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Age Dynamics in Formation of Regulatory and Speech Functions in Preschool Age: Neuropsychological Aspect

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Abstract: The study is devoted to the analysis of the age dynamics of regulatory and speech functions in preschool age on the basis of the results of neuropsychological examination of 3-7 years old children with conditionally normative development and health limitaions who are raised in multilingual and monolingual environment. It emphasizes the features of age dynamics of the indicators of programming and control function connected speech as well as other parameters of speech development that are determined by delay in the formation of certain brain structures and higher mental functions. The necessity of early neuropsychological diagnostics and focused psychological-pedagogical intervention in the context of formation of junior preschoolers' regulatory and speech functions is argued.

Key words: Neuropsychological diagnostics, polylingual and monolingual environment, programming and control, speech developmen, preschoolers'

INTRODUCTION

At the present time due to increasing tendency towards the number of children with deviant development in the child population due to complexity, persistence and variation as well as the ambiguity of differential diagnostics, an increasingly greater attention is being paid to the problem of neuropsychological approach to the evaluation of actual development of a child (Akhutina, 2009; Glozman and Amelina, 2015). The neuropsychological method that studies special aspects of formation of high psychic functions determining human's conscious activity and behavior in course of the personal development allows to analyze the reasons and the character of brain disorders in various mental activities and their phases. Neuropsychological diagnostics allow to evaluate the system-dynamic changes accompanying the mental development of a child at the level of brain provision and to plan an adequate psychological-pedagogical follow-up program exactly for this particular child. In recent years, it is noted that the number of children with underdeveloped regulatory functions has been increasing. The difficulties in voluntary regulation of activity and behavior become especially noticeable when a child starts studying at school and often they lead to persistent manifestations of maladjustment that may determine the problems of socialization of a child with health limitations (Borisova, 2015).

In recent years, it is noted that the number of children with underdeveloped regulatory functions has been increasing. The difficulties in voluntary regulation of activity and behavior become especially noticeable when a child starts studying at school and often they lead to persistent manifestations of maladjustment. In that context the reference to preschool-age group in order to reveal underdeveloped pre-learning skills and cognitive and regulatory capacities being necessary for further development as the basics of cognitive functions has high prognostic, preventive and correctional potential.

Insufficient development of regulatory functions is closely related to gaps in speech development. Speech is

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considered not only as a communication and cognition tool but also as a key mediating element of the structure of high mental functions that plays an important role for voluntary regulation of mental activity. Thus, in Mari El Republic in accordance to the data of Head Medical-Psychological-Pedagogical Commission in 2014-2015 academic school year 2,214 children of 3-7 years old were examined 1204 of them appeared to have speech disorders and 612 had mental retardation. Mari El Republic is a multicultural region. Multiculturalism is intimately connected with multilingualism. Often a child especially living in a countryside communicates with the representatives of two or three linguistic groups. In most cases these languages are Russian from Eastern-Slavic linguistic group Mari from Finno-Ugric group and Tatarian from Turkic linguistic group. The way the multilingualism influences the special aspects of mental development, especially speech development is an interesting problem for many contemporary psychologists, educators, speech pathologists. Nowadays the migration processes are so fast-moving that these questions become extremely critical and the answers to them are of great current interest and require an immediate practical solution.

The known neuropsychologist Glozman and Amelina (2015) notes that bilingualism may act as both negative and positive parameter of child development. Bilingualism has an inhibiting effect in the periods of hypersensitive development of speech function. Beyond such periods bilingualism is a favorable factor and mostly promotes the development of more flexible thinking and cognitive capabilities.

MATERIALS AND METHODS

Within the study implemented with the support of Russian humanitarian scientific fund (project No. 14-16-12004), a comparative analysis of the results of neuropsychological examination of 3-7 years old children with dysontogenesis variations (delay in speech development, general speech underdevelopment, mental developmental delay) and with conditionally normative development was performed. The participants of the experiment were children from junior (3-4 years old), medium (4-5 years old), senior (5-6 years old) and preparatory (6-7 years old) groups of pre-school facilities in the amount of 400 persons. The organizational method is cross-sectional method. The formation of groups was held in accordance with the conclusions of medical psychological pedagogical commission as well as the evaluation of educators (teachers-logopedists).

The diagnostic program included particular units of battery tests by A.R. Luriya (Akhutina, 2009; Glozman and Amelina, 2015), the structure of the program was determined in accordance with the testees' age. For the neuropsychological examination of children of senior pre-school age (5-7 years old) the complete test battery consisted of 26 tests and the accomplishment was evaluated by 144 parameters while the children of the 4th year of life received 16 tests (35 parameters).

RESULTS AND DISCUSSION

The voluntary regulation processes go through a long development path in their formation is intimately connected with regulative function of speech. It is noted that till the age of 2, 5-3 years old a child is able to subordinate his/her acts due to an adult's direction. On this stage speech starts occupying a central position in child mental development and there are significant changes in associative layers of brain frontal lobe cortex, though the frontal lobe does not play a special role in activities yet. To the end of preschool age many researchers notice the features of final formation of processes allowing to manage the impulsiveness in behavior.

Let us review the examination results for children of junior preschool age (the 4 and 5th years of life) with conditionally normative development and with mental developmental delay.

The evaluation of the indicators of programming and control unit was performed according to the results of the following tests: dynamic praxis, reciprocal coordination (for children from 4 years old), correction task, composition a story on series of pictures (from 4 years old), "the odd one out".

When examining children of the 4th year of life some difficulties with accomplishment of the greater part of the tests were noted in both subgroups; at that special characteristics were also revealed.

The dynamic praxis test for the children of junior subgroup (the 4th year of life) was used in simplified version (according to J.M. Glosman). The acquisition of program at the first presentation was shown by over 1/3 of educatees with normative development and only by 11% of group with Mental Developmental Delay (MDD) (Table 1). The most of preschoolers with MDD (64.7%) could perform this test only together with teacher. The great majority (73.4%) of participants of this group showed step-by-step non-automatic accomplishment or the appearance of multiple failures when trying to increase

Table 1: Marks for the execution of dynamic praxis test by preschoolers of the 4th year of life (the percentage of children who got the respective mark*)

Marks	Groups	Normal	MDD
Acquisition	0	36.7	11.8
	1	16.3	0.00
	2	28.6	11.8
	3	14.3	64.7
	4	4.10	11.8
Execution	0	18.4	0.00
	1	28.6	13.3
	2	30.6	13.3
	3	22.4	73.4
Serial organization error	0	34.7	13.3
	1	30.6	13.3
	2	34.7	73.4

*1: Acquisition of the movement program; 0: after the first presentation; 1: after the second presentation; 2: after shared execution; 3: after shared execution according to a speech instruction; 4: non-acquisition of the program (in this case the highest penalty points are assigned to the rest three parameters as well). 2: execution of the program (after acquisition); 0: from delayed to smooth execution; 1: from step-by-step to smooth execution; 2: execution in batch mode from the beginning or after failures; 3: step-by-step non-automatic execution or the appearance of multiple failures when trying to increase the tempo. 3: serial organization errors; 0: no errors; 1: single failures, i.e., errors with self-correction; 2: repeated failures (over 2 times), single uncorrected errors

the tempo. At the same time, a great number of educatees with normative development quite confidently changed delayed (18.4%) or step-by-step accomplishment of tasks (28.8%) to smooth without errors (34.7%) or with single errors including self-correction (30.6%). There is also a difference in the capability to keep the program in memory: 52.9% of children with MDD could not reproduce the sequence of movements after a short pause that characterizes both the voluntary sphere (serial organization of movements) and the ability to keep traces.

The usage of compensatory technique for acquisiting and keeping the program in the studied subgroups also has some differences: preschoolers with MDD used space mediation a little more frequently as the regulative role of speech still yields to regulative impact of vivid signals.

A similar tendency showing the lack of programming and control functions for the testees with MDD is also noticed while analyzing the number of impulsive (perseverative) errors in the postural praxis test. The most of preschoolers with normative development made no more than two errors per 10 tasks (34.7%-0 errors; 24.5%-1 error; 20.4%-2 errors). In the MDD subgroup unmistakable execution is rare, the prevailing value is more than three failures in the regulatory plan (23.5%-3 errors; 23.5-4 errors; 5.9.%-5 errors).

In the battery of tests proposed by T.V. Akhutina the unit for programming and control functions evaluation also includes "the odd one out" task. Within our study we used non-verbal stimulus material and diagnostic procedure, well proven by J.M. Glosman. At the age of 3 years old the well-formedness of general concepts is not a normative requirement that is also reflected in the findings. Difficulties in the formulation of categorical answers were marked in both subgroups: 62.5% of normatively developed preschoolers did not actualize the general concepts when explaining the chosen solution. At that in the group of children with MDD there were more unfavourable trends as the categorical explanation appeared to be unavailable for them and situational and inadequate explanations prevailed. It should be noted that though the difference between the studied groups insignificantly differed by the degree situational substantiations usage, inadequate solutions prevailed in the group of preschoolers with MDD (inadequate explanations were not used by 72.9% of normatively developed preschoolers and only by 33.5% of children with MDD).

The statistical analysis (Mann-Whitney U) proves the significant differences in the level of expressiveness of the feature by such parameters as: acquisition ($p = 0.0001$) and execution ($p = 0.001$) of the program, serial organization errors ($p = 0.015$), keeping the program ($p = 0.004$) in the dynamic praxis test, the number of impulsive errors in postural praxis test ($p = 0.007$) and the number of categorical answers in "the odd one out" task ($p = 0.006$).

By and large, the analysis of the results of these tests performed by preschoolers of the 4th year of life reflects the immaturity of programming and control functions which is mostly peculiar to children with mental developmental delay. Let us review the examination results for children of the 5th year of life.

The movement program acquisition in the dynamic praxis test appeared to be more available for the preschoolers of both subgroups of this age. The greater amount of preschoolers with normative development acquisited the program at the first (43.8%) or the second (37.5%) presentation and did not require performing together; moreover, the most of preschoolers with MDD did not need a speech follow-up. The success rate of the program execution and the percentage of serial organization errors also got better in this age range, though in a significantly lesser degree (Table 2).

In the MDD-children subgroup the tendency to apply space mediation as the compensatory technique of the program acquisition became more expressed (50%), though the difficulties of keeping the series of movements in memory also remained (50%). In both subgroups tonic control disorders are noted, mostly by hypotype.

Table 2: Marks for the accomplishment of dynamic praxis test by the preschoolers of the 5th year of life (the percentage of children receive the respective mark*)

Marks	Groups	Normative	MDD
Acquisition	0	43.8	7.10
	1	37.5	35.70
	2	12.5	28.60
	3	6.3	14.30
	4	0.0	14.30
Execution	0	12.5	0.00
	1	43.8	8.30
	3	6.3	50.00
Serial organizaion errors	0	37.5	8.30
	1	43.8	75.00
	2	18.8	16.70

*1: acquisition of the movement program; 0: after the first presentation; 1: after the second presentation; 2: after shared execution; 3: after shared execution according to a speech instruction; 4: non-acquisition of the program (in this case the highest penalty points are assigned to the rest three parameters as well). 2: execution of the program (after acquisition); 0: from delayed to smooth execution; 1: from batch-mode to smooth execution; 2: execution in batch mode from the beginning or after failures; 3: step-by-step nonautomaticexecution or the appearance of multiple failures when trying to increase the tempo. 3: serial organization errors; 0: no errors; 1: single failures, i.e., errors with self-correction; 2: repeated failures (over 2 times), single uncorrected errors

Table 3: Marks for the execution of reciprocal coordination and choice reaction tests by the preschoolers of the 5th year of life (the percentage of children received the respective mark*)

Marks	Groups	Normative	MDD
Reciprocal coordination: execution	0	18.3	0.0
	1	31.3	0.0
	2	18.8	14.3
	3	18.8	57.1
	4	12.5	28.6
Reciprocal coordination: tempo	0	43.8	14.3
	1	56.3	85.7

*1: reciprocal coordination. Execution; 0: change to automatic execution smoothly atonce or after single failures in the beginning; 1: change to automatic movements after a few failures or step-by-step execution; 2: repeated failures, lagging of one hand with self-correction; 3: moving hands in turns; 4: similarity if movements of both hands. 2: tempo of execution. 0: normal or fast; 1: slow

The characteristics of serial organization of movements in the reciprocal organization test (Table 3) for the group with normatively developed children are higher than in the group of MDD-children as well: the half of them showed smooth automatic execution from the beginning or after few failures or the execution in turns in a normal (43.8%) or a bit slow tempo. At the same time, when performing a task mostly slowly (85.7%), a great number of children with MDD showed step-by-step execution (57.1%) and similarity of movements of both hands (28.6%) in the reprocical coordination test. At that the problems with tonus regulation in MDD-group were noticed much more rarely (14.3 and 43.8%, respectively).

The development of regulatory functions with aging leads to the decrease of number of impulsive errors in a postural praxis test accomplishment. More than a half of preschoolers with conditionally normative development performed the tasks without errors (62.5%). In the MDD-subgroup the improvements are expressed in a lesser degree: almost 80% of preschoolers made two (50%) and more (28.6%) errors.

Table 4: Marks for the execution of "the odd one out" test by preschoolers of the 5th year of life (the percentage of children received the respective mark*)

Marks	Groups	Normative	MDD
The number of categorical explanations	0	28.6	50.0
	1	0.0	35.7
	2	28.6	14.3
	3	7.1	0.0
	4	35.7	0.0
The number of concrete-situational explanations	0	50.0	21.4
	1	0.0	21.4
	2	35.7	35.7
	3	7.1	21.4
	4	7.1	0.0
The number of inadequate explanations	0	78.6	14.3
	1	7.1	35.7
	2	7.1	28.6
	3	0.0	0.0
	4	7.1	21.4

It is quite interesting that the productivity of correction task execution is not significantly different in the studied groups: the average of correct executions in the group with normative development is 25.1 while in the MDD group it equals to 22.1.

When accomplishing "the odd one out" test (non-verbal stimulus material, J.M. Glosman's version) over one third of normatively developed preschoolers operated with general terms in all tasks when explaining the chosen solution and a quarter used a categorical substantiation in none of the tasks (Table 4). In the MDD subgroup 35.7% of testees rested on general terms only in one of four tasks; for 50% it still appeared to be unavailable but the number of inadequate solutions decreased.

Statistically significant differences were revealed by the following parameters: acquisition ($p = 0.01$) and execution ($p = 0.004$) of the program in dynamic praxis test, the performance of reciprocal coordination test ($p = 0.004$), the number of impulsive errors in postural praxis test ($p = 0.001$), grammatical structure of speech ($p = 0.022$), the number of categorical ($p = 0.016$) and inadequate explanations in "the odd one out" task.

The analysis of the results of these tests accomplished by the preschoolers of the 5th year of life as well as by children of lesser age, reflects immaturity of programming and control functions which is peculiar to a child with mental developmental delay and delay in the speech mediation development. It determines the necessity to evaluate the completeness of voluntary regulation from junior preschool age while it's in progress in order to timely organize the correctional-developmental work.

The comparative analysis of the results of neuropsychological examination of the children of senior preschool age (the 6th and the 7th years of life), belonging to different nosological categories, allowed to reveal both general and particular characteristics (Borisova *et al*., 2014).

With the purpose of implementation of a neuropsychological examination and a qualitative analysis of the test results in this age group, a child-friendly version of A.R. Luriya's battery of tests (T.V. Akhutina and others) was applied. While examinating educatees of senior groups, it was found that for the conditionally-developed sample the most difficult was graphic test that allows to evaluate the opportunity of acquisition of the motion program, its automation and the ability to change one movement to another. While the execution of the reviewed neuropsychological tests by children with deviant development, the main difficulties were related to dynamic praxis and reciprocal coordination tasks as well as graphomotor test and story composition. Due to the comparative analysis (Mann-Whitney U) of penalty point averages in these tests for the subgroups of normatively developed children and MDD-children (senior group), significant differences were revealed by the following parameters: execution of the program ($p = 0.001$) and serial organization errors ($p = 0.019$) in dynamic praxis test; execution of the program in reciprocal coordination test ($p = 0.015$), programming a story ($p = 0.002$).

When comparing normatively developing preschoolers (preparatory group) and their coevals with mental developmental delay, the significant differences were highlighted by such parameters as: choice reaction ($p = 0.0001$), program acquisition ($p = 0.0001$) and execution ($p = 0.0001$), serial organization errors ($p = 0.008$) in dynamic praxis test, the execution of program in reciprocal coordination test ($p = 0.008$), correction test ($p = 0.002$), the special aspects of serial organization ($p = 0.01$), pauses ($p = 0.001$), the average speed per batch ($p = 0.02$) in graphomotor test, the number of regulatory errors in Head's test ($p = 0.002$).

The tendency of insufficiency of voluntary component in MDD-children's mental functions revealed in all studied age groups is coherent with general notions of the clinical-psychological structure of the defect for this deviation. The analysis of age-related changes underlines the particular importance of well-timed correctional-developing work in this context. Although, the respective brain structures maturate with aging the differences between the degree of completeness of programming and control functions of normatively developing and MDD-preschoolers are not leveled out and moreover become more palpable. It is proved with the increase of the number of parameters by which the statistically significant differences are noted when comparing the findings of the examination of educatees from various age groups.

This situation raises the importance of focused effort to form the regulatory component. At that in junior preschool age (3-4 years old) a special consideration as a rule is not given to the evaluation and development of regulatory functions because of settled conviction about normal age immaturity of these processes. In a greater degree the emphasis is laid on the development of cognitive functions but the work on regulatory functions begins only in senior preschool and junior school age. In many cases it leads to the fact that when finishing the preschool stage of education, a child with MDD slowly gets in the task and becomes embarrassed with its conditions, finds it difficult to compose, execute and control the program, showing inactivity or impulsiveness.

Let us review the special aspects of speech development of children in the studied groups. The analysis of the children's expressive speech was performed while their execution of the following tests: conversation with the child, naming of objects and acts, composition of phrases, composition a story on a picture, composition a story on the series of pictures; the impressive speech was studied while testing the understanding of words' meaning and logical-grammatical structures. The study of children's speech behavior in "conversation with a child" test (Glozman and Amelina, 2015) showed that about a half of children of this age group do not suffer expressed difficulties in keeping the dialogue running easily come into contact with the teacher and answer the questions willingly. In terms of diagnosis, these were children whose mental development was evaluated as normative. The 43% of children of the 5th year of life and 49.5% of testees of the 4th year of life get their bearings in the environment, answer the questions about age, call their address though feel no confidence, make errors and correct them themselves. The expert opinions show that these children have the features of system speech under development (general speech under development, phonetic and phonemic speech under development). The rest part of the children except for a small number of testees with the manifestation of expressed mental developmental delay verified clinically had some difficulties in running a dialogue with a partner and the true answers for the partner's questions required elaborative questions from the experimentalist.

In the "naming objects and acts" test 29% of testees of the 4th year of life unmistakably named all shown

Table 5: Marks for the execution of tests of understanding the word meaning and logical-grammatical structures by the preschoolers of the 4th and the 5th years of life(the percentage of children received the respective mark**)

Mark	Understanding of word meaning			Understanding of logical grammatical structures			
Groups	0	1	2	0	1	2	3
The 4th year of life	21.8	53.5	22.8	13.9	57.4	25.7	3.0
The 5th year of life	20.0	47.7	30.8	30.8	50.8	18.5	0.0
The 6th year of life	42.0	47.7	10.2	48.3	46.0	4.60	1.1
The 7th year of life	61.6	33.0	5.40	75.0	24.1	0.90	0.0

**Understanding of word meaning; 0: unmistakable and confident matching of all presented words/pairs of words with the pictures at the first presentation; 1: single errors in understanding by impulsiveness type with self-correction or with a single necessity of repeated presentation; 2: multiple errors (mistaking the word meaning, phonetic and semantic changes, perseverations or passes while showing of picture pairs) with partial correction or multiple necessity of repeated presentation. 2: understanding of logical grammatical structures; 0: unmistakable and confident matching of all presented phrases and instructions with pictures or acts at the first presentation; 1: single errors in understanding of passive constructions or singular necessity of repeated presentation; 2: multiple errors in understanding of reversible active and passive constructions or multiple necessity of repeated presentation; 3: uncorrectable errors of all types specified above in more than a half of presented phrases

objects and acts. The most of the children (50% the 4th year of life and 72.3% the 5th year of life) showed the search of nominations, the increase of latency when naming words which are evaluated as low-frequency in the word stock of a child of this age. Over 15% of educatees of every age group showed the presence of multiple paraphasias and perseverations with partial correction if the first sound of the word was prompted. The mental development of these educatees bears the marks of mental developmental delay and expressed system underdevelopment of speech complicated with the symptoms of neurological pathology.

In the "composition of phrases" task about a half of children (47%) unmistakably and confidently composed extended exact phrases being correct in lexico-grammatical and phonetic senses with only small errors. A great number of the testees (40 and 47%) showed multiple verbal paraphasias, lexico-grammatical and phonetic errors while composing the phrases; a number of children (about 12%) showed total incompleteness of phrasal speech. These are children with the features of mental developmental delay and speech underdevelopment, the children of the second level of speech development.

The analysis of the results of the study of impressive speech special aspects (Table 5) showed that at average 21% of testees of junior and medium preschool age do not have difficulties with understanding of named objects and acts. They unmistakably and confidently matched all named words with the pictures at the first presentation. A half of the children (53.52% the 4th year of life and 47.7% the 5th year of life) showed single errors in understanding speech by impulsiveness type with following self-correction. The cases of expressed difficulties in speech understanding in the form of multiple errors (mistaking the word meaning, phonetic and semantic changes, perseverations or passes while showing of picture pairs) with partial correction or the multiple necessity of repeated presentation refer to 22.8% of children of junior age and 30.8% of children of medium preschool age. These findings were received in the group of educatees with expressed variation of psychoverbal pathology (a complicated variation of general speech underdevelopment, mental developmental delay with neurological symptoms).

The test focused on the study of special aspects of understanding of lexico-grammatical structures showed almost the same results. The 13.9% of testees of junior preschool age and 30.8% of children of medium preschool age do not suffer difficulties in understanding of lexico-grammatical structures. As a rule, these are children with normative development or with the features of mild speech pathology of phonetic system.

Considerable number of testees (57.4 and 50.8%) showed some difficulties in the understanding of lexico-grammatical structures, they made single mistakes or their reactions while testing were showing that the experimentalist should've repeated the task instruction. These were children with the features of system speech pathology.

Children with expressed features of mental developmental delay made multiple errors in the understanding of instructions and they were overcome only after multiple repeating of the task instructions.

Older children did not have difficulties in impressive speech 42% according to the results of the first test and 46% in the second test. In the group of children of the 7th year of life the percentage of such results is higher (61.6 and 75%). It highlights the positive dynamics in overcoming difficulties of impressive speech formation till school age in the context of correctional work. A significant number of errors were observed only in particular cases. Such errors were made by children with expressed variations of mental dysontogenesis.

Therefore, the clinical physiological special aspects of mental development of preschool-aged children have a negative influence on the formation of various aspects of child's speech. This is yet more proof of the necessity of the organization of complex medical-psychological-pedagogical assistance for children.

These findings correlate to the indicators pointing at mono/multilingualism. Small difficulties in the sphere of speech perception were suffered by children with the features of bilingualism; the testees with multilingualism showed clearly expressed difficulties.

Let us review the special aspects of the age dynamics of development of connected speaking. The conducted study resulted in the following findings. In the "phrase composition" test the composition of extended, exact sentences being correct in lexico-grammatical and phonetic senses was performed by a small number of testees (about 8%). The most of the children (48%) madee single errors in terms of incompleteness or redundancy of phrase. A great number of testees (34%) made multiple errors like verbal paraphasias, lexico-grammatical and phonetic inaccuracies while composing a phrase. The 10% of testees appeared to have underdeveloped phrasal speech.

According to the results of "composition a story on a picture" test the same number of children like in the previous test (8%) showed the results giving evidence of extended, consistent and correct speech. The 23% of testees made single errors when composing a story. A half of the children of the 5th year of life suffered serious difficulties with connected speaking: their speech bristled with errors in terms of incompleteness of redundancy of constructions of connected speech; significant errors were observed while the determination of words order. For a great number of testees (20%) the connected speaking turned to be unavailable.

The study conducted by us has shown that the more expressed picture of disorders at the level of connected speaking organization is peculiar to children with clinically verified mental developmental delay diagnosis. All the special aspects described above were expressed in the stories of these children more clearly. In this group of testees there were no children being capable to compose an extended, consistent, grammatically correct and lexically complete text. Over a half of such children (57%) made multiple errors in composition of a consistent telling, their stories contained incomplete constructions and incorrect word order.

The most of tellings of children with normative development or development being close to normative (with the consequences of phonetical-phonematic underdevelopment of speech) showed complete semantic adequacy, included the basic semantic units in correct order with connecting links and were grammatically correct .

Thus, the analysis of stories based on a picture within conducted by us neuropsychological study of 5-7 years old children of multicultural region shown that the most of children with variations of psycho verbal dysontogenesis had problems with productive composition of a story that were expressed to different extents. These symptoms are demonstrated at various levels: in some cases in articulation but in most cases at the level of syntax. The children construct simple sentences with simplified structure, they need inducing questions to develop the topic of the picture. The stories contain the features of semantic inadequacy in terms of mistaking and unrealistic explanation of things that ignores the key elements of the picture; when composing a story, the missing of semantic units and links or the presence unreasonable repetitions of linking words were observed. In terms of grammar it is obvious that the most of the childrens' stories are grammatically correct but the sentences are short with simplified structure and word order being unusual for Russian language.

Within our study bilingual and multilingual children composed shorter stories full of sentences with simplified structures.

The program of neuropsychological study traditionally includes a test called «composition of a story on the series of narrative pictures». "In this complex test which consists of the task to understand the sense of picture series and the story composition itself, the first part is evaluated by three parameters and the second one by nine parameters. The first three parameters (putting the series of pictures in order, semantic completeness and semantic adequacy) are complex and summarily reflect the understanding of the sense of series and the productivity of the story" (Akhutina, 2009).

The greater amount of testees showed standard time of task execution or the chronological indexes were minimized that was explained by the incompleteness of the story told. Putting the series of pictures in the right order which matches the understanding of storyline was not broken in most cases and children put the pictures properly themselves.

Significant errors were revealed while characterizing the semantic adequacy of the text. A great number of tested children showed semantic inadequacy because of the weakness of dextrocerebral functions (according to Akhutina T.V.) These children composed stories with mistaking and unrealistic descriptions of events.

Age dynamics in the evaluation of this criterion show that the older children in comparison with children of medium age make less errors related with left hemisphere but the expressiveness of indicators determining the weakness of dextrocerebral functions increases.

The grammatical analysis of the stories testifies that the testees use short sentences which are as a rule less-common or uncommon; they miss the basic sentence parts and break the word order.

While composing a story on series of pictures, almost all aspects appeared to be broken: semantic adequacy, programming a story, the grammar of story. The story consisted of short unextended sentences.

The most of children showed the impairments of both understanding of the sense and the productivity of story. At the level of syntax there were all variations of this impairment described in literature. As a rule, the texts were unextended short containing stereotypical linking words (the most frequent is "then"). The greater number of the children's stories were characterized with missing significant notional parts of text or hardly realistic interpretation of things.

The factor of multilingualism of social environment when the communication in family and kindergarten is conducted in at least two languages did not essentially manifest itself while the examination of the children of senior preschool age.

As we had supposed dinour previous works (Borisova *et al*., 2014), the multilingualism manifested itself more clearly while the evaluation of younger children's connected speech. Children living in bilingual environment composed shorter stories with simplified structure of sentences. They are characterized with more expressed agrammatisms; moreover, in the subgroups of such children there were more preschoolers with mental dysontogenesis variations in comparison with monolingual environment.

As a whole, the findings of the speech study show that the special aspects of language environment have an impact on the special aspects of formation of speech of 3-4 years old children in a multicultural region. The questionnaire survey results testify that bilingualism, the difference in languages spoken in family and at preschool facilities was specific as a rule to children with the features of mental dysontogenesis. It underlines the relevance and interconditionality of clinical-physiological and social-environmental factors of mental development of children in multilingual region.

Therefore, it can be expected that in multilingual environment the mental development of a child of junior and medium preschool age in particular the speech development has its own special aspects. The presence of unfavourable clinical-physiological factors is complicated by social-environmental phenomena that causes persistent manifestations of mental dysontogenesis features. All this underlines the timeliness of focused psychological-pedagogical affection in terms of speech development with consideration of the distinction of both psychopathological and culturological factors.

The findings of the study show the necessity to perform early diagnosis and organize the psychological-pedagogical support of children in order to prevent the development of expressed forms of psychoverbal ontogenesis of children living in a multicultural region.

In this regard, the organization of timely and focused correctional-developing and preventive work, allowing to alleviate the expressiveness of speech dysontogenesis and voluntary regulation insufficiency till the beginning of school education becomes a matter of great current interest. Taking into account the received findings, it appears more logical to apply motor methods which activate the interactions between various levels and aspects of mental activity. The consideration of age regularities is also held to imply the emphasis on gaming methods allowing to provide the emotional engagement and to keep the motivation going. It is appropriate to foresee the implementation of these activities within an adapted educational program which should be the result of collegial planning of a personal educational route for a child with health limitations in the context of educational institution.

CONCLUSION

By and large, the study findings prove the assumption regarding the possibility of early revealing of difficulties in regulatory and speech functions formation via the neuropsychological approach. The found tendencies determine the necessity of wider practical application of neuropsychological diagnostics in the psychological-pedagogical support of preschoolers as an effective and prognostic differential-diagnostic tool.

Organizing the work of preschool facilities in which the children with different starting capabilities can be educated the accomplishment of measures for timely diagnostics and for the correction of children's developmental deviations as well as social, psychological and methodological support of their parents will allow to decrease the number of children requiring an expert assistance in the preschool age and to decrease the acuteness of social and psychological problems in family. Development and implementation of the model of psychological-pedagogical accompaniment of children with health limitations which is based on the neuropsychological approach and oriented to general education institutions will be aiding the development of inclusive education and effective individually-oriented intervention programs.

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