

PSYCHO-PEDAGOGICAL INTERVENTION STRUCTURED ON COMPONENTS SPECIFIC TO READING AND WRITING ACTIVITIES

CLAUDIA-DOINA GREC*, OLGA CHIȘ**

ABSTRACT. This research aims to investigate the efficacy of the psycho- pedagogical intervention program structured on techniques that develop the organizational skills of students with attention deficit hyperactivity disorder who have reading and writing difficulties. The complex of manifestations specific to attention deficit and hyperactivity emerges and develops in the context of mainstream school and the psycho-pedagogical intervention depends, in any context, upon teachers' experience and knowledge. Customizing the intervention according to the learning difficulties encountered in the field of reading and writing, was a necessity in the development of the psycho-pedagogical intervention program, executive functioning deficits reflecting differently in the sphere of reading and writing, fact proven by the studies. Psycho-pedagogical intervention techniques can be implemented by the classroom teacher without disturbing students' educational program, through management techniques of the time for study / individual work in the classroom, planning techniques, prioritizing techniques, self-monitoring techniques, techniques for preparing the materials for school.

Keywords: *attention deficit hyperactivity disorder, lexical graphical disorders, psycho-pedagogical intervention program, customized intervention, organizational skills.*

ZUSAMMENFASSUNG. Die vorliegende Forschung untersucht die Wirksamkeit einer strukturierten psycho-pädagogischen Interventions Programms, das auf den Entwicklungsfähigkeiten der organisatorischen Fähigkeiten der Schülern, die Aufmerksamkeit- und Hyperaktivität Defizite, im Rahmen des Lesens und Schreibens haben, strukturiert ist. Der spezifische Ausprägungskomplex im Bereich Aufmerksamkeit- und Hyperaktivität Defizit entsteht im Rahmen der Bildung der Massen und die pädagogische Intervention hängt, in jedem Kontext, von der Erfahrung und vom Wissen der Lehrern. Angepasster Angriff abhängig von den

* Junior Lecturer Phd, Faculty of Psychology and Education Sciences, Education Sciences, Departament, Babeș-Bolyai University, Cluj-Napoca, Romania, claudiagrec@yahoo.com

** Lecturer Phd, Faculty of Psychology and Education Sciences, Education Sciences, Departament, Babeș-Bolyai University, Cluj-Napoca, Romania, olga_marcus@yahoo.com

begegneten Lernschwierigkeiten im Bereich des Lesens und Schreibens, war eine Notwendigkeit in der Entwicklung des pädagogischen Interventionsprogramms. Exekutive Funktionen Defizite, nach Studien, sind unterschiedlich in der Sphäre des Lesens und Schreibens verbreitet. Pädagogische Interventions-Techniken können durch Lehrern im Klassenzimmer umgesetzt werden, ohne den Bildungsprogramm der Schülern, durch Zeitmanagement-Techniken und individuelles Schulungsraumarbeit/Studium, Planung-Techniken, Priorisierung-Techniken, Self-Monitoring Techniken oder Schulungsmaterialien Vorbereitungs-Techniken zu stören.

***Schlüsselwörter:** Aufmerksamkeits-Defizit- und Hyperaktivitäts-Störung, Lexikographische Störungen, Pädagogisches Interventionprogramm, angepasste Anpassung, organisatorische Fähigkeiten*

INTRODUCTION

Existing literature indicates the association of attention deficit and hyperactivity with learning difficulties, difficulties which may lead to poor school performance in the case of students with above average intellect. The detailed study of the particular association between primary manifestations of the attention deficit and hyperactivity and the specific learning difficulties identified the difficulties faced by students with attention deficit and hyperactivity in reading and writing tasks.

Students with attention deficit and hyperactivity have poor results in various tasks involving verbal learning, memory, vigilance and complex problem solving. So, when they are combined with attention deficit and hyperactivity, learning difficulties have a specific role in school failure. The difficulties faced by students with attention deficit and hyperactivity affecting the learning process concern: vigilance or reflection processes, oral expression, written expression, coordination of fine movements, reading comprehension, long-term memory, short term memory and working memory. The types of learning difficulties that are commonly encountered in these students are problems of visual and auditory perception, language learning, hyperactivity, impulsiveness, distractibility, abstraction, problems that are reflected in the lexical- graphical performance.

Educational influences appropriate to the potential of each student, respecting the individual characteristics and needs, determine the compliance with the principle of differentiated education. Thus, a psycho-pedagogical intervention program applied in the case of students with attention deficit and hyperactivity disorder presenting learning difficulties may ensure equal opportunities for development.

METHODOLOGY

Research objectives

The objective behind the development of this research was to elaborate and investigate the efficacy of the psycho-pedagogical intervention program based on the component "techniques for the development of the organizational skills, associated with self-organization skills, in customized ways for learning difficulties (reading and writing) " in the case of students with attention deficit and hyperactivity.

Research hypothesis

Consistent application in students with attention deficit and hyperactivity disorder (grades II -IV), of a psycho-pedagogical intervention program structured on components of organization, self-organization, of general character and specific to reading and writing activities, in relation to the specific profile of the executive functions, contribute to efficient learning.

In this research we focused on the coordinate described as a specific hypothesis: the development and use of the organizational skills, self-organizational skills specific to reading and writing, support significantly the elimination process of lexical-graphical difficulties.

Research variables

The independent variable of the research was represented by the psycho-pedagogical intervention program, structured on the component regarding the formation of the organizing skills specific to reading and writing.

The dependent variables of interest in this research were represented by: the variables regarding school performance (reading automaticity, reading comprehension and written expression) and variables regarding the executive functioning (graphic and motor organization and visual-spatial skills, planning and visual-spatial memory, planning, monitoring, self-regulation and problem solving skills).

There were also categorical variables: the *grade* the student with attention deficit and hyperactivity disorder associated with learning difficulties comes from, the *drug therapy* received or not by these students and the *type of attention deficit and hyperactivity*.

Procedure

The research was conducted during the 2011-2012 school year, on a group of 42 students with attention deficit hyperactivity disorder, the inattentive, hyperactive / impulsive and combined types, integrated in the mainstream

education, who presented lexical – graphical difficulties. This study was a continuation of the psycho-pedagogical intervention program targeting the forming of the general character organizational skills in these students.

Description of the psycho-pedagogical intervention program

The intervention program was implemented by the teacher during 16 weeks, in the case of students with attention deficit hyperactivity disorder and learning difficulties and consisted of: the consolidation of the general character organizing techniques, implemented in the first part of the psycho-pedagogical intervention program, routines to solve writing and reading difficulties, "We all make mistakes," "I have ten minutes to solve this task", "first of all..." "Homework in the contract" "I am a project manager", observation, recording behaviors.

The techniques that form the intervention were grouped into several categories dealing with other aspects of the organizational skills. Thus, there were proposed several techniques for the management of the time for study / individual work in the classroom, planning techniques, prioritization techniques, self-monitoring techniques, techniques for preparing materials for school.

Routines in solving reading and writing difficulties

Difficulties faced by students with attention deficit and hyperactivity in reading and writing tasks were different so that the intervention was individualized. There was done a general description of the intervention program according to the difficulties encountered and there were proposed ways of intervention for each difficulty. There was used a personal " Dictionary" to take notes about the problems faced by each student.

"We all make mistakes!"

The student learned to check his work at the end of each individual activity performed and correct it.

Initially, after completing a form, the teacher used to correct the paper and give a mark, without writing anything on student's paper. The student was instructed to correct his mistakes that he identified himself, and the mark was changed with a slight penalty.

Gradually, the teacher asked the student to correct the paper before handing it, in order not to be penalized.

"I have ten minutes to solve the task!"

This technique was applied in courses that do not raise performance difficulties. The student had to be confident in his ability to solve the task and finish the task in the given time. In order to help, we used a wall clock and periodically noted on the blackboard the remaining time.

"First..."

Students were taught to enumerate (make a list of) the tasks they had to perform, to name the ones they wanted to achieve first and those that seemed more difficult. There was established an order to solve the tasks

The homework in the contract

The role and importance of a contract were explained to the student, then the student and parent / teacher (in the case of the extended program) signed a contract which established the completion of homework in a certain period of time. The contract included several points (Appendix16): the object of the contract which consists in finishing homework in a certain time interval; there was an article for each exercise in which was mentioned the time limit. In the contract were mentioned student's and parent's obligations and the bottom of the page there was a space where the student and the parent signed.

I am a project manager!

The student was designated to coordinate a large group project, which was evaluated at the end of the semester. Coordinators were trained separately by the teacher on the responsibilities and steps they had to follow. They were handed a list of tasks and necessary steps. The project was conducted in the classroom over a period of three weeks. There was an objective to reach every week.

After the implementation of the intervention program, there were completed again, for each student, the behavior rating scales during the instructive - educative activities from the curriculum area *language and communication*.

After completing the entire psycho-pedagogical intervention program, students were assessed again, using instruments which tested reading and writing (l' Alouette test, reading comprehension tests and image composition) and neuropsychological tests: Rey - Complex Figure (copy -recall) and Tower subtest (NEPSY), establishing its efficiency.

RESULTS

The study investigating the effectiveness of the psycho-pedagogical intervention program, structured on components specific to reading and writing, is a continuation of the experimental study on the intervention program based on the organizational component of general character. In this study was continued the analysis of data resulted from the application of the second component of the psycho-pedagogical intervention program, based on techniques of developing organizational skills, associated with self-organizing skills specific reading and writing.

Correlation tests on the final post-test variables

The analysis consisted in performing the correlations in the mirror, for the variables from the final post - test to see if the correlation trends are maintained. There were strong correlations between all pairs of variables of interest in research:

- Significant positive correlation between the variables of graphical- motor organization and visual- spatial perception skills and those concerning school performance ($r = 0.70$, $p < 0.01$ reading automaticity, $r = 0.69$, $p < 0.01$ reading comprehension, $r = 0.70$, $p < 0.01$ written expression skills).
- Significant positive correlation between the planning variables and visual-spatial memory and school performance variables: reading automaticity ($r = 0.67$, $p < 0.01$), reading comprehension ($r = 0.72$, $p < 0.01$) and written expression skills ($r = 0.69$, $p < 0.01$).
- Significant positive correlation between the variables concerning planning, monitoring, self-regulating and problem solving skills and all school performance variables: reading automaticity($r = 0.66$, $p < 0.01$), reading comprehension ($r = 0.68$, $p < 0.01$) and written expression skills ($r = 0.72$, $p < 0.01$).
- Significant positive correlation between variables, on neuropsychological tests between themselves(e.g. planning, monitoring, self-regulating and problem solving skills and the graphical- motor organization $r = 0.58$, $p < 0.01$ and planning and visual- spatial memory $r = 0.69$, $p < 0.01$) and between the variables from the pedagogical tests between themselves: reading automaticity and all the other results at: reading comprehension ($r = 0.73$, $p < 0.01$) with the written expression skills ($r = 0.78$, $p < 0.01$).

The analysis of the correlation tests showed that all correlations are significantly higher than in the pretest or partial post- test. Absolutely all the pairs formed between the 6 variables of interest in the research are strongly correlated at a significance level $p < 0.01$. These correlations increased compared to the situation from the partial post - test. It can be said therefore that the psychopedagogical intervention produced positive changes in students' performance and, moreover, these changes have accentuated in time.

When controlling the variable year of study, at the analysis of the correlations between the variables of interest in research from the final post-test, was noticed that:

- At the level of the 2nd grade there are positive correlations between most variables, for example:
 - Planning and visual -spatial memory and the variables: planning, monitoring, self-regulating and problem solving skills ($r = 0.72$, $p < 0.01$), reading comprehension ($r = 0.70$, $p < 0.01$), written expression skills ($r = 0.71$, $p < 0.01$) and reading automaticity ($r = 0.57$, $p < 0.05$).

- Graphical- motor organization and visual- spatial perception skills, with the variables concerning school performance, at a significance level $p < 0.05$: reading automaticity $r = 0.65$, $r = 0.60$, reading comprehension and written expression skills $r = 0.60$.
- Planning, monitoring, self-regulation and problem-solving skills and the variables: planning and visual- spatial memory ($r = 0.72$, $p < 0.01$), reading comprehension ($r = 0.74$, $p < 0.01$) and written expression skills ($r = 0.73$, $p < 0.01$).
- At the level of the 3rd grade there is a positive correlation between all the pairs of variables of interest in the research, at a significance level < 0.01 , this class seems to be the most efficient from the point of view of the results' correlation.
- At the level of the 4th grade there is a positive correlation in most pairs of variables at a significance level < 0.05 .

The situation certainly improved, not only compared to the pre-test, but also to the partial post- test, the improvements being clear at the level of each year of study.

In the case of the partial post-test there were positive correlations between the variables regarding the executive functioning and those regarding school performance, both in the group receiving medication and in the group not receiving medication.

This trend is maintained in the final post-test, and it became more obvious: improvements are obvious compared to the situation from the pretest, in what concerns the significant correlations at levels < 0.05 for both groups of subjects; there remains, however, a slight difference in favor of the group of those receiving medication.

Thus in the case of students with attention deficit and hyperactivity disorder receiving medication, there are positive correlations between:

- Graphic-motor organization with the results obtained at: l'Alouette test $r = 0.47$ (reading automaticity), reading comprehension test $r = 0.45$ (reading comprehension) and image composition test $r = 0.45$ (written expression skills).
- Planning and visual -spatial memory with the variables: Reading automaticity $r = 0.37$, reading comprehension $r = 0.46$ and written expression skills, $r = 0.41$.
- Planning, monitoring, self-regulating and problem solving skills with the skills involved in reading automaticity $r = 0.39$, reading comprehension, $r = 0.43$ and written expression skills, $r = 0.38$.

In the case of students with attention deficit and hyperactivity not receiving medication, there are positive correlations, but they are fewer: graphic-motor organization correlates at a level < 0.05 with reading automaticity $r = 0.55$, with reading comprehension $r = 0.58$; planning and visual- spatial memory

correlate with reading comprehension ($r = 0.68$, $p < 0.01$), and the planning, monitoring, self-regulating and problem solving skills correlate with written expression skills ($r = 0.79$, $p < 0.01$).

There was performed a data analysis also in the case of the *variable type of attention deficit and hyperactivity*.

As to the correlations of variables in the final post-test, when controlling the type of ADHD it was observed:

- A clear improvement in the case of the predominantly hyperactive type, which, although has fewer correlations, shows clear progress compared to the partial post- test and the pretest where there is no correlation between variables at this category. The graphic- motor organization and visual- spatial perception skills correlate with reading automaticity skills ($r = 0.95$, $p < 0.05$) and written expression skills ($r = 0.99$, $p < 0.01$); planning, monitoring, self-regulating and problem solving skills correlate with reading automaticity skills ($r = 0.64$, $p < 0.05$) and with reading comprehension skills ($r = 0.96$, $p < 0.05$).
- In the predominantly inattentive type there are strong correlations, slightly lower than in the case of the combined type. Graphic-motor organization and visual- spatial perception skills correlated with the variables concerning pedagogical performance: reading automaticity ($r = 0.85$, $p < 0.01$), reading comprehension ($r = 0.73$, $p < 0.05$) and written expression skills ($r = 0.83$, $p < 0.01$). In addition, planning and visual-spatial memory correlate with all the variables concerning school performance: reading automaticity ($r = 0.79$, $p < 0.01$), reading comprehension ($r = 0.69$, $p < 0.05$) and written expression skills ($r = 0.70$, $p < 0.05$).
- Most correlations appear in the combined type, the category where all variables of interest in the research are strongly correlated; it is the category with the best results obtained at the applied tests. All the variables from the neuropsychological tasks correlate strongly at a level < 0.01 , with those from the pedagogical tasks.

The variables from the Rey Complex Figure test:

- a) Graphic- motor organization and visual- spatial perception skills correlate with reading automaticity ($r = 0.66$), with reading comprehension ($r = 0.66$) and written expression skills ($r = 0.64$);
- b) Planning and visual -spatial memory correlate with reading automaticity ($r = 0.63$), with reading comprehension ($r = 0.73$) and the written expression skills ($r = .65$).

Planning, monitoring, self-regulation and problem-solving skills correlate with reading automaticity ($r = 0.62$), with reading comprehension ($r = 0.79$) and written expression skills ($r = .81$).

Significance tests: final post - test compared to the partial post - test

The Paired Samples Statistics table was repeated and were calculated the averages, the size of the sample, the standard deviation and standard error of averages, for each variable of interest in the research in the partial post- test and final post- test.

For all pairs of variables, the averages have increased between the partial post- test and final post- test. In other words, the results were different, as there were obtained better results in all the variables in the partial post - test, compared to the results from the final post-test (with the exception of the reading automaticity, where the difference between the averages is not a significant one at a level < 0.05).

Table 1 presents the value of the correlations between the variables and the level of significance, for each pair of tested variables. It was noted that there are strong correlations between paired variables (with the exception of the reading automaticity, whose coefficient is significant at a significance level <0.05), and that all these correlations are significant at a significance level <0.01. For example, the highest Pearson coefficients (0.84, in the case of the graphic -motor organization and visual- spatial skills; 0.85 in the case of planning and visual-spatial memory) showed a strong correlation between the two measurements.

Table 1. The coefficients of correlation between the variables and the significance level (final post - test compared to the partial post - test)

		Correlation	Sig.
Pair 1	Rey copy 2 – Rey copy 3	,840	,000
Pair 2	Rey recall 2 –Rey recall 3	,856	,000
Pair 3	Tower 2 – Tower 3	,465	,002
Pair 4	l’Alouette 2 –l’Alouette 3	,394	,010
Pair 5	Reading comprehension 2 - Reading comprehension 3	,605	,000
Pair 6	Image composition 2 – Image composition 3	,663	,000

Table 2 presents the *t test*. Considering that for all pairs of variables, the significance level is 0.000, it was concluded that better scores obtained by students in the final post-test compared to the partial post-test are not due to random variations, but may be clearly attributed to the educational intervention delivered between the two measurements (partial post-test and final post-test).

Table 2. *T* test (partial post-test compared to the final post-test)

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Rey copy 2 – Rey copy 3	-26,071	8,940	1,379	-28,857	-23,286	-18,900	41	,000
Pair 2	Rey recall 2 – Rey recall 3	-26,310	10,064	1,553	-29,446	-23,173	-16,941	41	,000
Pair 3	Tower2 – Tower3	-4,238	1,973	,304	-4,853	-3,623	-13,920	41	,000
Pair 4	l'Alouette 2 – l'Alouette 3	-32,381	14,303	2,207	-36,838	-27,924	-14,672	41	,000
Pair 5	Reading comprehension 2 – Reading comprehension 3	-31,190	14,220	2,194	-35,622	-26,759	-14,215	41	,000
Pair 6	Image composition 2 – Image composition 3	-29,405	11,904	1,837	-33,114	-25,695	-16,008	41	,000

T-test was repeated on paired samples on these variables, controlling also the variable grade (students were in the 2nd, 3rd and 4th grade). All the differences between the averages on each pair of assessment tools, show STATISTICALLY SIGNIFICANT improvements, regardless of grade: the results were better in the case of most students at the final post-test compared to the partial post-test, regardless of the grade the students were in.

The same test was used in the context of controlling another variable, to see if there are differences in the performance of students who received medication and those who did not receive medication.

In the case of controlling this variable, the results are also conclusive (Table 3). Results have significantly improved in both groups of students (those who received drug treatment and those who did not receive drug treatment); this condition did not produce differences in the results of the final post-test compared to the partial post-test, neither on the neuropsychological tests nor in school performance tests.

Another attempt was repeating the test, controlling the variable type of attention deficit and hyperactivity.

Analyzing the results divided into the three types (hyperactive, inattentive and combined) one could say that in the case of students from the inattentive and combined groups, the psycho-pedagogical intervention was effective in terms of significantly improving the performance between the partial post- test and

the final post -test. In the case of the hyperactive students category, however, differences between the results were not significant at a significance level of <0.01 (for any variable), but most of them are significant at a level of <0.05 (planning and visual-spatial memory; planning, monitoring, self-regulating and problem solving skills; reading automaticity, reading comprehension, written expression skills).

Table 3. *T* test for students with / without drug treatment (final post-test versus partial post-test)

Treatment			Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
With treatment	Pair 1	Rey copy 2 – Rey copy 3	-27,143	9,664	1,826	-30,890	-23,396	-14,863	27	,000
	Pair 2	Rey recall 2 – Rey recall 3	-25,179	10,045	1,898	-29,073	-21,284	-13,264	27	,000
	Pair 3	Tower 2 – Tower 3	-5,107	1,499	,283	-5,688	-4,526	-18,027	27	,000
	Pair 4	l'Alouette 2 – l'Alouette 3	-38,500	12,149	2,296	-43,211	-33,789	-16,769	27	,000
	Pair 5	Reading comprehension 2 – Reading comprehension 3	-34,107	14,723	2,782	-39,816	-28,398	-12,258	27	,000
	Pair 6	Image composition 2 – Image composition 3	-33,571	10,528	1,990	-37,654	-29,489	-16,873	27	,000
Without treatment	Pair 1	Rey copy 2 – Rey copy 3	-23,929	7,119	1,903	-28,039	-19,818	-12,576	13	,000
	Pair 2	Rey recall 2 – Rey recall 3	-28,571	10,082	2,695	-34,393	-22,750	-10,603	13	,000
	Pair 3	Tower 2 – Tower 3	-2,500	1,653	,442	-3,454	-1,546	-5,661	13	,000
	Pair 4	l'Alouette 2 – l'Alouette 3	-20,143	9,836	2,629	-25,822	-14,464	-7,662	13	,000
	Pair 5	Reading comprehension 2 – Reading comprehension 3	-25,357	11,513	3,077	-32,005	-18,710	-8,241	13	,000
	Pair 6	Image composition 2 – Image composition 3	-21,071	10,224	2,733	-26,975	-15,168	-7,711	13	,000

Table 4. *T* test for students with ADHD- hyperactive, inattentive and combined type (final post-test compared to partial post-test)

ADHD			Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Hyperactive	Pair 1	Rey copy 2 – Rey copy 3	-21,250	14,361	7,181	-44,102	1,602	-2,959	3	,060
	Pair 2	Rey recall 2 – Rey recall 3	-26,250	13,769	6,884	-48,159	-4,341	-3,813	3	,032
	Pair 3	Tower 2 – Tower 3	-4,000	1,414	,707	-6,250	-1,750	-5,657	3	,011
	Pair 4	l'Alouette 2 – l'Alouette 3	-23,250	13,961	6,981	-45,465	-1,035	-3,331	3	,045
	Pair 5	Reading comprehension 2 – Reading comprehension 3	-31,250	10,308	5,154	-47,652	-14,848	-6,063	3	,009
	Pair 6	Image composition 2 – Image composition 3	-21,250	10,308	5,154	-37,652	-4,848	-4,123	3	,026
Inattentive	Pair 1	Rey copy 2 – Rey copy 3	-30,000	7,071	2,236	-35,058	-24,942	-13,416	9	,000
	Pair 2	Rey recall2 – Rey recall3	-29,000	11,005	3,480	-36,873	-21,127	-8,333	9	,000
	Pair 3	Tower2 – Tower3	-3,400	1,647	,521	-4,578	-2,222	-6,530	9	,000
	Pair 4	l'Alouette 2 – l'Alouette 3	-22,400	13,858	4,382	-32,313	-12,487	-5,111	9	,001
	Pair 5	Reading comprehension 2 – Reading comprehension 3	-29,000	10,750	3,399	-36,690	-21,310	-8,531	9	,000
	Pair 6	Image composition 2 – Image composition 3	-25,000	7,454	2,357	-30,332	-19,668	-10,607	9	,000
Combined	Pair 1	Rey copy 2 – Rey copy 3	-25,357	8,491	1,605	-28,649	-22,065	-15,803	27	,000
	Pair 2	Rey recall 2 – Rey recall 3	-25,357	9,421	1,780	-29,010	-21,704	-14,242	27	,000
	Pair 3	Tower2 – Tower3	-4,571	2,098	,397	-5,385	-3,758	-11,529	27	,000
	Pair 4	l'Alouette 2 – l'Alouette 3	-37,250	12,295	2,323	-42,017	-32,483	-16,032	27	,000
	Pair 5	Reading comprehension 2 – Reading comprehension 3	-31,964	15,948	3,014	-38,148	-25,780	-10,606	27	,000

PSYCHO-PEDAGOGICAL INTERVENTION STRUCTURED ...

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	Pair 6	Image composition 2 – Image composition 3	-32,143	12,651	2,391	-37,048	-27,237	-13,444	27	,000

Significance tests: final post-test compared to final pre - test

There were compared the six variables (covered by the tests: Rey complex figure - Copy and recall, Tower subtest and those concerning school performance) before the intervention (pretest) and after the final intervention (final post -test).

In the final post- test there appear again, for each pair of tested variables, the value of the correlations between the variables and the level of significance. It could be observed that there are high correlations between the results of each pair of variables, and that all these correlations were significant, at a significance level < 0.05 . For example, the highest Pearson r coefficients (0.62 for the variable *graphic- motor organization*, 0.60 for the variable *planning and visual -spatial memory*) indicate that there was a major difference for students between the two measurements.

The table below (Table 5) presents the T test. Taking into account the fact that the level of significance is 0.000 for all pairs of variables of interest in the research, it could be concluded that better scores obtained by students in the final post- test, were not due to random variations, but may be attributed clearly to the psycho-pedagogical intervention delivered between the two measurements (pretest and final post-test).

Table 5. T test (final post -test compared to pretest)

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Rey copy 1 - Rey copy 3	-38,214	13,785	2,127	-42,510	-33,919	-17,966	41	,000
Pair 2	Rey recall 1 - Rey recall 3	-52,500	13,936	2,150	-56,843	-48,157	-24,415	41	,000
Pair 3	Tower 1 - Tower 3	-9,952	1,794	,277	-10,511	-9,393	-35,959	41	,000
Pair 4	l'Alouette 1 - l'Alouette 3	-44,857	14,971	2,310	-49,522	-40,192	-19,418	41	,000
Pair 5	Reading comprehension 1 - Reading comprehension 3	-40,119	13,502	2,083	-44,327	-35,912	-19,257	41	,000
Pair 6	Image composition 1 - Image composition 3	-43,690	14,401	2,222	-48,178	-39,203	-19,662	41	,000

The variable *grade* was also controlled (the students were enrolled in the 2nd, 3rd and 4th grades), repeating the T test on paired samples on the same variables.

All the differences between the averages showed STATISTICALLY SIGNIFICANT improvements on each pair of evaluation, regardless of the grade:

most students obtained better results at the final post-test than they did on the pre-test, regardless of their year of study. It should be mentioned, however, that at the level of the 3rd grade, improvements are noticeable.

The same *T* test was used in the context of controlling another variable to see if there are differences in the performance of students who received medication and those who did not receive medication.

In case of controlling this variable, results are also conclusive: students who received drug treatment but also those who did not receive drug treatment have significantly improved their results, so this condition did not bring differences in the results of the final post- test, neuropsychological tests nor in those of school performance.

T test was repeated, taking into account the type of attention deficit and hyperactivity. Analyzing the results, divided into the three types of attention deficit and hyperactivity (hyperactive, inattentive and combined), we could say that in the case of students with attention deficit and hyperactivity disorder -predominantly inattentive and combined type, the psycho-pedagogical intervention was effective in terms of significantly improving their performance between the pretest and the final post- test. In the case of the hyperactive children, there is only one variable in which, despite the improvements that appear between the pre-test and the final post –test, these improvements are not statistically significant. (Graphic- motor organization, where the significance level is $> 0,05$).

CONCLUSIONS

In the final post- test after the implementation of the entire psycho-pedagogical intervention program on the two components: organization, self-organization of a general character and specific to reading and writing activities, there were obtained significant positive correlations, between the variables concerning the graphic- motor organization and visual- spatial skills and all the variables concerning school performance (reading automaticity, $r = 0.70$, $p < 0.01$; reading comprehension, $r = 0.69$, $p < 0.01$ and written expression skills, $r = 0.70$, $p < 0.01$); between the variables concerning the planning and visual-spatial memory and school performance variables (reading automaticity, $r = 0.67$, $p < 0.01$; reading comprehension, $r = 0.72$, $p < 0.01$ and written expression skills, $r = 0.69$, $p < 0.01$); similarly in the correlation of variables concerning planning, monitoring, self-regulating and problem solving skills and all the school performance variables (reading automaticity, $r = 0.66$, $p < 0.01$; reading comprehension, $r = 0.68$, $p < 0.01$ and written expression skills, $r = 0,72$, $p < 0.01$).

Correlations were accentuated, compared to the situation from the partial post- test, focused on the organizational component of general character, which confirms that there have been positive changes in students' performance.

In the students from the 2nd grade, there were positive correlations between the graphic- motor organizational skills and visual- spatial skills (Rey - copy) and reading automaticity (l' Alouette test, $r = 0.65$, $p < 0.05$), reading comprehension (reading comprehension, $r = 0.60$, $p < 0.05$) and written expression skills (image composition $r = 0.60$, $p < 0.05$); also between the planning, visual - spatial memory (Rey-recall) and reading automaticity (l' Alouette test, $r = 0.57$, $p < 0.05$), reading comprehension (reading comprehension, $r = 0.70$, $p < 0.01$) and written expression skills (image composition $r = 0.71$, $p < 0.01$).

In the 3rd grade, the significant positive correlations at a significance level $p < 0.01$, were found in all the variables concerning school performance. This was the grade with the best performance in terms of results correlation.

In fourth grade, there were significant correlations:

- ✓ a significance level $p < 0.01$: between graphic-motor organizing skills and visual- spatial skills and all the variables concerning school performance (reading automaticity, $r = 0.81$; reading comprehension, $r = 0.79$ and written expression skills, $r = 0.72$); between the variables concerning planning, visual- spatial memory and reading automaticity, $r = 0.75$ and between planning, monitoring, self-regulating and problem solving skills and reading automaticity, $r = 0.84$, reading comprehension, $r = 0.71$ and written expression skills $r = 0.76$.
- ✓ at a significance level $p < 0.05$: between planning and visual- spatial memory and reading comprehension, $r = 0.62$ and written expression skills, $r = 0.64$. Thus, the improvements were shown at the level of each grade.

In the case of children with attention deficit and hyperactivity receiving drug treatment, the correlations were significant between all the variables of interest in the research (neuropsychological tests and tests assessing school performance) but at a significance level $p < 0.05$; the group who did not receive medication registered improvements, but not in all variables.

When controlling the type of attention deficit and hyperactivity there were observed improvements in all the types, but the strongest correlations were met at a significance level of 0.000, at all variables, in students with attention deficit hyperactivity disorder combined type.

There was drawn a comparison between the variables of interest in research, between the assessments from the end of the psycho-pedagogical intervention (final post- intervention) and the initial results (pretest), and those realized after the implementation of the first part, based on the organizational component of general character (partial post- intervention). In both cases the intervention brought about positive changes in students' performance, changes that have accentuated over time, which proves the effectiveness of the implemented intervention program.

There were significant improvements in students' performance and the fact that there were registered better scores in both cases (partial post-intervention and final post- intervention) at a significance level of 0.000, shows that this is not due to random variation, but obviously to the implementation of the psycho-pedagogical intervention program with the two components: organization, self-organization of a general and a character specific to reading and writing activities.

Starting from the *t* values, all the differences between the averages, on each pair of variable, in both situations of intervention, show statistically significant improvements, regardless of students' year of study.

In the case of students with attention deficit hyperactivity disorder who received / did not receive medication, the differences between the averages obtained on the two variables from each pair, between the final post- test compared to the partial one, as well as to the pre-test, were statistically significant at a significance level <0.01 in both cases. This indicates a performance change following the implementation of the intervention program based on the two components.

Statistically significant differences, based on the *t* values are observed in the case of the type of attention deficit hyperactivity disorder, at a significance level < 0.05 , between the final post- test, both compared to pretest but as well to the partial post- test in the case of the predominantly inattentive and combined type. In the case of the predominantly hyperactive type, differences are significant at a level < 0.05 , between the final post- test compared to the partial post- test, almost in all pairs of variables, except the graphic- motor organization and visual - spatial skills, probably because of the limited number of participants. The situation is similar in the case of the differences between the averages of the scores obtained on the two paired variables (graphic- motor organization and visual- spatial skills) between the partial post- test compared to pre-test, the significance level being > 0.05 .

Obvious performance improvements in most students from the 3rd grade could be explained by the fact that this is the period in which the training level influences favorably the overall development, and especially the reading and writing, resulting a sense of stability and in the fourth grade is expected a differentiated development. It seems that in the 2nd grade there is a heterogeneous period from the point of view of the acquirement and the level of automation varies.

The psycho-pedagogical intervention program structured on the component of organization specific to lexical-graphical disorders in children with attention deficit and hyperactivity must integrate contents and experiences from the area of factors impacting on the attention deficit and hyperactivity.

REFERENCES

- American Psychiatric Association (2000), *Diagnostic and statistical manual of mental disorders*, 4th ed. Revised, Washington DC, American Psychiatric Association
- Atkins, M.S. & Pelham, W.E. (1991), School-based assessment of attention deficit-hyperactivity disorder. *Journal of Learning Disabilities*, 24, 197-204, 255
- Barkley, R.A. (1990), *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment*. New York: Guilford Press
- Campbell, S.B. (1990), *Behavior problems in preschool children: Clinical and developmental issues*. New York: Guilford Press
- Campbell, L.R. & Cohen, M. (1990), Management of attention deficit hyperactivity disorder (ADHD): A continuing dilemma for physicians and educators. *Clinical Pediatrics*, 29, 161-193
- Cantwell, D.P., Baker, L. (1991), Association between attention deficit-hyperactivity disorder and learning disorders. *Journal of Learning Disabilities*, 24(2):88-95
- Denckla, M.B. (1996), Research on executive function in a neurodevelopmental context: application of clinical measures. *Developmental Neuropsychology*, 12:5-15
- Foucambert, J. (1983), La dyslexie. *Les actes de lecture nr. 4*, Association française pour la lecture
- Hart, E.L., Lahey, B.B., Loeber, R. et al (1995), Developmental change in attention-deficit hyperactivity disorder in boys: a four-year longitudinal study. *J Abnorm Child Psychol*, 23:729-749
- Korkman, M, Kirk, U., Kemp, S. (2005), *Nepsy. Evaluare neuropsihologică a dezvoltării*. Manual
- Kytja K.S., Voeller, M.D. (2004), Attention-Deficit Hiperactivity Disorder, *Journal of Child Neurology* 19 (10): 798-814.394
- Kulcsar, T. (1980), *Lecții practice de Psihodiagnostic*, capitolele 2 și 3
- Levy, F. & Hobbes, G. (1989), Reading, spelling, and vigilance in attention deficit and conduct disorder. *Journal of Abnormal Child Psychology*, 17, 219/8
- Levy, F., Hay, D.A., McStephen, M. et al. (1997), Attention-deficit hyperactivity disorder: a category or a continuum? Genetic analysis of a large-scale twin study. *J Am Acad Child Adolesc Psychiatry*, 36:734-744
- Mih, V. (2004), *Înțelegerea textelor. Strategii și mecanisme cognitive. Aplicații în domeniul educațional*, Editura ASCR, Cluj-Napoca
- Miranda, A., Jarque, S., Tarraga, R. (2006), *Interventions in school settings for students with ADHD*. *Exceptionality*, 14, 35-52
- Pennington, B.F., Grossier, D. & Welsh, M.C. (1993), Contrasting neuropsychological deficits in attention deficit hyperactivity disorder versus reading disability. *Developmental Psychology*, 29, 511-23

- Pennington, B.F., Ozonoff, S. (1996), Executive functions and developmental psychopathology, *Journal of Child Psychology and Psychiatry*, **37**, 51-87
- Rappley, M.D. (2005), Attention-Deficit/Hyperactivity Disorder. *New England Journal of Medicine*, *352*, 165-173
- Reiber, C., McLaughlin, T.F. (2004), Classroom Interventions: Methods to Improve Academic performance and Classroom Behavior for Students with Attention Deficit / Hperactivity Disorder. *International Journal of Special Education*, vol. 19, no.1
- Report (2005) on Attention Deficit Hyperactivity Disorder (ADHD) Connecticut ADHD Task Force 3rd Edition
- Rieben, L. (1989), Individual differences in word recognition: A path from an interactive model of reading to an interactive instructional setting. *European Journal of Psychology of Education*, *4*, 329-347
- Roșca, M. (1972), *Metode de psihodiagnostic*. Ed. Didactică și Pedagogică, București
- Rourke, B.P. (1991), *Fuerst DR: Learning Disabilities and Psychosocial Functioning: A Neuropsychological Perspective*. New York, Guilford
- Sturge, C. (1982), Reading Retardation and Antisocial Behavior. *Journal of Child Psychology and Psychiatry*, *23*, 21-31
- Ungureanu, D. (1998), *Copiii cu dificultăți de învățare*, Editura Didactică și Pedagogică, R.A., București
- Winebrenner, S. (1996), *Teaching Kids with Learning Difficulties in the Regular Classroom: strategies and techniques every teacher can use to challenge and motivate struggling students*. Free Spirit Publishing Inc. United States of America