



Psychological and Speech Therapy Interventions in Language and Communication Disorders in Preschoolers

Valentina OLĂRESCU^{1*}, Diana BUGANU^{2*}

Received: 06 January 2022/ Accepted: 18 May 2022/ Published: 29 May 2022

Abstract

Through the present research, the theoretical-applied psychological foundations have been established, that form the basis for the identification of an alternative pathway for the development of language and oral communication in preschool children aged 5-6 years, by considering the relationship between pronunciation and memory disorders, and there has been developed, implemented and approved a systemic psycho-speech therapy intervention program aimed at recovering pronunciation disorders (polymorphic dyslalia) in preschoolers focused on language development, communication in conjunction with the memory function. The aim of the research is to develop, implement and validate the efficiency of a systemic psycho-speech therapy intervention program for the remediation of language disorders, based on the study of the peculiarities of the language development and communication related to the memory function with preschoolers. The results of the study provide a contribution to the psychological and speech therapy science with new information related to the knowledge of the relationship between pronunciation disorders and memory function, in preschool age.

Key words: Memory function; polymorphic dyslalia; preschoolers; speech therapy

How to cite: Olărescu, V., Buganu, D. (2022). Psychological and Speech Therapy Interventions in Language and Communication Disorders in Preschoolers. *Journal of Innovation in Psychology, Education and Didactics*. *Journal of Innovation in Psychology, Education and Didactics*, 26(1), 107-116. doi:10.29081/JIPED.2022.26.1.09.

¹ Prof. PhD, Ion Creanga State Pedagogical University of Chisinau, Chisinau, Moldova, E-mail: volarescu@yahoo.com

² PhD Student, Ion Creanga State Pedagogical University of Chisinau, Chisinau, Moldova, E-mail: diana.buganu@gmail.com

* Corresponding author

1. Introduction

In the preschool period, language undergoes intense development, acquiring specificity and manifesting itself as a significant item in organizing the intellectual and psycho-behavioral functionality of the child (Golu, 2010; Racu, 2015; Vâgotski, 1971). Language is continuously enriched, phonological development is almost completed, the capacity for logical-grammatical formulation is developed, and communication encourages the child's interrelationship. At this stage, the child develops on multiple levels, the cognitive and linguistic development, as well as communicative skills are supported and contribute to the psycho-affective development (Bucun, 2009; Ciobanu, 2005; Gînu, 2001; Verza, 2009). During this period, language and communication disorders may be seized, constituting the interest of many researchers who address them from different angles (Bodea Hațegan, 2016; Olărescu, 2008; Păunescu & Mușu, 1984; Popovici, 2000).

The pronunciation disorder is a language disorder that is widespread among preschool children and requires a complex approach, because if not remedied in time, it intensifies and causes disorders of communication, socialization and the child's personality. The results of modern studies plead for the inclusion of the language disorder (polymorphic dyslalia), along with dyslexia and dysgraphia, in the category of learning difficulties or development disorders, these being considered on a continuous axis and being maintained by deficits at the level of the working memory. Its role is significant in learning and education, and is related to the child's ability to process information and to learn basic skills in oral and written language, mathematics and social interactions. The working memory, along with phonological awareness, is a good predictor of school success in children (Buganu, 2020; Cowan et al., 2003; Montgomery, 2003; Olărescu & Buganu, 2018; Olărescu et al., 2020; Visu-Petra & Cheie, 2012).

From the perspective of the working memory training, researchers have focused particularly on school-age children, but most of these studies were conducted on children with typical development. In preschool children, the literature attests to few investigations aimed at highlighting programs to improve the working memory capacity or acquisition memory strategies in 5-7-year-old children, such as verbal labeling, simple verbal repetition, verbal recoding, categorization of strongly related items, visual strategies (Sodian et al., 1986; Visu-Petra & Cheie, 2012). We consider that the studies on the relationship between pronunciation disorders and working memory in preschool, from the perspective of designing programs to support the development of oral communication skills and the remission of pronunciation disorders are insufficient and reveal a field in the incipient state of exploration.

In this context, our research acquires a special practical and theoretical topicality, and the *elaboration of a systemic program of psycho-speech therapy* for senior preschoolers with polymorphic dyslalia becomes particularly current. The degree of research of the proposed problem and the premises of the research highlighted *the scientific problem*, determined by the dilemma between an insufficient investigation of the pronunciation disorders in relation to memory function in preschoolers with polymorphic dyslalia, and the need to develop a systemic intervention psycho-speech program which would streamline the development of the language and communication at these children. *What would be the alternative way to streamline the speech therapy intervention, in order to develop language and oral communication, by taking into account the relationship between the pronunciation disorder and the memory function?*

The aim of the research is to develop, implement and validate the efficiency of a systemic psycho-speech therapy intervention program to fix the language disorders, based on studying the peculiarities of the language development and the communication in relation to the memory function with senior preschoolers.

The goals of the research aim are the following:

- identification of the neuropsychic function in the context of the presence of pronunciation disorders;
- determining the connection between mnemonic function and pronunciation disorders (polymorphic dyslalia) in senior preschoolers;
- elaboration and implementation of a systemic psycho-speech therapy intervention program focused on the development of language and communication, and of the mnemonic function.

2. Research methodology

2.1. Participants

The experiment was conducted from September to November 2018 and consisted of a comparative study of oral language and memory in typically developing preschoolers and preschoolers with pronunciation disorders (polymorphous dyslanguage) aged 5-6 years. 150 children took part in the experiment, of which we delimited a sample of 70 preschoolers with typical development (group N), as well as a sample of 80 preschoolers with polymorphic dyslalia (group D).

2.2. Method

The research instruments used were the following: the Alice Descoedress Test, to determine the psychological age of language development; the Bankson-2 Test for the Language Assessment (BLT-2), to measure linguistic aspects at the semantic, morpho-syntactic, pragmatic level; Raven's Progressive Colour Matrices, parallel version, to determine the level of intellectual development in relation to chronological age; Pronunciation Ability Examination Sheet (taken from speech therapy practice), to assess pronunciation disorders; the Auditory-verbal memory capacity assessment test – to assess auditory-verbal memory capacity in relation to chronological age; the Visual memory assessment test to measure visual memory capacity; the NEPSY battery – to assess the level of development of neuropsychological functions: language, memory and learning, attention/executive functions, sensorimotor functioning, visual-spatial processing, in relation to chronological age.

3. Results

The results are presented in correlation with the research hypotheses.

Working hypothesis: Only preschoolers with language disorders will commit imperfections in the pronunciation of sounds (consonants) of the Romanian language.

Table 1. Decision ability examination sheet, batch D

	Frequency	Percentage
Dyslalia in the first joint region	15	18.75
Dyslalia in the second joint region	80	100
Dyslalia in the third joint region	17	21.25

The maximum score in this test was 40 points. The average gross scores of the subjects had the value of 10.20 points, and the variability of the scores around this average value was ± 3.38 points. Given these values, we consider that group D is sufficiently representative in terms of the presence of polymorphic dyslalia.

Working hypothesis: There are significant differences between pre-schoolers with pronunciation disorders and pre-schoolers with typical development in terms of the psychological age of language development.

Performing an average of the performances on all 7 samples of the A. Descoedress test, we delimited the psychological age of the language, which we related to the average chronological age. The average values of the chronological age in relation to the psychological age in group N being 5.5 years (with $\delta = 0.336$) and 5.9 years, respectively (with $\delta = 0.230$); in group D being 5.59 years (with $\delta = 0.292$) and 5.27 years respectively (with $\delta = 0.295$). Hence, in the case of typical preschoolers, a psychological age of the language higher than the average chronological age, the advance being almost half a year in the language development. The value of the *t test* for independent samples at the level of the average chronological age was statistically *insignificant* ($t = -1.708$, at $p = 0.090$), while from the perspective of the psychological age of the language the value of the *t test* was *significant* ($t = 14.370$, at $p \leq 0.001$).

Working hypothesis: There are significant differences between pre-schoolers with language disorders and pre-schoolers with typical development in terms of the language development on the semantic, morphological, syntactic, pragmatic side.

The linguistic performances of pre-schoolers with language disorders were clearly placed at lower levels, respectively most of them had performances of medium level (62.5%) or below average (20%), and few of them had better results, above average (11.2%) or higher (6.3%). On the other hand, it is observed that the language development was predominantly of higher level in the pre-schoolers with typical development (70%), but also of medium level (15.7%) or above average (14.3%), presented in Figure 1.

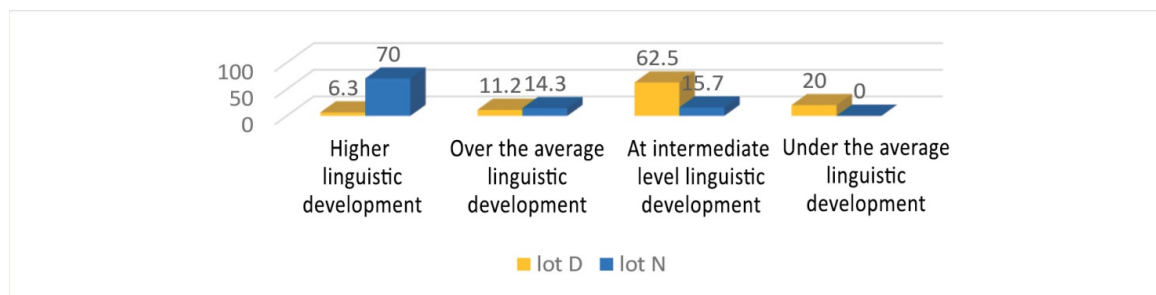


Figure 1. Distribution of subjects from groups D and N by levels of language development

The statistical analysis of the data obtained in the BLT-2 test allowed the validation of the working hypothesis.

Working hypothesis: There are significant differences between pre-schoolers with language disorders and pre-schoolers with typical development in terms of the ability to learn and update mechanical and logical associations.

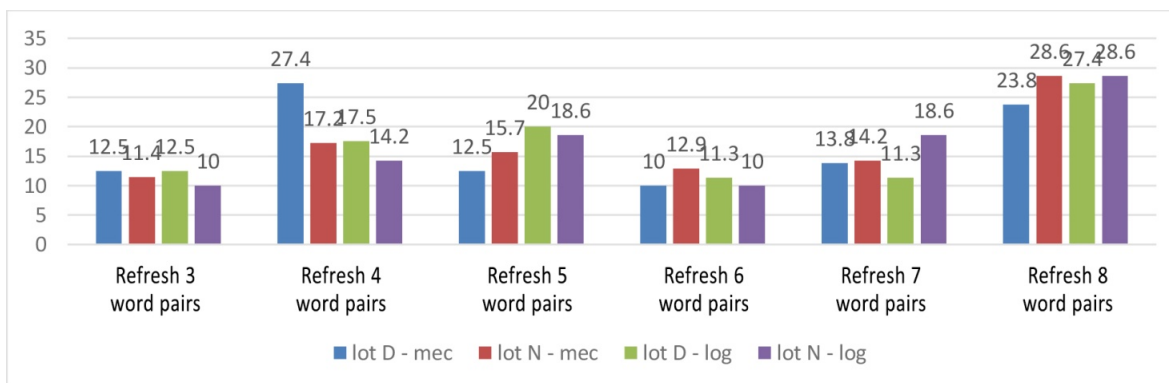


Figure 2. Results in the ability to mechanically and logically associate words

From the perspective of the number of mechanical and logical associations of words, a similar distribution of the results obtained by the subjects from both groups is observed, with some small differences. In this test, the average gross values of performance were calculated, both in terms of the number of mechanical and logical associations updated by the subjects in the two groups (rendering list 2 and list 4), and in terms of time and number of repetitions required for memorization the word pairs.

Table 2. Results in the learning / updating capacity of mechanical and logical associations

		No. of subjects	Gross average	Standard dev.
Mechanical associations (playlist 2)	Lot N	70	5.87	1.7850
	Lot D	80	5.56	1.8131
Logical associations (play list 4)	Lot N	70	5.98	1.7403
	Lot D	80	5.73	1.7913
Repetition of mechanical combinations (list1)	Lot N	70	3.51	1.2711
	Lot D	80	4.02	1.1471
Repetition of logical associations (list 3)	Lot N	70	3.32	1.3375
	Lot D	80	3.50	1.2222
Mechanical association time (list 1)	Lot N	70	5.16 min	1.33 min
	Lot D	80	6 min	1.23 min
Logical association time (list 3)	Lot N	70	4.43 min	1.34 min
	Lot D	80	4.56 min	1.21 min

Analysing the results obtained for the *t test* in this sample, a series of insignificant values were delimited: of the number of the mechanical associations ($t = 1.049$, $p = 0.296$), of the number of logical associations ($t = 0.858$, $p = 0.392$), of the number of repetitions necessary for the logical learning of word pairs ($t = -0.820$, $p = 0.413$), as well as the time necessary for memorizing word pairs through logical learning ($t = -0.901$, $p = 0.369$). On the other hand, some significant values of the *t test* were delimited: of the number of repetitions necessary for the mechanical learning of word pairs ($t = -2.586$, $p = 0.011$) and of the time necessary for memorizing word pairs by mechanical learning ($t = -3.067$, $p = 0.003$). The values of the *t test* were calculated for groups with homogeneous variances - the values of the F Levene test were insignificant, f having values between 0.185 and 3.130 (the values of the significance thresholds

being between 0.079 and 0.688). The working hypothesis is only partially confirmed in the sense that there are statistically significant differences between group D and group N only in terms of the number of repetitions required to memorize word pairs by machine learning, as well as the time required to mechanically memorize pairs of words. The working hypothesis is not confirmed from the perspective of the number of updated logical and mechanical associations, of the number of repetitions necessary for the logical memorization and of the time necessary for memorizing the pairs of words associated on a logical criterion.

Working hypotheses: There are significant differences between pre-schoolers with language disorders and pre-schoolers with typical development in terms of the ability to retain a series of auditory-verbal and visual elements.

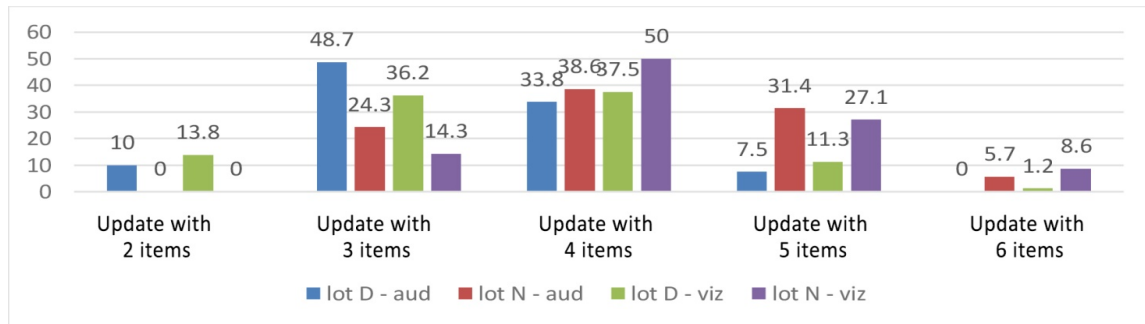


Figure 3. Distribution of results to auditory and visual memory capacity

We present below the average performances obtained by the subjects of the two groups, both from the perspective of the *working memory capacity* as well as the *potential memory capacity* (random playback of the items presented in series), on the two modalities, auditory and visual.

Table 3. Average performances obtained at the working memory capacity and the potential memory capacity, lots D and N

		No. of subjects	Gross average	Standard dev.
Number memory (working, auditory)	Lot N	70	4.18	.8730
	Lot D	80	3.38	.7712
Number memory – at random	Lot N	70	4.58	.7321
	Lot D	80	3.73	.8228
Image memory (work, visual)	Lot N	70	4.30	.8227
	Lot D	80	3.50	.9140
Image memory – at random	Lot N	70	4.75	.6241
	Lot D	80	3.98	.8343

Summarizing the results of these two tests, the intergroup analysis revealed mnemonic performances (visual and auditory) inferior to pre-schoolers with language disorders, compared to typical pre-schoolers. Intergroup analysis revealed a better visual memory capacity than the auditory memory capacity in both typical pre-schoolers and pre-schoolers with language disorders. By applying the *t test* for comparing the averages for independent samples, from the

perspective of the number/auditory memory and image/visual memory, a series of *significant differences* were delimited between the two groups of subjects. From the point of view of the memory capacity of the auditory and visual serial elements (number memory and image memory), *significant values* of the *t test* were obtained, both in number memory ($t = 5.946$; $p \leq 0.001$) and in image memory ($t = 5.602$; $p \leq 0.001$). From the perspective of the potential mnemonic capacity, on auditory and visual typology (number-random memory and image-random memory), *significant values* were obtained: for the random rendering of the numbers $t = 6.629$ at $p \leq 0.001$, and for the random rendering of the images $t = 6.323$ at $p < 0.001$. The intergroup analysis revealed a capacity for retention of serial elements (auditory and visual) significantly more developed in typical pre-schoolers, compared to that of pre-schoolers who have polymorphic dyslalia. We can say that the deficits of the working memory are more accentuated at the phonological level and less at the imagistic level, in children with polymorphic dyslalia. Under these conditions, the working hypotheses were confirmed.

Working hypothesis: There are significant differences between pre-schoolers with language disorders and pre-schoolers with a typical development in terms of the level of development of the neuropsychic functions.

The calculation of the average values of the performances, on the 5 development areas (basic subtests), by taking into account the sum of the standardized scores (composite scores) showed that the performances of the subjects from group N are superior to the subjects from group D, and the differences are statistically significant, the conclusion from the administration of the *t test* for independent samples (Figure 4).

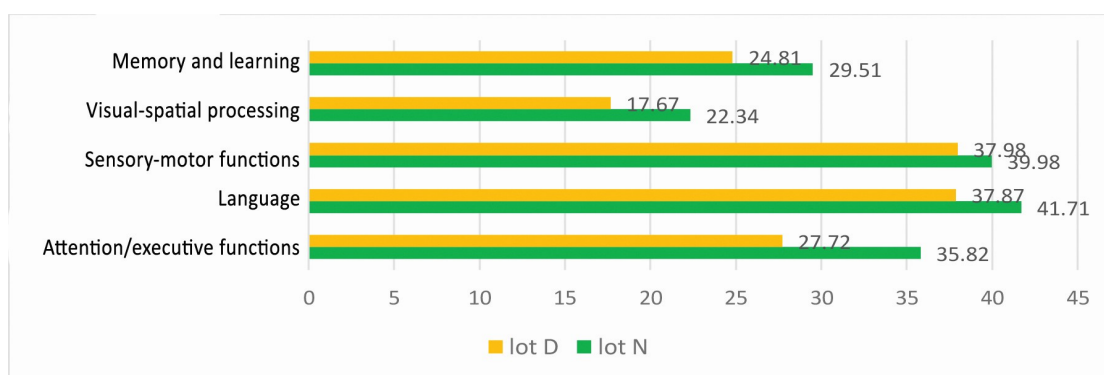


Figure 4. Mean values of the neuropsychic functions within the *NEPSY battery*

As we analysed the situation in each area of investigation of the neuropsychic functions, significant differences were observed between the performances of the two categories of children. The values of the *t test* for independent samples had statistically significant values, $p \leq 0.001$. The *t test* values were calculated for homogeneous groups - *Levene f test* having insignificant values (*f* had values between 1.296 and 3.062, at significance thresholds between 0.082 and 0.257). Based on the values of the *t test* for independent samples, we calculated the *d Cohen* indicator in all 5 areas of development, registering statistically significant values; a very important standardized difference of the averages obtained at the levels of development of the neuropsychic functions, between the two groups. In conclusion, it is reconfirmed, once again, that there are significant differences between pre-schoolers with pronunciation disorders and pre-schoolers with typical development in neuropsychic functions: attention/executive

functions, language, sensory-motor functions, visual-spatial processing, memory and learning. Another conclusion drawn by processing and interpreting the experimental data, suggests that for the studied age stage (5-6 years), the pronunciation disorder (polymorphic dyslalia) no longer falls within the physiological limits of evolution, highlighting the fact that it is related to mild disturbances of neurocognitive functions.

Working hypotheses: There are significant correlations between the variables studied in the two categories of subjects investigated. We have applied the *Pearson correlation test*. A series of positive correlations were established, of which the most important are those between the variables representing the linguistic abilities (psychological age of the language, language, semantic knowledge, morpho-syntactic rules, pragmatic language) and between the variables representing mnemonic functions (memory and learning, mechanical word association, *Auditory Memory*, *Visual Memory*). We also identified the indirect correlations between pronunciation disorders and language skills, respectively memory functions, which can guide us in developing the training program. Overall, the finding is that through the development of language and communication, respectively of the mnemonic function, we will indirectly influence the pronunciation disorders, and increase the psychological age of language in pre-schoolers.

4. Conclusions

Several conclusions emerge from the research:

- The existence of statistically significant differences between group D and group N were revealed, from the perspective of the investigated psychic levels, respectively language, memory and some neuropsychic functions;
- Significant differences were delimited at the level of the psychological age of the language through the A. Descoedress test;
- The presence of the pronunciation disorder (polymorphic dyslalia) imprints an inferior development of the linguistic structures from a semantic, morphological, syntactic or pragmatic point of view; with reference to the level of the phonological processing and to the receptive and expressive language skills, there are statistically significant differences between the categories of the children;
- There are statistically significant differences between the groups of pre-schoolers in the field of memory and learning, respectively in memory and visual-verbal learning and narrative memory (mnemonic functions);
- The working of auditory memory in pre-schoolers with polymorphic dyslalia is lower than the limits reached by the typical pre-schoolers;
- The method of evaluating the visual memory, elaborated and applied in analogy with the method of evaluating the auditory-verbal memory, allowed the highlighting of superior performances in the visual mnemonic functioning compared to the auditory mnemonic functioning, in the two categories of subjects;
- In terms of learning and updating of group mechanical and logical associations, statistically significant differences were identified between the categories of children, only from the perspective of the mechanical word associations, more precisely from the perspective of the number of repetitions necessary to memorize word pairs, by mechanical learning, as well as the necessary time of the mechanical memorization;
- The results of the ascertaining experiment showed that the pronunciation disorder (polymorphic dyslalia) is related to slight disturbances of the neurocognitive functions. From the perspective of the fields of attention/executive functions, sensorimotor functions and visual-spatial processing, the obtained data attest to slight deviations in

development, and the differences from the performances of the typical pre-schoolers are statistically significant, given the presence of the polymorphic dyslalia.

- By applying the Pearson correlation test, a series of positive correlations were established, between the language skills and the memory functions.
- Indirect correlations were also identified between the pronunciation disorders and the language skills, respectively mnemonic functions, which can guide us in developing the training program.

References

- Bodea Hațegan, C. (2016). *Logopedia. Terapia tulburărilor de limbaj. Structuri deschise* [Speech therapy. Therapy of language disorders. Open structures]. Bucharest: Trei Publishing House.
- Bucun, N. (2009). Pregătirea psihologică pentru școală a copiilor cu tulburări de limbaj [Psychological preparation for school of children with language disorders]. *Univers Pedagogic*, 3, 68-75.
- Buganu, D. (2020). *Metodologia programului sistemic de intervenție psiho-logopedică* [Methodology of the systemic psycho-logopedic intervention programme]. Chișinău: Garomont Studio Publishing.
- Ciobanu, A. (2005). Indici de diagnostic și diferențiere a copiilor cu reținere în dezvoltarea psihică de natură deprivatională [Diagnostic indices and differentiation of children with mental retardation of a deprivation nature]. *Psihologie. Pedagogie Specială. Asistență Socială*, 1, 53-57.
- Cowan, N., Towse, J.N., Hamilton, Z., Sauls, J.S., Elliott, E.M., Lacey, J.F., Moreno, M.V., & Hitch, G.J. (2003). *Children's working-memory processes: A response-timing analysis*. *Journal of experimental psychology*, 132(1), 113–132, <https://doi.org/10.1037/0096-3445.132.1.113>.
- Gînu, D. (2001). *Psihologia diferențierii dezvoltării copiilor în procesul educațional. Chișinău: Institutul de Științe Pedagogice și Psihologice*. [The psychology of differentiation of children's development in the educational process]. Chișinău: Institute of Pedagogical and Psychological Sciences.
- Golu, F. (2010). *Psihologia dezvoltării umane*. [Human development psychology]. Bucharest: University Publishing, 315.
- Montgomery, J.W. (2003). *Working memory and comprehension in children with specific language impairment: what we know so far*. Article published in *Journal of Communication Disorders*, 221–231. [citat 18.04.2019]. [https://doi.org/10.1016/S0021-9924\(03\)00021-2](https://doi.org/10.1016/S0021-9924(03)00021-2)
- Olărescu, V. (2008). *Logopedia. Perspectiva diagnosticului logopedic*. [Speech therapy. The perspective of speech therapy diagnosis]. Chișinău: Elena-V.I. SRL Publishing.
- Olărescu, V., & Buganu, D. (2018). *Aspecte ale capacității mnezice la preșcolarii cu dislalie polimorfă* [Aspects of mnesic ability in preschoolers with polymorphous dyslexia]. *Psychology, Scientific-practical journal*, 33, 3-4.
- Olărescu, V., Buganu, D., & Madan, L., (2020). *Strategii didactice în logopedie*. [Teaching strategies in speech therapy]. Chișinău: Garomont-Studio Publishing.
- Păunescu, C., & Mușu, I. (1984). *Tulburări de limbaj la copil* [Language disorders in children]. Bucharest: Medical Publishing.
- Popovici, D.V. (2000). *Dezvoltarea comunicării la copiii cu deficiențe mintale* [Communication development in children with intellectual disability]. Bucharest: Pro Humanitate Publishing House.
- Racu, J. (2015). *Formarea abilităților comunicative la preșcolarii mari ca factor al socializării eficiente* [Communication skills training in older preschoolers as a factor of effective socialization]. Paper presented at *Methodological guidelines for early childhood socialization* (pp. 45-50). Chișinău: Institute of Education Sciences.

- Sodian, B., Schneider, W., Perlmutter, M. Recall,(1986). Clustering, and metamemory in young children. *Journal of Experimental Child Psychology*, 41, 395-410. [https://doi.org/10.1016/0022-0965\(86\)90001-9](https://doi.org/10.1016/0022-0965(86)90001-9).
- Verza, E. (2009). *Tratat de logopedie* [Speech therapy treatise]. Vol.II. Bucharest: Semne Publishing House
- Visu-Petra, L., Cheie, L. (2012). *Dezvoltarea memoriei de lucru – Exerciții pentru preșcolari și școlari* [Working memory development - Exercises for pre-school and school children]. Cluj-Napoca: ASCR Publishing.
- Vîgotski, L.S. (1971). *Opere psihologice alese* [Selected psychological works].Vol I; II. Bucharest: Didactic and Pedagogical Publishing House.