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Psychological Peculiarities of Correlation between Phonemic Hearing and Orthographic Skills in Synthetic Languages

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Annotation: The paper is based on the empirical evidence of psychological peculiarities of correlation between phonemic hearing and orthographical skills on different stages of acquiring writing by Russian learners. The psychological causes and mechanisms of difficulties in the process of transition from a formal to functional level of writing are in the center of attention.

Key words: phonemic hearing, phonemic perception, psychological mechanism of a formal level of reading and writing, a functional level of reading and writing, orthographic skills, writing skills, automatic action.

Психологические особенности взаимосвязи фонематического слуха и орфографического навыка в синтетических языках

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Аннотация: статья описывает эмпирическое исследование психологических особенностей взаимосвязи фонематического слуха и орфографического навыка на разных этапах формирования письменной речи носителей русского языка. Выделяются психологические причины и механизмы

трудностей перехода от формальной к функциональной грамоте.

Ключевые слова: фонематический слух; фонематическое восприятие; психологические механизмы формальной грамоты; функциональная грамота; орфографический навык; автоматизированное действие.

According to Noam Chomsky a human being has an inborn talent for languages [Chomsky, 1966], but the fact is that languages have their own specific features and can be learned differently. Due to the language typology [Greenberg, 1960] we can single out specific psychological mechanisms and a language acquisition device in general. The process of conscious language acquisition, i.e. the acquiring of graphic forms of the language, reveals the greatest difficulty.

Orthographic skills suppose grammatically correct transition from the verbal information into a graphic text. Orthographic skills are closely connected with the rules of writing and oral perception of the information, i.e. auditory perception. Phonemic hearing is an ability to differentiate the phonemes of different languages [Luria, 2002; Kornev, 2006]

Nowadays illiteracy is a widespread problem of many countries all over the world. The common ground for this problem is the difficulty and specification of psychological mechanisms involved in the process of orthographic acquisition. As for the Russian language that belongs to the group of synthetic languages the difficulty is connected with the transition from formal to functional levels of reading and writing skills.

A.A. Leontyev [Leontyev et al., 2007] defined the skills and abilities to code and decode the verbal information into a written form of the text as a formal form of reading and writing and consequently the ability to use correctly and fluently a formal form of reading and writing as a functional level of reading and writing.

In the theoretical part of the research we singled out the compounds of orthographic skills in their strict succession to estimate the importance of phonemic perception in the developing of orthographic skills. We analysed all compounds of orthographic

skills, compared them with the structure of phonemic hearing, as the result we came into a conclusion that phonemic hearing is of great importance at all levels of writing formation or realization. But the functions of hearing differ: it is an aware function at the first stage (the generalization of stimuli) , the function of singling out and differentiation of separate speech sounds at the second stage (the differentiation of stimuli), the analytical function, i.e analyses, synthesis, verification at the third stage (the systemacy of stimuli).

Phonemic hearing is active even in the process of writing. When a person is pronouncing the text while writing it is the rudiment of rigid writing technique.

We organized three testing groups for our study: the first group (preschool children, 61 pupils) is at the preliminary level of orthographic acquisition, besides it is the sensitive period in the developing of phonemic hearing; the second group (pupils of the third form, 58 people) is the level when elementary skills of orthography are formed, but in general the rules of written speech are not used properly, it is the formal level of reading and writing; the third group (first-second year students of non-linguistic department, 66 people) presents the level of actual reading and writing, i.e. they have completely acquired the knowledge of the language, their orthography skills are formed. The total number of people taking part in the study is 185, they presented different levels of orthographic acquisition.

The diagnosis of written speech and phonemic hearing in contemporary practical psychology is complicated, because such diagnostic tests are held either at the sensitive the most active period in the developing of phonemic hearing or at the level of speech and language pathology. It doesn't correspond to all general psychological periods of orthographic acquisition in ontogeny. Besides, the diagnosis of adult written speech more often is aimed at the exposure of thought presenting, collocation of words, the outlook of the person and so on. There are no enough techniques to diagnose the compounds of written speech, their influence on the quality of the speech at the period of automatic action in written speech.

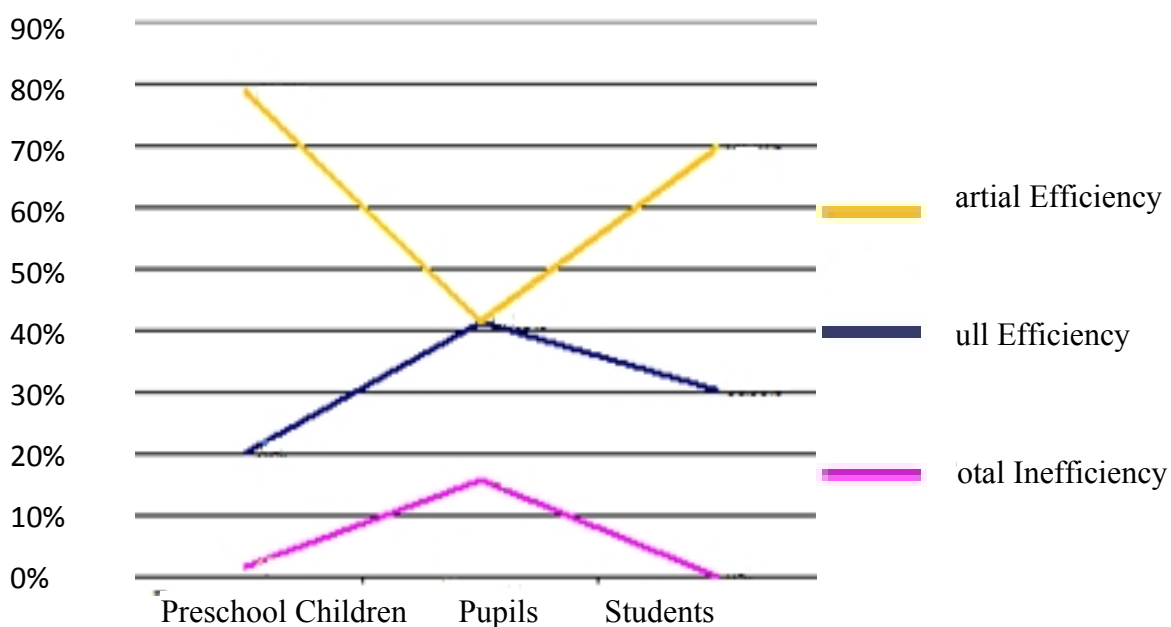
We have used the following techniques in our study:

I – general techniques for all participants: the diagnosis of speech pathology based on the neuropsychological methods for all age groups [Fotekova et al., 2009], the technique of qualitative analysis worked out by the laboratory under A.R. Luria;

II – techniques for preschool children: 1) the assignment to imitate the capital letters out of the tests on school mental maturity [Kern-Yerasic, 2009], 2) the assignment to analyze the sound form of the word [Venger et al., 2006].

Let us analyze the results of diagnosis in general.

According to the criteria of general progress in school activities the best results were shown at the stage of formal level of reading and writing. In the transition to this stage the number of testing students with good results in all types of assignments has shown 2,1 per cent increase. The number of testing students with excellent progress in school activities has become by 21,68% more than in a previous group, with only 19,7% of such students (Graph. 1).



Graph 1. The formation of orthographic acquisition by all groups of testing participants according to the criteria of total efficiency in all types of tests

The language acquisition at the stage of formal level of reading and writing and the transition to the mutual knowledge is accompanied with the greatest degree of conscience in writing activity with all its compounds. The increasing number of testing students with total inefficiency though the degree of conscience in all stages of writing is extremely high can only prove that the components of this action are not formed. The tenseness of conscience and mind can hardly lead to the best results because the writing skills have no fundamental basis. The adults, who have attended a prolonged course of studying, have the quality of the consisting elements practically closer to the level of preschool children than the pupils of elementary school. The same can be said about the number of total inefficient students.

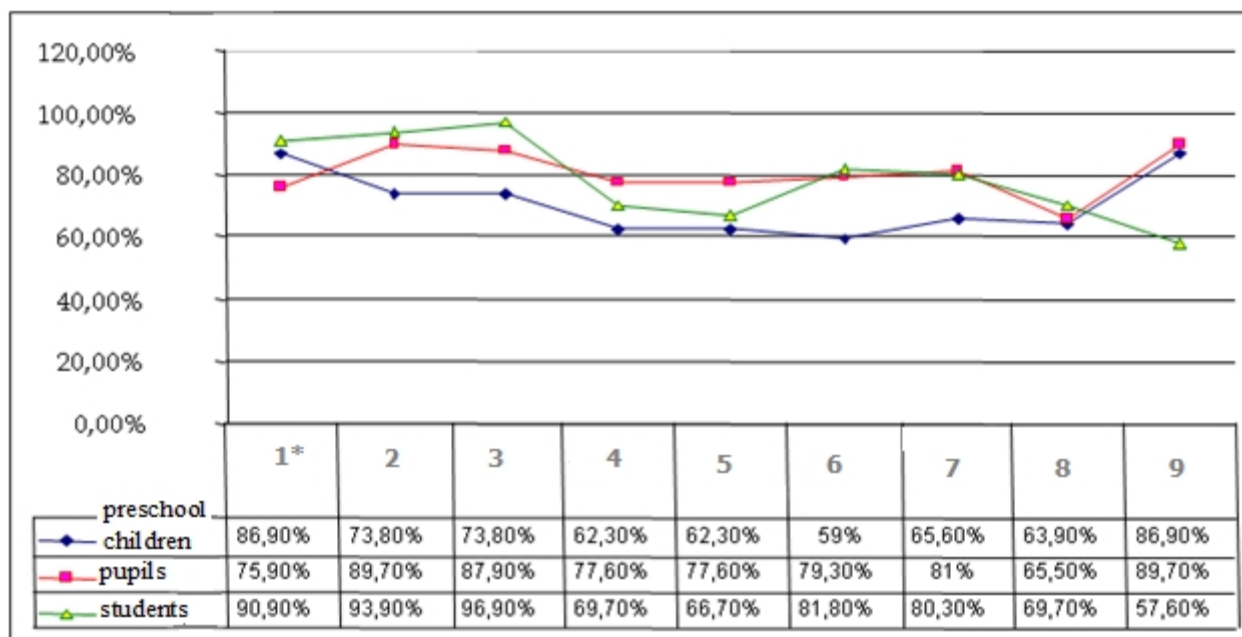
The growth of conscience in language acquisition leads to the division of students into those who are efficient and those who have bad commands in the language. Transition to the third stage, where the attitude to the language basis is not so precise, allows inefficient students become partially efficient via the worked out system of compensation. At this stage of education the acquisition of reading and writing is not the primary one because other aims of education become prevailing ones.

Now let us analyze the results of all three groups according to the criteria of each task efficiency. The results are clearly observed in Graph 2.

The second group of participants turned out to be the most stable, the third was the most unstable. It means that at the stage of formal level of the language acquisition the percentage of task efficiency was practically the same, between 77% and 90%. The datum of the first group is between 62% and 73%. It is extremely difficult to sum up the results of the third stage because there are sharp and multiple changes.

The goal of our research is to define the influence of the phonemic hearing on the orthographic skills. The low level of phonemic compound is observed in all types of tasks done by all groups. If we compare the results with writing skills it can reveal

the following.



Graph 2. The average task efficiency by all testing students: 1- sound pronunciation, 2 - sound structure, 3 - syllable structure, 4 - phonemic hearing, 5 - phonemic perception, 6 - word perception, 7 - sound analysis, 8 - language analysis, 9 - writing.*

At the first stage of preparing to writing the level of phonemic hearing is the lowest, meanwhile the motor writing (imitating/drawing) is the highest. At the stage of formal level the phonemic hearing is improved but writing doesn't become better. Logically, during the further studying these both data should have been increased, but we failed to meet our expectations. On the contrary, at the stage of the functional level of reading and writing the degree of phonemic hearing dramatically dropped up to the results of the first group, the level of writing turned out to be the most inefficient in all types of tasks.

Let us analyze the results of each diagnose task taking into consideration the factor of orthographic skill developing.

Analyzing the results of the first group we can judge that the most difficult task

was word perception (59%), then goes phonemic hearing and phonemic perception (62,3%), after that language analysis (63,9%), further sound and syllable structure (73,8%), sound pronunciation and writing (86,9%). To sum up, phonemic hearing is the greatest problem, though it is the stage of sensitive developing period.

The group of formal level has the difficulties in language analysis (65,5%), then tasks in sound pronunciation (75,9%), in phonemic hearing and phonemic perception (77,6%), word perception (79,3%), sound analysis (81%), syllable structure of the word (87,9%), word sound structure and writing (89,7%). Thus we can conclude that the second group is at the stage of incomplete phonemic formation. Here we can observe a type of correlation and weak compensatory function in perception/hearing.

At the stage of functional level the most difficult tasks were writing (57,6%), phonemic perception (66,7%), phonemic hearing and language analysis go further (69,7%), sound analysis (80,3%), word perception (81,8%), then sound pronunciation (90,9%), sound structure of the word (93,9%) and syllable structure of the word (96,9%). This group in comparison with the previous one showed the noticeable difference between phonemic hearing and phonemic perception. It proves the high degree of compensatory formation between phonemic hearing and phonemic perception and their correlation. But phonemic hearing is the ground for phonemic perception, thus as soon as any difficulty in hearing appears it can lead to difficulty in perception.

Separately we have analyzed the negative results of all groups and now can judge the following. The phonemic component of speech can be improved as soon as the language study becomes conscientious. The difficulty in phonemic hearing immediately provokes mistakes in phonemic perception, it is because phonemic hearing is of primary importance, it is basic. But the psyche exists according to the laws of systemacy: none of the structural compounds can work alone as the only one decisive.

The results in writing among the representatives of the first two groups, the first and the second, shows that the level of efficiency is higher than the level of phonemic compound in all types of tasks. The first group has no formed writing skills, they have only some ability in writing. The second group shows the initial writing skills. We can hardly speak about the automatic action of writing. It means that practically all compounds of writing as a process are held at the level of full conscience. The conscientious attitude to correct writing is added as the high degree of motivation in studying is observed due to the personality development and age traits of character.

The third group shows the lowest results in writing efficiency, the level of phonemic perception is low as well, but the level of phonemic hearing is unexpectedly 3% higher. It only proves that the levels of formation, activity and automatism in orthographic acquisition are not sufficient enough. In other words, orthographic skills of great number of students are based in general not on the phonemic compound and knowledge of rules but on the knowledge of rules only.

Especially noticeable fact is the low index of writing though all the rest tasks were done well. In this case we can conclude that not all abilities of psyche are used in the process of writing, only memory and thinking.

To sum it up, we can conclude that our set up hypothesis is confirmed by the results in total efficiency, by comparing the results in average task efficiency, by analyzing the negative results.

We used the statistic variational analysis with the usage of t-criteria of Student for independent unbiased sampling to acknowledge the data of qualitative analysis. It is stated that all three groups were chosen independently, the sampling is unbiased, the results are different, thus it can't be regarded as a single sample.

We have made a correlation analysis of data (r-Pearson) to specify the results and to establish the correlation among the average index of all variables of all participants. It allows to specify the meaningful variables and the importance of correlative links. Each group sampling reveals the symptom complex, the meaningful

correlation is proved to exist between phonemic hearing, phonemic perception and correct writing/ orthography.

The data of the empiric research make us sum up the following: phonemic hearing being a compound of phonemic perception is a meaningful structural component of human speech done in written form, since it is observed at all stages of speech production in writing, it influences the quality of speech, the orthography of the written text.

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