, 2015).

Huge value within the dynamic studying principle realization of the child is gained by L.S. Vygotsky's concept of actual and next development zones. Certainly, the effective correctional help corresponds to the child subsequent adequate forecasting development that is possible on condition of the interrelation of system studying, the qualitative analysis of data and the accounting of regularities of normal ontogenesis.

Weaknesses detection in the development of mental processes at each age stage is extremely significant. When carrying out diagnostic inspection determination of the nature of interrelation and interconditionality of various mental processes is represented significant (Polivara, 2015).

System approach realization in psychology and pedagogical diagnostics assumes research of intellectual development (operational, technological level) and developments of the emotional and personal sphere (personal motivation level) of the child. Personal development components define features of children cognitive activity, successful training, and development possibility. One of the mental development elements of the children is the motivational level development. The modern view on the problem of complex diagnostics also assumes studying of such essential elements of mental activity as self-control and self-checking.

Requirements of system approach to psychology and pedagogical diagnostics of children with speech dysfunctions

reflect the need of a definition of basic components of mental underdevelopment and cognitive activity. Neuropsychological studying assumes the analysis of mechanisms of the speech violations connected with specific features of the ontogenetic development of functions of the brain. Identification of condition of the highest mental functions, in this case, is caused, first of all, by the need of qualification of the primary defect and the consequences following from it. The analysis of abnormal manifestations which is carried out taking into account laws of development allows to estimate the role of the main defect in the formation of the speech of the child, to separate the reason from consequence.

It is important to remember that development of all mental spheres is presented by consecutive formation of interdependent structures, non-disjunctive of mental functions (perception, attention, memory, the speech, and thinking) and mental processes estimation has to be carried out as inseparable complete structures studying. Besides, the technique of diagnostic testing has to reveal not simply violation mechanisms, but also predict the next actual level of development.

On the basis of the modern synergetic approach is a core component of the diagnostic study of the regulatory, spatial and affective factors. The regulatory factor defines the formation of any regulation of the child mental activity, spatial factor, in turn defines the level of development of cognition and existential representations. The affective factor acts as an affective regulation system basis. The particular attention has to be paid to assessment of formation of the spatial and functional organization of brain systems, studying of features of functioning of cerebral hemispheres in the conditions of their interaction, including at functional asymmetry (Simernitskaya, 1985).

A Necessary prerequisite of integrated approach realization is also the accounting of cortical and subcrustal interrelations features development. The assessment of these characteristics can be received in the conditions of the standardized neuropsychological techniques application on studying of profile lateral (touch and motor) preferences, self-control and mental activity processes estimation (Birkin, 2007 & Repina, 2008).

Thus, the speech statement programming and implementation is difficult, multilevel process which normal functioning can be broken on one of the levels – the level of perception, cognitive and linguistic planning, the realization level (phonetic-motor programming). Considering the violation question mechanism within the linguistic approach American scientists were divided into three groups.

The first group of scientists believes that defects of the touch organization of the speech are the verbal activity violations cornerstone (breach at the perception level). So, scientists of Tallal & Pircy (1973), (1978) assume that the processes connected with auditory-time difficulties processing of speech information are the language violations cornerstone (that is the reason for speech and language development delay). Researchers of Jaffe (1980), Bridgeman & Snowling (1988), Groenat al (1993) consider that the speech apraxia is the cornerstone defects of the speech perception, in particular – weakness of deduction in memory of acoustical traces.

The second group of scientists suggests that the statement organization violation mainly at the level of the representing scheme is the cornerstone of apraxia. It, in turn, affects all aspects of the planning function of the speech (cognitive, linguistic, and phonologic) and it is shown at all levels of the expressional speech (Aram & Classon (1979), Ekelman & Aram (1983), Panagos & Bobcoff (1984), Smith, Marquardt, Cannito, Davis (1994)). Scientific Velleman & Strand (1994) emphasize that children with apraxia of development are at a loss in creation and the correct use of structures which in norm provide the analysis, the organization, use of information received from motor, touch, linguistic system – all components necessary for oral speech realization.

Some researchers in this direction believe that the processes connected with violations of phonologic ideas of phonemes/words – defects of phonologic decoding are the defect cornerstone (Marion et al, 1993).

The third group of researchers does not connect the apraxia mechanism with processes of cognitive and linguistic planning and considers, that frustration are the cornerstone defects of motor programming (choice search, to the articulation coordination). The term "motor programming" however is extremely generalized therefore scientists in the works try to replace it with more concrete semantic filling. So, researchers (Aparicio-Rodriguez et al, 2011) consider that apraxia can result in motor programming violation, however it is the most probable and the highest motor control violation result at implementation of the speech, believing thereby that violations are the cornerstone of difficulty in control of the statement.

The number of the researchers is working in line with this direction state other assumptions. In particular, De Diego-Balaguer (2004) considers that apraxia of the speech is shown "in violation of the ability to programming of the articulation poses, to the muscles movements coordination providing any pronouncing phonemes. Thus, the speech muscles function normally – it is not noted weaknesses of muscles, slowness and coordination violations at the realization of speech tests. Prosodic frustration can be caused by articulation problems, most likely, turning on of certain compensatory mechanism". Lately in the world practice the term "information-SJPD processing violation syndrome" has

gained popularity (Gaz, 2014). This syndrome gives to explanations for the sensorimotor violations integration of the brain structures, in particular, which are responsible for the speech.

#### 4. Results

Researchers R.A. Vafeev, L.N. Kisileva, F.S. Usmanova, E.A. Salikhova *et al* emphasize the native language standards second leading role in assimilation. However, the influence mechanism remains a riddle. We believe that ethnic behavior nature (sociocultural, first of all) also bears in the acquired language itself specifics (Ryazantsev *et al*, 2014 & Karabulatova, 2013: 794).

At the same time exists as we believe, subjective-objective predisposition to language certain type assimilation. So, for example, for years of long speech therapist and linguistic correction work with the Russian children having the Tatar roots in the generation and genealogical scheme we have noted regularly found difficulties in lexical and grammatical forms formation, and also in sounds articulating (1998-2011). The similar situation is observed and at the Russian children with the Jewish origins (uvular P), at the Russian children with the Belarusian-Polish-Ukrainian origins (lambdacism: instead of L it is said At asyllabic).

It should be noted that the social circle of parents, their psychosomatic status, and alcohol abuse is of great importance for diagnostics of speech violations at the Russian children of the advanced preschool age. Our data are completely correlated with scientific researches of culturologists, sociologists and demographers about reproductive families opportunities and traditions (Ryazantsev *et al* 2014; Ryazantsev *et al*, 2015; Ryazantsev *et al*, 2015 (a); Gilazov *et al*, 2015; Karabulatova & Zinchenko, 2014; Karabulatova & Polivara, 2015 & Karabulatova, 2004), it also imposes the specifics on interaction with local community and authorities representatives (Khairullina & Karabulatova, 2014).

Our research has revealed the most typical violations, characteristic for *cortical* form of ataxophemia: existence of the strained, slowed down articulatory movements was noted, complete articulatory skills broke up to the elements making them, switching from one of these elements was at a loss, there were perseveration. These disorders of the articulatory movements were clinically shown in specific phonetic violations - partial or full replacements of sounds, their additions, and admissions. For children with cortical ataxophemia the increased voice loudness, the syllabic speech was characteristic. For children with cortical ataxophemia, "apraxia searches" of the necessary articulation are typical. Difficulties of pronouncing concordant sharply prevail over pronouncing vowels difficulties.

Typical violations were: 1) syllable concordant components mixture; 2) partial replacements as a syllable part; 3) literal paraphasias; 4) choice delay of the necessary syllable involves delay of speech tempo, its intensity and not smooth jerky.

Thus, it is possible to tell, neurolinguistic approach to the speech dysfunctions pathogenesis analysis (neuro phonetic) allows to reveal additional significant diagnostic criteria that will help to differentiate various forms of ataxophemia moreover, it is correct to plan speech therapy correction of each child. At the same time, the analyzes material gave strong reasons for more accurate differentiation of purely speech therapy and connected with bilingualism violations.

#### 5. Conclusion

As a rule, bilingual children develop unequally (Karabulatova & Polivara 2013; Karabulatova & Polivara, 2014 & Karabulatova, Polivara & Zamaletdinov, 2014; Polivara, 2014 & Karabulatova, Polivara, 2015). At the same time, we observe the growth of neurolinguistics mechanism development various pathologies (Polivara, 2014) caused by both social factors, and especially neurophysiological. So some of them cannot read and count to 20 at school and others already know and differentially use several languages. Intellectual development is more important, than concrete language in which thoughts are expressed, but language can reflect education level too. Especially brightly it is presented in language and social activity of labor migrants, illegal migrants and members of their families (Ryazantsev *et al*, 2015; Ryazantsev *et al*, 2015(a) & Karabulatova & Polivara, 2015).

Under the native language influence at preschool bilingual-children advanced age the following ethnolinguistic differentiations occur in the Russian speech:

- Insufficient memory size speaking or functional immaturity of the speech centers;
- Features of role and functions of the first and second (on assimilation time) languages in children's community and family;
- Degree of civilization or acculturation of languages, i.e. volume of continuous use of mass media, applicability

in business and education, and also opportunity to benefit from language;

- Isolation speaking from the initial language environment;
- Cultural prestige and/or language deficiency use outside one cultural environment.

The neuro linguistic ethnic psycho-linguistic correction approach base of lexical assimilation and grammatical categories by children bilinguals and Russians of the advanced preschool age with the general speech violations through ethnolinguistic prism differentiations has to be presented by the linguistic, psychological and psycholinguistic directions in the language acquisition theory.

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