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Cognitive approach of written language disorders Therapeutical interventions

-ABSTRACT-

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PART I

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KEY WORDS: dyslexia-dysgraphia, instrumental troubles, strephosimbolie, phonological processing, agnozia, spatial-temporal dyspraxy, intermodal association, intersensorial defficit, cross-over cerebral dominance, cerebral assimetry, poor visual-motor skills, perceptive-motor structures, serial visual memory, eye-hand coordination, body scheme, fine pronounciation motor skills.

ABSTRACT

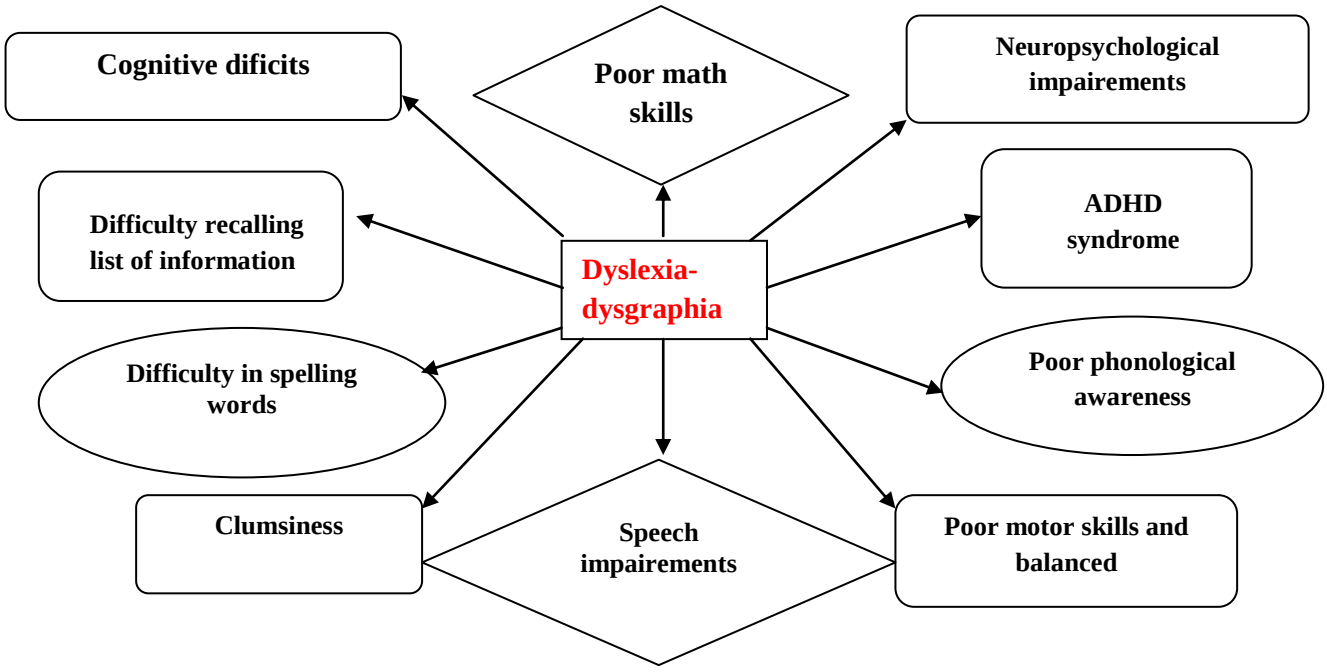
First part

In the first part of our research we approached the theoretical aspects of the written language disorders from a cognitive and neuropsychological perspective.

Chapter I of the thesis is entitled **"The written language disorders"**. It studies and analyzes the definitions and terminology used to describe the written language disorders. The analysis of several papers revealed a great number of scientific reasearches which have studied the dyslexia-dysgraphia phenomenon with a huge interest. These scientific researches have classified the different definitions of dyslexia according to the diversity of etiological factors which has led to various classifications: conceptual, descriptive, genetic or psychological definitions.

In 1968, the international dyslexia researchers launched an operational definition of dyslexia under the title "Word Federation of Neurology". They defined dyslexia as "*a learning disorder in reading, which occurs in the absence of sensory impairment or neurological deficits or an innappropriate school instruction, as a result of cognitive difficulties."*

While analyzing the complexity of reading-writing difficulties, the Romanian researchers E.Verza (2003) and C. Păunescu (1984) focus their studies on the processing of letter/ sound association in reading. In the reading process, the words are recognized and assigned a meaning by understanding their content. We cannot draw a line between reading and writing because in the educational process they are taught and learnt together.



Picture 1: *Reading-writing specific disorders (S.Chișu)*

Dyslexia can be described at the neurological, cognitive and behavioral levels. It is typically characterized by inefficient information processing including difficulties in phonological processing, working memory, rapid naming and automaticity of basic skills. Difficulties in organisation, sequencing and motor skills may also be present.

Analyzing the disorders occuring in the area of literacy, we think that dyslexia is a specific learning difficulty, characterised by difficulties in accurate and fluent word recognition and by poor spelling and decoding abilities. The reading mechanism is a very complex cognitive process. Students learn to read by translating and decoding phonemes. As the child begins to recognize words, reading becomes an automatic process. The dyslexic students have big difficulties recognizing letters and words which leads to difficulty in reading, spelling, recalling lists of words, poor phonological awareness, and many other specific symptoms. Most individuals with dyslexia have problems with symbols such as letters, numbers, words. They have deficits in processing visual and spatial stimulus, deficits in working memory, sequencing problems, delays in motor skills and balance, clumsiness.

Visual thinking is a holistic system of global information and knowledge which involves the synthesis of a complex cognitive system. In its turn, this involves intuition and inductive reasoning (from part to whole).

Although dyslexic students may have some good visual processing skills that involve the identification of real objects, they cannot understand and recall the symbols (letters of the alphabet, digits or words). Dyslexic pupils have difficulties understanding what they read, sometimes do not understand their own handwriting or show poor or inaccurate vocabulary. The most common types of distorsion in dyslexia are: omissions or additions of elements (letters, words), confusion, subtitutions of letters, additions of letters, syllables or even words.

Chapter II of this research is entitled **"The etiology of written language disorders".** We described and analyzed the diversity of etiological factors which cause dyslexia. The first descriptions of the etiology of written language disorders have taken placed in the U.S. and have been explained by Geschwind. The author highlights the nature of neurological disorders that can lead to dyslexia by bringing ontogenetic and behavioral arguments which refer to the fundamental role of the *angular gyrus*. This gyrus is responsible for the intermodal associations which are very important in the development of language and in the learning process. The intermodal associations are the key factors in learning how to name objects and also in the process of learning to read and write. Delays or cerebral microlesions of the angular gyrus may cause disturbances in naming words, difficulties in intermodal learning and reading-writing disorders. Reading and writing involves a

functional integration of the two cerebral hemispheres. The left cerebral hemisphere controls spoken language and its semiotic function, while the right hemisphere processes the symbols and automatic, unconscious skills. Individuals with dyslexia present an unbalanced organisation of the two cerebral hemispheres.

The left cerebral hemisphere controls handwriting and reading. It is responsible for data analysis whereas the right hemisphere plays an important role in the automatic processes such as word recognition, the flow of words and their ordering in sentences. The right cerebral hemisphere has an important role in data organization and data synthesis.

Any infant is born with the ability to perceive the spoken language with the right ear (which is the function of the left cerebral hemisphere) and to perceive rhythmic structures with the left ear (which is the function of the right cerebral hemisphere). The language develops in both cerebral hemispheres. There are individuals with left-lateralization cross between cerebral hemispheres. This aspect causes a conflict between the cerebral hemispheres. It is known that each cerebral hemisphere is specialized in a type of activity. The specific type of activity leads to two different types of learning : the visual learning and the auditory learning type, respectively. An individual who uses his left hemisphere is an auditory type, so he perceives and identifies sounds very well, has good oral language, tends to verbalize and wants to know the rules to comply with them. An individual who uses the right cerebral hemisphere is a visual type, so he can process the visual information easily, can read, is creative and intuitive and finds easily words that begin with the same syllable.

Handwriting and reading develop in both cerebral hemispheres. In order to learn to read and write, there must be a balance between the two cerebral hemispheres. This balance enables them to function well. When one hemisphere does not work properly anymore and no longer processes information, the other cerebral hemisphere becomes more active. The more active hemisphere determines the type of perception.

Orton suggests that dyslexia occurs when the two cerebral hemispheres are not connected properly. The author considers that the the first symptoms of dyslexia can be seen in a dyslexic subject by analyzing his handwriting: the symbols seem to be broken, twisted or turned. Orton names these specific symptoms – *strephosimbolie* (which means twisted or turned letters or symbols).

Researchers from Yale Medical School (J.R. Gruen) and British researchers have identified a *gene of chromosome 6*, called *DCDC2* which could be responsible for dyslexia. The researchers think that dyslexic individuals have a disruption of the connectivity of temporoparietal and frontal network within the language system with concomitant difficulties in language-related functions in dyslexia. The dyslexic cerebral hemispheres cannot work

together well because the connections between them are interrupted, a fact that leads to difficulties in phonological awareness, phonological memory and naming words. Briefly speaking, dyslexia may result from a mutation in a neuronal migration gene, which triggers developmental plasticity that results in changes in the underlying brain strucures involved in the sound and phonological acquisition and processing (A. Galaburda, 1994). These researchers stress the need for a multilevel approach to research in reading and dyslexia to obtain convergence of scientific data. They discuss the alternative learning approaches to dyslexic students.

Poor visual-spatial motor skills (oculomotor disturbances) could be another cause of dyslexia. Dr. G. Eden (1996) reveals the inability of dyslexic subjects to track visually a moving target. Their poor visual-motor skills explain the discrepancy between the peripheral retina and central retina (called foveal retina) that allows the understanding of the perceived image.

Poor visual motor skills are visible in the subject's inability to organize the handwriting on the paperwork, information and materials, in sequencing problems. For instance, when a dyslexic student reads a text, he fails to follow the lines and consequently, he does not know which the last word he read was, he does not comprehend the words and sentences and show significantly lower reading achievement than other students. These difficulties are caused by *impairments of instrumental functions*. Many times these abnormalities (visual motor skills) are confused with a simple squint.

Visual-motor skills disorders show some deficits in the *magnocellular system* (which is part of the central nervous system). The magnocellular system commands and controls the visual perception and discrimination. The dyslexia difficulties are explained by the overlapping of the visual images (letters or words) while reading a text.

Dr. G.Eden (1996) discusses how neuroscience experiments using functional imaging techniques, event-related potentials and other neurobiological measures add to our understanding of brain-basis of learning and have potentials for the education of the children at-risk of dyslexia. Dr. Eden has used fMRI to visualize the brain areas involved in reading a text. FMRI is a method of cerebral investigation which uses magnetic resonance imaging. It is a non-invasive procedure. By using a contrast agent injected into the cerebral vascular system, dr. Eden has identified the cerebral areas where the cortical activity is higher than in other areas as a result of the neuronal activity during the process of reading.

Dr. G.Eden shows that dyslexics do not have brain activity in the area called V5/MT which is specialized in motion detection. This study explains the poor visual motor skills and difficulties arising from dyslexia in processing visual information.

We believe that in the future, the brain imaging visualization method can be of real help in early diagnosis, evaluation and explanation of reading and writing disorders.

Many microbiology studies have revealed cellular abnormalities in the deep cerebral hemispheres, inside the *geniculate corpus*, which has an important role in the connection of the visual and auditory neuronal pathways. These cellular abnormalities appear as clumps of cells in excess (called *ectopia*) and can cause dyslexia. They have been observed particularly in the left cerebral hemisphere, in *the perisylvian gyrus* that controls speech.

S. Borel-Maissony (1967), M. de Maistre, F. Estienne (1994) focused their studies on the impairments of *instrumental functions*. If the instrumental functions are impaired, delayed or have some deficits they will be responsible for causing dyslexia.

Ajuriaguera's (1973) and D. Bakker's (1972, 1983) studies show that lack of temporal organization and of acoustic-to-phonological conversion, phonological awareness and memory are included in instrumental disorders (or disorders of instrumental functions). Bakker stresses that assesment of temporal order perception in young children in preschool stage is very important because it could indicate students at-risk of developing dyslexia.

G. Geiger (1990) reveals that dyslexic students have an acoustic-auditory discrimination deficit. This deficit can be included in instrumental disorders and can cause difficulty in learning reading.

In their studies, K.Shapiro and his co-workers (1990) found out that students with dyslexia are different from other students because they have difficulties processing sequential information. The authors have assesed the ability of temporal perception in an identifying words task by using all kinds of reading strategies which involved simultaneous and sequential information.

J. Piaget and B. Inhelder (1966) believe that movement organization is a response to the individual's internal and external requirements to adjust to the environment.

E. Dupre and A. Gesell (cited. F.Estienne, 1994) have classified the most common instrumental disorders as follows: difficulties related to visual and auditory perception, poor visual-motor skills, poor motor skills, spatial-temporal disorders, sequencing problems, clumsiness, organisation of information, letter-sound association, delays or deficits in working memory, speed of processing information, difficulty in naming objects, phonological awarness, slow speech, inaccurate vocabulary and so on.

Our experience shows that a large number of children with dyslexia have many instrumental functions disorders. These children, despite a normal intellect may experience difficulties in learning reading and writing and have poor school performance.

We think that it is very important to adopt therapeutic interventions in the early stages of the written language disorder, during which the mechanisms of these disorders are not well consolidated yet and, that is why, can be removed completly or replaced easily with new skills. Successful results with preschool children are expected because of the great plasticity of the child's nervous system.

In **Chapter III** of the thesis we analyzed „**The taxonomy of written language disorders and its manifestations".** The multifactorial nature of the etiology of the written language disorders has led to a classification according to the diversity of the etiological factors. This is correlated with the characteristics of perception and with the cognitive processes: perception, attention, memory, language.

Dyslexia and its level of functioning can be classified according to several criteria. There are several varieties of dyslexia: visually based dyslexia, phonological dyslexia, surface dyslexia, deep dyslexia and developmental dyslexia.

Chapter IV entitled **" Cognitive mechanisms involved in reading and writing "** analyzes the cognitive components which are the underlying properties of the written language. To be able to read and write, the student must achieve a phonological awareness which enables him to master the alphabetical principle underlying the transposition of oral language to written language.

Language is hierarchically structured on several levels : phonetic, semantic, syntactic and the language of discourse. The understanding of a word that is being read, is directly connected to its decoding at the phonological level. The phonological processing represents the psycholinguistic system of the language. When a young student reads a word he needs to split it into its phonological components, a process that interferes with superior cognitive processes. These superior cognitive processes will facilitate the comprehension of the word. Phonological processing in dylsexia has poor representations, so the dyslexic child does not use his cognitive functions to achieve the meaning of the word.

The phonological skills acquired by a young child in the preschool period represent a key factor in predicting the evolution of his process of learning reading and writing. We believe that the assessment of these skills at the end of kindergarten or early in the first grade could identify children at- risk of developing learning difficulties in reading or writing.

Learning difficulties may occur only in the process of writing or reading acquisitions or in both, concomitantly.

Chapter V named **"Theoretical models of cognitive and neuropsychological mechanisms of reading and writing"** describes the main theoretical models of cognitive and neuropsychological mechanisms of reading and writing. In order to recognize words and

their meaning when reading a text, a student has to use the phonological mediation. Studies have shown that students with dyslexia have difficulties such as: phonological deficit, poor phonological memory and poor metaphonological awareness. In order to learn the alphabetic principle the child needs to reach a phonetic and phonological awareness, a well developed syntactic and semantic sense. The phonological mediation is important because it facilitates and helps creating the pathways of spelling words.

The phonological deficit prevents the dyslexic child from using his superior cognitive functions in order to understand the meaning of the word. The most important components of phonological deficits are related to phonological awareness, phonological memory, word naming and working memory.

In order to learn how to read the student must recognize that a word is composed of small segmental units, elements that make possible the understanding of the alphabet. The student who learns to read has to split the small elements of the word - letters (for written words) or sounds (for spoken words). This process involves the superior cognitive functions.

Practice indicates that we hear the sounds of a syllable as a single sound and cannot determine the point where a sound ends and another one begins as we lack self-perception and acoustic invariance. The phonological awareness and phonological memory are important indicators of how a student perceives the sequence of phonemes in a spoken word.

Bryant and Goswani (1991) consider the phonological awareness a multi-stage development. Phonological processing skills are the key of understanding a written text. For this reason we sugest that an early phonological training may enhance the efficiency of cognitive processing in language tasks.

We noticed a reciprocal connection between reading and phonological awareness: the phonological awareness is a mandatory precondition for learning reading and, in its turn, reading facilitates the development of phonological awareness. In this way, writing and reading disorders may manifest separatly or together as a result of various factors: neurobiological, psycholinguistic or social factors.

Over time, many studies have explored the spoken and written language and tried to explain the basic mechanisms of learning to read and write. This chapter describes the most important researches in the development of the written language.

The cognitive models were proposed by cognitive psychologists in the early 1970's. They tried to understand the cognitive mechanisms and mental operations involved in learning to read and write. Efforts and concentrated activities are required while children learn to read. Reading involves the visual processing of the written text. The easiness of reading aquisition is related to the development of phonological awareness. There is

substantial evidence that the phonological loop, a component of the working memory, plays an important role in reading (Baddeley, 2003).

The psycholinguistic model proposed by J. Mettelus and Lichteim L. (1996) attempts to split the reading activity into multistage successive mental operations. They establish cerebral pathways designed to represent the main anatomical areas where the read word is decoded and other pathways which are responsible for the connections between those cortical areas.

The figure proposed by L. Lichteim (1990) shows the most important cortical centers where concepts such as auditory, motor, visual and acoustic representations of words as well as speech production pathways occur. The author is interested in learning where the boundary between the oral and written language is, while Wernicke (1977) considers that the written language is learned after the spoken language is mastered. Langdon (1897) claims that reading can be achieved without mastering the representations of the spoken language.

The associationist current proposes a psycholinguistic model of speech production and language understanding which aims to establish different levels, pathways and cognitive processes that allow the transition from one level of representation to another. For instance, *the alpha pathway* is responsible for reading aloud; *the beta pathway* allows the identification of a lexical unit that is the key to spelling components, a process which finally leads to the phonological form without access to the semantic representation; *the gamma pathway* identifies the phonological form directly, without involving the phonological output.

The visually dyslexic child fails to read correctly all the suggested words and does not comprehend their meaning. The alpha pathway which is responsible for linking the lexical semantic representation to the lexical representation and the lexical-phonological spelling of the words blocks the understanding of the word meaning because it is damaged.

In phonological dyslexia the child can read the words but fails to come up with new words because the gamma pathway is affected and does not allow the conversion of phonemes (sounds) into graphemes (letters).

The neuro-anatomical and functional models proposed by Geschwind in 1965 identify various cerebral areas involved in reading and writing. The author believes that first, the information reaches the primary cortical areas, and after that it is transferred to the associative visual cortical areas of the right cerebral hemisphere. Then, it is transferred to the left hemisphere into the angular gyrus. The angular gyrus, a temporoparietal region, is connected to visual association areas and posterior language areas. Wernicke's areas are connected to the semantic links between words and concepts. Words are decoded and receive

a meaning that is transferred to Broca's area, the motor cortical area. Broca's area is engaged in the speech production and the pronunciation of words.

Demonet (1977), Galaburda and Kemper (1979) consider Broca's area very important in phonological awareness development and in reading acquisition. Broca's area is activated during the rhyming tasks and the temporoparietal cortex, during the short-term memory task. Dyslexics have a weak connectivity between anterior and posterior language areas. This provides strong support for Orton's theory (1937) that learning to read requires children to disengage posterior right hemisphere visual representations that interfere with proper word identification.

Livingstone (1991) and his colleagues notice that the connection between the retina and primary visual cortex from the occipital lobe takes place in *the lateral geniculate corpus*. The geniculate corpus sends the nervous impulse along the optic nerve from the retina to the primary visual area.

The genetic models of development represented by U. Frith's model (1986) are directly inspired from phylogenesis and oriented to describe reading strategies. U. Frith's studies explain the differences between the cognitive processes of a dyslexic brain and of a non-dyslexic one (a competent reader). The author identifies four reading strategies. Reading and writing are formed due to these strategies.

The theoretical model proposed by Marshall and Newcombe highlights the following aspects:

1) The phonological way identifies the correspondence between sounds and letters by splitting words into smaller units. This pathway involves analysis and synthesis – cognitive fundamental processes.

2) The lexical way is an indirect pathway and is responsible for word recognition. It does not require analysis and synthesys.

3)The global method is useful when the student masters the cognitive processes such as analysis and synthesis and does not have dyslexia.

In teaching strategies both the phonological and lexical ways can be used alternatively or simultaneously in a mixed form.

Patterson and Morton's (1969, 1980) pluralist model is a cognitivist model which illustrates reading as a result of two cognitive processes, more or less independent. These two cognitive processes have their own roles. They correspond to two voices: the lexical voice which allows quick visual familiar words identification and the phonological voice which allows the conversion from phoneme (sound) into grapheme (letter).

Ineffectiveness of one or the other has been considered the origin of the two forms of dyslexia: visual and phonological.

The models of cognitive psychology have allowed the identification of several forms of written language disorders that cannot be explained by one single model. Psychologists consider the processes of word recognition very important in understanding and explaining the reading mechanism.

The main objective of the cognitive psychology researcher is to find more hypotheses regarding the mechanisms of mental activity involved in reading and check them experimentally. Psycholinguistic variables known as the rules of spelling, orthography and word order have an impact on the cognitive mechanisms involved in reading activities.

Three important factors are involved in the process of understanding the reading mechanisms. They are: the reader's skills and the visual processing of the written text which involves cognitive operations that allow the reader to understand the meaning of the words.

By adopting a cognitive approach in assessing the language disorders displayed by a dyslexic student, the therapist needs to use the theoretical models to understand the origin and the mechanisms involved in reading and writing.

Chapter VI is entitled **" Psychological aspects of child's writing ".**

The analysis of children's drawings reveals that they are not as realistic when compared to the right spatial pattern or design. This happens because, at a certain age, children have not fully developed motor skills, yet. They lack visual focus, have poor visual-motor skills and weak eye-hand coordination. Children do not have the ability to achieve the appropriate lines when drawing or writing .

Fine motor skills are very complex. The development of fine motor skills needs a few preparatory stages in order for a child to achieve proper writing .

At the age of 2 and 3 years old a child draws straight lines without a well-defined direction and location. It is a specific exploratory stage. At this stage, the child doodles without considering the graphic space limit and cannot stick to a certain shape. Between 3 and 4 years old, the child's motor imitation is realized in the form of graphic representation by straight horizontal or vertical circles of the same relative size but incorrectly made due to the fact that his skills are not well developed yet. A 4 or 5 year-old child starts to show preferences for colors and shapes. This stage plays an important role in drawing and writing (Tjonkheere, cited. C.Păunescu, page 206).

The most important stages of the fine motor skills are:

- **The stage of the first fine motor skills** represents the level when the child makes marks on the paper which tend to be centrifugal, curves and can go clockwise or counterclockwise.
- **The perceptive stage of fine motor skills** corresponds to 2 ½ years up to 3 years old. At this stage it is helpful for the child to color templates or coloring worksheets which develop his fine motor skills and help him control his fingers and his hand better.
- **The representation stage of fine motor skills** corresponds to 3 to 5 years old and represents a higher level in the development of fine motor skills because it marks the moment when the child begins to master form, proportion, number and space.

Maria Montessori considers that the child's first prewriting exercises need to meet certain principles which will help the child learn to write. These principles are:

a) Before learning handwriting any child needs to exercise his hand fine motor skills by drawing pictures in kindergarden or at preschool level.

b) A student needs to learn how to read first and then to write. There is a correlation between the two activities (reading and writing) that requires common skills in decoding the letters, words and sentences. These skills are: upside-down orientation of the page, letter/sound association, the ability to analyze and synthesize.

c) The transition from the smears stage (the entertainment graphics, figurative drawing) to the proper handwriting.

d) The first writing exercices must take into account the characteristics arising from the direction of graphic gestures: rectilinear and curvilinear .

In our opinion it is important for a child to be taught to discriminate between visual symbols (the letters) that can be confused (such as d – b, p – q, p - b) because of their spatial orientation (such as the letters u - n, b - d or m - n).

Many studies consider the age of six as most favorable for learning reading. Romanian authors such as E.Verza and C. Păunescu (1983) think that acquiring reading and writing can begin when the child has reached a mental age of at least five years old and only if neuropsychological processes are well developed.

Among many pedagogical, neuropsychological and cognitive approaches regarding the reading-writing stages, we consider the most interesting the approach of E. Verza (2003) who grouped the well-structured process of learning reading and writing in three main levels:

1. The prealphabetical level begins in child's family, nursery, kindergarten or in pre-school institutions. It is the stage when the child develops his capacity to perceive and represent the body parts and when he starts to fix up the hand laterality.

The child begins to build his functional cognitive system.

2. The alphabetical level begins in the first grade in primary school (the preparatory class) when the young student starts to learn reading and writing. The educational system develops the child's fine motor skills of the hand, the eye-hand coordination, the capacity of analysis and synthesis, the phonemic hearing, the sense of observation, the intermodal learning skills that contribute to the development of the superior cognitive processes.

3. The postalphabetical level represents a stage when the child develops the abilities of synthesis and generalization. By this time, the child's language is well developed so it becomes an important instrument in the thinking processes. It allows the student to acquire more knowledge especially through written texts.

PART II

In **Chapter VII - "The assessment of written language disorders"** we approached the assessment methods of written language disorders from a cognitive and neuropsychological perspective. The first neuropsychological reading tests were those which assessed the difficulties of dyslexia (Kay, Lesser, Coltheart, Lemay, cited. Van Hout, A. Estienne, 1994).

Goswami (2004) discusses how neuroscience experiments using functional imaging techniques, event-related potentials and other neurobiological measures add to our understanding of cognitive processes of learning and have potentials for education and intervention in the case of children at-risk for dyslexia. To better understand the various kinds of difficulties in assessing reading and writing disorders we consider the components of cognitive processes very important. By getting to know dyslexia difficulties we will be able to find exactly the type of written language disorders and identify their specific symptoms. If we find disorders in reading aloud it means that there is a disruption and a problem with the phonological word production mechanisms. In these cases the dyslexic has phonological dyslexia and does not understand the meaning of the words.

By studying the cognitive approach of the phonological production system we focused our assessments on reading aloud tests, because the reading mechanism is described by theoretical models which are explained in the fifth chapter of the thesis. The theoretical

models are important as they guide the therapist to indentify exactly the location of the language deficit and apply the right intervention .

Dyslexia assessment methods used in international practice and in our country are configured as follows:

1.In francophone countries:

• test *L'Alouette by Lefravrais* is a predictive test of the reading level;

• *reading comprehension tests* and *Lobrot abilities test of reading;*

• The *Ferré test*;

• *Khomsi testing strategies* aimed to analyzing the understanding of text reading;

• The *Belec battery*;

• The *LMC-R test assessing reading competence*.

2. The most common test used in **the U.K. and the U.S.** is *Woodcock-Johnson (Woodcock - Johnson Reading Mastery Test)* which is based on Horn and Cattel's theory on the cognitive processing of information. All subtests used in reading and writing areas measure cognitive abilities such as: fluid reasoning, understanding knowledge, visual processing, auditory processing, speed processing of information, working memory and short-term memory, the vocabulary, naming objects, speech disorders, phonological awareness, letter/sound association, word recognition.

3. In Romania, authors such as E.Vrășmaș, I.Mușu, C.Stănică, E.Verza, C. Păunescu believe that learning reading and writing involves cognitive skills, fine motor skills, eye-hand coordination and a strong motivation to learn. For this reason, the written language disorders assessment should consider the cognitive development of children, the motivation for learning, and their personality characteristics. A complex evaluation of written language disorders should include a medical exam, a psychological testing, teaching and educational assessments. The educational evaluation should consider the reading and writing level, the child's vocabulay, the word recognition and the motivational level for learning. It is very important to conduct a right assessment which will make the difference between authentic written disorders and other psychological disorders such as authism, ADHD, delayed speech that could display the same symptoms as dyslexia.

For assessing reading and writing skills we use different screening methods focused on diferent criteria such as, rapid letter naming, phonological awareness, spelling words, word recognition, word segmentation, word or sentence decoding, handwriting, orthographic pattern recognition, pronunciation of unfamiliar words, letter-sound association, text comprehension, reading speed, reading fluency and comprehension, word order, writing after dictation, composing a text starting from pictures, correcting a missing letter from a word.

Chapter VIII of the thesis called **"The therapeutic interventions"** discusses the main therapeutic guidelines and interventions for dyslexia disorders. These are:

- *Therapeutic approaches focused on symptoms* start from the principle that the dyslexic child cannot associate the sound with the proper letter. The therapy should begin by identifying the reading errors and will be oriented towards correcting them. Authors such as, S.Borel - Maissony, D.Maistre, Bourcier, Brunfant, Muchielli – Bourcier, C. Chassagny have developed various therapeutic methods for the written language disorders.
- Therapeutic guidelines based on the theory of *cognitive mental management methods* applied to reading disorders are relatively recent and aim to ensure school success by curing disturbances that may interfere with written language learning. By studying the information processing mechanisms the therapists build a pedagogical approach which can be successfully used throughout the intervention. The student is engaged in a cognitive approach that allows him to improve his poor or disabled mental functions and thus, make singnificant progress in reading fluency.
- The therapy of dyslexia-dysgraphia requires a very complex psychoeducational intervention which must be conducted by a speech pathologist assisted by a group of specialists (doctors, psychologists, teachers) and parents, and has to include many approaches. It is very important to stimulate multisensory pathways to reinforce learning reading and writing: V-A-K-T (visual, auditory, kinaesthetic, tactile). The specialist need to make sure that dyslexic children hear the teacher say a word, feel the muscle movement as they trace the word, feel the tactile surface under their fingertips and hear themselves say the word as they trace it. In the complex process of dyslexia therapy, the speech pathologist needs to prepare the students by working on their fine-motor skills and perceptive skills. The training of the perceptive-motor skills structures includes perceptive-motor, visual and auditory disturbances as determining features of various graphics.

Education and rehabilitation exercises of the fine motor skills focus on the overall balance, hand coordination and general dynamic eye-hand coordination.

It is important to know the child's learning strengths and his learning weaknesses. Teaching approaches, strategies and techniques need to be used in the areas of word identification, vocabulary development, reading comprehension/fluency, writing and spelling.

The speech pathologist has to determine the student's dominant hand. The dyslexia therapy needs to be oriented towards the use of the right/proper student's dominant hand. The best approach to educate the right dominant hand has to take into account the following aspects: translational motion (back and forth, up and down, right-left) and rotation (the

vertical axis and lateral). All these movements of the dysgraphic student's dominant hand will be achieved by drawing, attractive programs and other unconventional techniques.

Training perceptive-motor skills will be based on qualitative and perceptive-motor structures and visual aids. The exercises will lead to the formation of notions of shape (line, point, round, square, round, thick, flat, curved, hollow, open, closed, full, twisted), size (small, large, medium, long, short thick, thin, larger, smaller, shorter), direction (right, left, tilted back, reverse, position, top-down, right, left, forward, backward, next).

In addition to traditional techniques, we have achieved very good results by using methods from new techniques such as (Sindelar training program and Meixner method described largely in the next chapter): the use of color in the writing of letters, syllables and words; the use of flash cards to adjust the children's level of knowledge and their difficulties; the arrangement of poor sounds in different positions.

The therapeutical intervention for dyslexia disorders will try to develop new skills and the poor instrumental functions or poor cognitive processes needed in the process of learning reading and writing. The educational objectives will be structured in the following direction:

- development of visual acuity and discrimination;
- perception of shapes and colors;
- visual discrimination between important stimuli and background;
- eye-hand coordination;
- letters/symbols identification;
- development of visual memory;
- development of perception and auditory acuity, phonological awareness;
- development of working memory;
- development of intermodal association;
- development of visual and auditory attention;
- differentiate and separate the sounds in known or unknown words.

We give a special importance to those therapeutical techniques that lead to the improvement of visual and auditory confusion. The intervention will focus on technical correction of typical confusion of letters and figures such as: u - n, m - n, p - b, b - d, a - o, 6 - 9, by removing such difficulties. For the removal and prevention of auditory confusion that may arise from different groups of sounds or dull sounds (F-V , V-Z , P-B , T-D , C-G) the intervention will focus on these particular difficulties that a dyslexic student can display.

The cognitive maturation is achieved through awareness and training of the perceptive-motor behavior, the organization and structuring of space and time, the development of the fine motor skills and the good eye-hand coordination.

Chapter IX of the thesis, **"The Research Methodology"**, includes the reasons for choosing this interesting subject, the goals, the research objectives, the research hypothesis and the methodological approach. It also describes the assessment samples and work tools used in all stages of the research. We offer a complex psychoeducational therapeutical intervention program for training students with dyslexia-dysgraphia as well.

The methodological approach of the research contains three distinct phases:

- **The exploratory stage** or the **pre-test** administration;
- **The experimental stage**, includes a special training program and **post-test** administration;
- **The third stage** contains the **re-testing**.

The general objectives of the research were:

- Identifing and experiencing the most effective methods of screening and early diagnosis of written language disorders;
- Investigating, assessing and establishing a complete diagnosis of (cognitive processes) instrumental functions involved in aquiring reading and writing;
- Designing and implementation of complex psychotherapeutic intervention programs and training for students at-risk of dyslexia, by stimulating the cognitive instrumental functions that could cause dyslexia.

The exploratory stage of the research was the starting point of our research and led to the objectives and research hypotheses.

The exploratory stage has several objectives:

- Identifing and analyzing the poor or dysfunctional disorders of the instrumental functions (cognitive processes) of students who started the first grade;
- Finding and identifying the causal factors that might lead to developmental dyslexia in 6 and 7 year-old students;
- The relevance of Burlea's screening test (which is a new, non-standradized test) to diagnose the students at-risk of dyslexia. We compare the students' results from Burlea's screening test with the Reversal test results which is already a standardized test and the use of the screening procedure to identify the children at-risk of dyslexia.

Our experimental research is based on the results obtained during the exploratory stage. It is meant to help us design a complex therapeutical intervention program for students at-risk of written language disorders. Thus, the experimental stage of our research involved three different steps:

The first step was the theoretical documentation and the synthesis of students' results from the exploratory stage, data that led to the experimental hypothesis.

The second step consists in the delimitation of the operational techniques and the selection of the screening methods and the participants in our study.

The third step was the creation of the experimental design: the pre-test, the experimental stage, the post-test, and the re-test.

The research investigations are set in accordance with the following specific objectives:

- The designing and implementation of educational intervention programs for children at-risk of written language disorders in three directions:
  1) The cognitive stimulation of the instrumental functions that could cause written language disorders;
  2) The prevention of written language disorders;
  3) The prevention of school failure through the development of the poor or inoperative instrumental functions;
- Recording, monitoring, comparing the statistical analysis of the students' results from the experimental and control group in the pre-test , post-test and re-test stages;
- Analysing the relationship between the academic achievement of students with written language disorders and the instrumental functions development.

The research was based on theoretical data collected before initiating the study and on the specific objectives of the experimental stage. These aspects led to formulation of the work hypothesis of our experiment. Therefore, the basic research assumption on which we have structured the experiment is based on the fact that early intervention programs designed to develop poor instrumental functions would enable the students at-risk of dyslexia to learn to read and write successfully.

The general hypothesis of our research is: designing and implementing early intervention programs for cognitive processes stimulation could improve the academical performance in students at-risk of written language disorders.

Given that the our research is oriented towards two main directions we consider necessary to set **two secondary hypotheses**:

1.Written language disorders are caused by poor development of the instrumental functions.

2.Early intervention based on complex psychoeducational therapeutical programs could improve the school performance of students with poorly developed instrumental functions.

Null hypothesis (H0): The improvement of the academic performance of students with poorly developed instrumental functions occurs by chance.

Independent variable :

A - the type of intervention (cognitive stimulation of the instrumental functions);

A0 - control group without intervention;

A1 - experimental group, who benefits of early intervention program of cognitive stimulation of the instrumental functions;

Dependent variable: X – students' school performance assessed at the re-test stage.

Experimental design:

The study was conducted during 2009-2012 and was based on the following experimental design.

Table IX.1. *General experimental design*

Stage / **Groups**	**Exploratory stage. Pre-test**	**Experimental stage**	**Post-test**	**Re-test**
Experimental	Sampling. Exploring the level of the instrumental functions of experimental and control groups. Assessment. In both groups we use the same screening and assessment tests.	Introducing the independent variables.	Measuring dependent variables. Applied to both groups	Measurement of the students' improvements of the features analyzed by applying the same tests to both groups.
Control		Non-intervention		

The experiment has the following stages and distinct sequences:

1.Exploratory stage, completed by the **pre-test** administration;

2.Experimental stage (consisted in a complex psychoeducational intervention) and **post-test** application;

3.Re-test stage.

The exploratory stage of our research was conducted at the beginning of the school year 2009-2010, on a randomly selected sample of 285 students from the first grade, aged between 6 and 7 years old, from five schools in Cluj-Napoca. The participants were 168 boys and 117 girls. The investigations were made only after we had obtained the written agreement of their parents. At the very first stage of our research which we conducted at the beginning of the school year, between September and October 2009, we applied the following screening and assesment tests to evaluate the students' instrumental functions: the Reversal test and Burlea's screening test.

Of the 285 participants assessed, we selected only those students who had the lowest performance (with at least one standard deviation under the average mean of the group). We found 24 students in this situation. The selected participants (N=24 students) were divided into two groups**: the experimental group (N = 12)** and **the control group (N = 12).** The experimental group consisted in 8 boys and 4 girls and the control group included 9 boys and 3 girls. The two groups of participants are relatively homogeneous in terms of chronological age.

Table IX.2.*The sample of participants*

Experimental group		**Control group**	
Boys	**Girls**	**Boys**	**Girls**
8	**4**	**9**	**3**

The groups were designed and organised in such a way as to allow us to compare the subjects from the statistical point of view of the development of instrumental functions. After the two groups were ready we used a complex assessment of all intrumental functions by using the following tests: Bender B test, Burlea's phonological processing assessment sheet and a new method developed by the psychologist Brigitte Sindelar. During October and November 2009 we evaluated the students' development of instrumental functions using the above mentioned assessment tests. We worked with each student individually. The students' results are shown in tables nr.X.18 and X.19 in **Chapter X "Results and data interpretation"**. In the exploratory stage we set as the starting point of our research the level of the students' development of instrumental functions.

The experimental stage of the research was conducted after the exploratory phase and the assessemnt of the instrumental functions disorders. The experimental stage took place between November 2009 and June 2010 and October 2010 and June 2011 and considered teaching and psychoeducational intervention on the experimental group, while the control group activity was not influenced at all by experimental variables. The participants from the

experimental group were included in a complex intervention program after we were given their parents' written permission.

In the experimental approach we set as a starting point the poor instrumental functions identified through the assessment test applied at the exploratory stage. We also knew the level of the cognitive development of the participants in the study. After collecting all the data about the students' cognitive development, we moved to the therapeutical intervention which consisted in a complex psychoeducational program that stimulated the experimental group's cognitive functions. The therapeutical intervention was designed specifically for the development of the poor instrumental functions. It involved the stimulation of cognitive processes through exercises which use new methods and multiapproaches such as: game-exercises for stimulating the cognitive processes, Sindelar's program designed to develop the poor instrumental functions, new teaching strategies for children at-risk of dyslexia designed by the Hungarian psychologist I. Meixner. The psychoeducational intervention programs took into account the model proposed by the Romanian author E. Vrăşmaşu.

Game-exercises used in the experimental stage contributed to the development of the children's cognitive functions. Designing these exercises as games aimed to stimulate and develop the cognitive processes and engaged the students in the educational task by making the teaching and learning processes of reading and writing a joyful and attractive activity.

The early intervention program designed by the Austrian psychologist B. Sindelar was meant to develop the poor or inefficient instrumental functions of the participants from the experimental group. It is considered that if the instrumental functions are well developed, the written language disorders will not occur.

The alternative method of teaching reading and writing strategies developed by the psychologist I. Meixner was tested and used in our study, too. We applied this new multisensorial approach to students who might be at-risk of reading-writing disorders. These students with poor instrumental functions require a different teaching strategy in order to learn reading and writing.

The therapeutic intervention focused on the designing and implementation of a complex psychoeducational program which was based on each individual's features. We customised the models, methods and materials to the need of each student. Each individual educational program intended to provide the appropriate educational opportunities tailored to the needs of the participating students. At the end of this study we administered post-tests whose main objective was the assessment of the development of instrumental functions. We

compared the students' results from the experimental group with the students' results from the control group to confirm the experimental hypothesis.

The **re-test** phase was conducted in February 2012 and aimed to check the stability of the students' long-time results obtained during the experimental intervention made six months ago.

Chapter X of the thesis is called **"Results and data interpretation".**

In our research we collected the students' results obtained in both the exploratory and the experimental stage, after therapeutical intervention. Analysis and the statistical processing of data was done with IBM SPSS program version 20.

The main objective of **the exploratory stage** was to assesses the instrumental functions that may cause dyslexia disorders. The first step of this stage was the asseessment of the instrumental functions of a number of 285 students from the first grade, who were recruited randomly from five schools from Cluj-Napoca, aged between 6 and 7 years old. There were 168 boys and 117 girls. The screening methods used firstly in our study were the **Reversal test** and **Burlea's test**. The **Reversal test** requires the participants to identify identical or different figures. The Reversal test has 84 items which consist in 41 pairs of identical figures and 43 different figures. The 43 different figures have different orientation such as: 22 pairs have even left or right orientation (as letters d or b), 8 pairs have up or down orientation (as letters d and g), 5 pairs have both left-right and up-down orientation (as letters d or p) and 8 pairs of figures are competly different. The Reversal test assesses the development of the child's visual perception, visual discrimination and focused attention – processes which must function well before the child starts to learn reading and writing.

The Reversal test is considered a good predictive test and indicates the perceptive development of young children who start school. The Reversal test represents a method of assessing the acquisition of reading.

Data analysis and interpretation were focused on each assessment task. We found that 8.43 % of the total participants assessed with the Reversal test indicated children at-risk of developing specific symptoms of dyslexia disorders.

We noticed that the students' results at the Reversal test have an average M = 74.31 and a standard deviation SD = 10.482.

Table X.1. shows the raw score obtained at the Reversal test for all participants (N=281)

Participants	Average	Standard error	Standard deviation
285	74.31	.621	10.482

The graph below shows the evidence of the students' raw score at the Reversal test for all 285 participants:

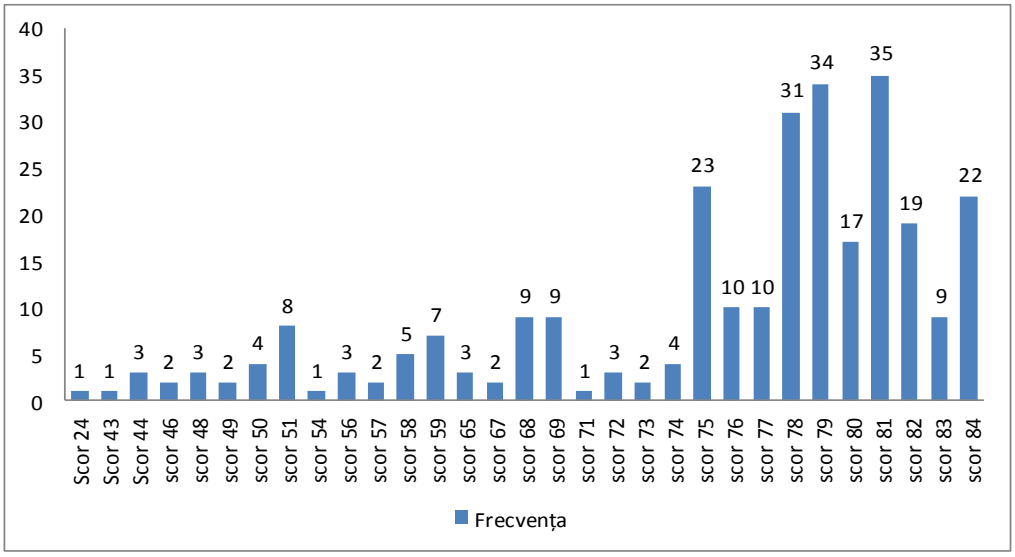


Figure 2: *Students' raw score at the Reversal test*

Given that the students in this study were aged between 6 and 7, we were interested to see whether there are significant differences between their results according to their age. We believe that this could be relevant to the methodological approach and the implementation of the therapeutic intervention. Initially we calculated the average and standard deviation for children aged 6 (N = 169) and 7 (N = 116). The table below shows the average scores by age groups:

Table X.2 :*The average scores at the Reversal test*

Students' age	**The average**	**Standard deviation**
6 year olds (N= 169)	**72,57**	**10,46**
7 year olds (N= 116)	**76,84**	**10,02**
Total: 285	**74,31**	**10,48**

Next we computed the difference between the averages scored by students aged 6 and 7 using the t test. The results obtained from statistical measurements are presented in table X.3:

Students	**Average means**	**Test t, p**
6 year olds	m=72,57 σ =10,46	t= -3,43 (p>0.10)
7 year olds	m=76,84 σ = 10,02	t= -3,46 (p>0.10)

In the above table, the descriptive statistics *independent t-test* shows no significant differences between the Reversal scores obtained by 6 or 7 year-old students (p> 0.10).

The next step in our study was to select only those students whose Reversal scores were less than 51 or equal to 51 (only poor scores). We selected 24 students.

The measurements and data analysis of errors made by these 24 students revealed high frequency of errors on:

- Left-right orientation of figures - 85%;
- Up-down symmetry at a rate of - 73%;
- Identical figures errors - 25%;
- Completely different figures - 10%;
- Errors of left-right symmetry and up-down orientation - 18%.

The qualitative analysis of errors shows that students who mistake the identical figures have difficulties or poor visual perception, poor visual discrimination, lack of power of observation and a weak capacity of analysing the items. Left-right symmetry errors show reduced neurological maturation: poor visual perception, poor lateralisation skills, unbalanced brain dominance, poor spatial and temporal skills. Syncretic perception prevents the child from perceiving the differences between figures.

We noticed that the major difficulties occur in the left-right symmetry which shows reduced cerebral dominance and poor lateralisation skills. We did not disregard the errors in totally dfferent figures either, because they are important signs of poor working memory, the lack of attention and poor visual discrimination. The child's ability to distinguish and discriminate between symmetrical and identical symbols/figures should not be neglected as it belongs to a stage of the child's neurological and psychological development. In the future, we will be concerned not only with determining whether the Reversal test correctly measures the child's reading ability but also to determine whether the test may allow to start the prognosis from the kindergarten level.

Next in our study was to decode the **Burlea test** results. This test consists in 8 different items and assesses speech language disorders, the visual and auditory perception, the spatial and temporal awareness, the visual discrimination, the working memory, the perception of temporal order of events, visual analysis and synthesis, the hand's fine motor skills, focused attention, the analysis of the skills of morpho-syntactic structures involved in the correct organization of the verbal message, and the active vocabulary – skills considered very important in the reading and writing learning process. Each item from Burlea test has a maximum point. The raw scores show the child's level.

The statistical measurements found that out of 285 students assessed there are 24 students at-risk of dyslexia because their scores were very low (between 63-89 points). The other students assessed (N = 261 students) displayed no difficulties to Burlea test and they

scored over 90 points. We were also interested in learning if there are significant differences between the scores of the 6 year-olds and the 7 year-old students. Therefore, we computed the descriptive statistics: the mean and the standard deviation for the two groups of students according to their age. The table below shows the average scores in Burlea test:

Table X.4: *Descriptive statistics (the average and the standard deviation) in Burlea test*

Students' age	**Average mean**	**Standard deviation**
6 year olds (N=169)	104,19	14,41
7 year olds (N=116)	109,87	17,35
TOTAL: 285	106,5	15,89

Next we calculated the difference between the average means using the *t test* for the independent variable - the age. The results are shown in the table below:

Table X.5: *t test independent results at Burlea test*

Students' age	**Average**	**Test t and p**
6 year olds	m=104,19 σ =14,41	t=-3 (p>0.49)
7 year olds	m=109,87 σ =17,35	t=-2,9 (p>0.49)

According to the t test there are no statistically differences between the average scores of the 6 year olds and the 7 year-old students at p > 0,4.

The analysis of statistical measurements indicated 24 students who obtained low scores in Burlea test (between 0-89 points). These students might be at-risk of developing dyslexia disorders.

The quantitative and qualitative analysis of the students' results shows the following aspects:

- only 2 students have pronuntiation difficulties,
- 54% of the students have visual perception and spatial difficulties;
- 65% of the students have poor spatial skills and poor lateralisation skills;
- 71 % of the students have poor spatial skills because they confuse the pictures they are presented (left - right, up – down), poor analysis, synthesis and visual capacity and attention difficulties;
- 85 % of the participants experienced difficulties in arranging images which requires a good temporal perception. It is important to notice the direction in which the student begins to work (from left to right). The reversal of the natural order of the succeeding images shows difficulties analysing the organization of sequences in serial processing. The students who have difficulty arranging sample images would definitely have difficulties confusing letters such as : p - d, b - d, n - u, n - m;

- 45% of the students have poor hand fine motor skills, lack of manual dexterity and poor eye-hand coordination;
- 94% of the participants display difficulties in the spatial arrangement of the objects which is a proof of poor visual perception and poor spatial skills as well as lack of focused attention;
- 43% of the students were impaired on morpho-syntactic language structures, written language disorders correlated with speech disorders such as naming words and recalling the correct lexical organization of the morpho-syntactic structure of the sentence. Some students have difficulties in lexical structures often observed in poor or limited vocabulary.

The students' results indicate a total of 24 students who scored poorly in both the Reversal test and Burlea test.

After we statistically analysed the data obtained using the screening methods, we proceeded to compare the student' results obtained at the Reversal test and Burlea test. We correlated the data by computing the Spearman correlation coefficient (ρ) and using the ranks method. We wanted to know if Burlea's assessment tasks make a good screening test for the identification of the students at-risk of developing dyslexia disorders. As we mentioned before, Burlea test is a new screening method designed by the Romanian psychologist Georgeta Burlea and has not been standardized yet.

On the other hand, the Reversal test is a standardized one, already in use. By correlating these two screening methods we wanted to find out the importance of Burlea test in screening children at-risk of dyslexia.

Regarding the correlations between the two screening tests (Reversal and Burlea), the statistical data analysis reveals a correlation coefficient Spearman $\rho = 0.899$ ($p <$ to 0.01) which indicates a significant correlation between thhose screening tests. We can conclude that Burlea screening test is reliable. We also noticed that the same students (N = 24) who had got low scores in the Reversal test, obtained poor scores at Burlea screening test, too. In addition, we noticed that Burlea screening test evidenced the participants' possible speech disorders, poor work memory skills, poor hand fine-motor skills, vocabulary and other written language aspects such as the word order. Burlea screening test has more items that assess more cognitive functions than the Reversal test.

After we completed these first steps of the exploratory stage of our study, we proceeded to group the students into two random samples: the control group (N = 12) and the experimental group (N = 12). The experimental group included 8 boys and 4 girls and the control group consisted in 9 boys and 3 girls.

The next step in the exploratory stage was to assess the students' phonological processing skills using a worksheet designed by Burlea. It is called **Burlea's phonological processing skills.** The students' results from the experimental and control groups revealed similar errors in both groups. The most common difficulties that students encountered are: finding words which consist in a given number of letters and syllables, word composition, giving examples of words that begin with a certain sound or syllable, finding words by specific syllables, identifying the first and the last sound in given words or all the sounds in words, recognizing the sound position in a word (first, mid or final position), replacing the first or the last sound of a given word with another sound and finding a new word, recognizing the rhyme of the words and giving examples of words that rhyme with that word. If we decode the difficulties faced by the students from the first grade, we can make some assumptions about the phonological processing skills. They are as follows: students displayed poor phonology differentiation, a deficit in the auditory perception of the phonetic aspects of the words, poor phonological awareness, poor motor-articulatory skills (when pronouncing unknown words). The phonological processing skills are extremely important instrumental functions in the written language acquisition and learning. Without developing these functions a first grade student will face difficulties learning how to read and write. Our experiment shows that all 24 students from both groups (experimental and control group) have approximately the same level of phonological awareness functioning.

In our study, we conduct a very complex screening and evaluation of all the aspects that can lead to written language disorders. The next test that we used in our exploratory stage was **Bender B test**. This test assesses the development of the perceptive-motor skills. The students' raw scores were quantitatively and qualitatively analysed and their results were compared to the standardized benchmark test.

If we analyze the students' raw scores in the Bender B test, we have found that the students from both groups have got about the same rates. The average of the experimental group is M = 9.16 and that of the control group is M = 10.75. The two samples are relatively homogenous in terms of development of the perceptive-motor skills. The most common errors are: deviations or distortions of figures, omission of the components of figures, rotation of the figures, the children failed to notice the relationship between geometric figures. We could also deduce that not all the students present difficulties in this area.

The development of the perceptive-motor skills must be well correlated with the written language skills and other cognitive processes such as, the visual perception, hand fine-motor skills, eye-hand coordination, spatial and temporal organization, representation, visual memory and focused attention. In our study, we considered the need to assess the

instrumental functions which are the most important skills for learning the written language. To test the instrumental functions, we used a very effective and relatively easy to apply screening method developed by the Austrian psychologist Brigitte Sindelar. After analyzing and interpreting the overall results obtained by the students in the experimental and control groups, we assessed the development of their instrumental functions with the **screening method** designed by **Sindelar**. Sindelar's method is a very efficient assessment tool for the detection of poor instrumental functions. Young children can be assessed easily with this method. It consists in 19 subtests that evaluate the following instrumental functions: visual perception (picture or symbol discrimination and differentiation), auditory perception (sounds and word discrimination and differentiation), phonological awareness, picture-word asscociation, word identification, intermodal learning, visual and auditory memory, fine-motor pronunciation skills, eye-hand coordination skills, visual and auditory attention, spatio-temporal awareness skills, hand fine-motor skills and cerebral lateralisation. We collected the raw scores from all subtests and represented them as a "tree-diagram" with19 branches that correspond to all 19 subtests. The raw scores are visually represented on each branch. At the end of the assessment process we can see very well where the child has poorly or well developed instrumental skills. This method is a new genuine assessment method. After evaluating the children's skills, Sindelar designed a special intervention program based on the assessment results.

Analysing the raw scores of the students at Sindelar's screening test we noticed the following aspects:

• All students answered met the test requirements to a better or lesser degree and the results ranged from 0 to 15 points. This accounts for the fact that a student has weaknesses in all instrumental functions, an aspect which proved to be a very important clue in designing a good individual intervention educational program.

• By analyzing the students' raw scores we observed that no student got a maximum score in all the 19 subtests. This indicates that the instrumental functions are not developed at an optimum level in all the participants and they may become important causes of dyslexia.

• Judging from their scores, the students in the two groups have approximately the same level of development of the instrumental functions. We cannot say that the students from the experimental group performed better than the students from the control group.

We used the statistic program SPSS version 20 to find the statistical descriptive average means and the standard deviations for both groups in all the 19 subtests of Sindelar's screening test. The analysis of the average and the standard deviation indicates no significant

differences between the two groups of participants. This suggests that both groups of participants have the same level of development of the instrumental functions.

The chart below illustrates that the level of development of the instrumental functions is relatively identical in the students of both groups:

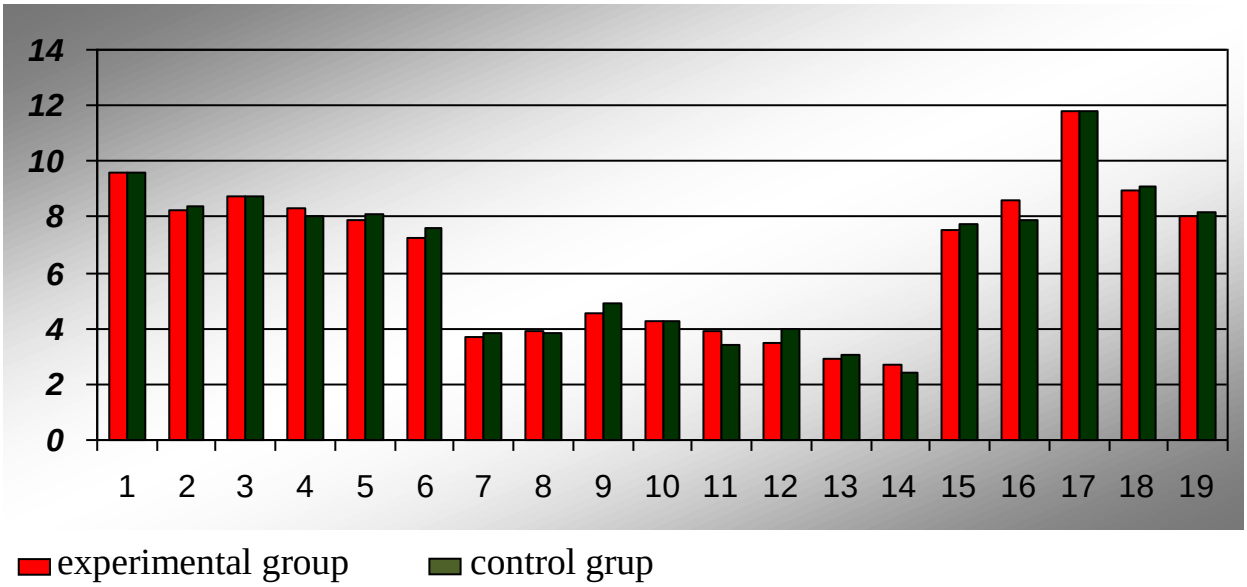


Figure 3: *Comparison of the averages scores by the students from the experimental and the control groups in the 19 pre-tests of Sindelar's screening method*

The averages scores of the students from the two groups were analyzed in pre-test, using the statistical methods to compare means with the independent samples of test t. We used this method to determine if there are significant differences between the results obtained by the students in the two groups.

Table X.6: *Comparison of the results obtained by the students from the two groups at Sindelar's subtests* ***in the pre-test:***

Sindelar's subtests	**Experimental group (N=12)**	**Control group (N=12)**
Subtest 1	t= 0 statistically insignificant at p > 0,05	
Subtest 2	t=-0,528 statistically insignificant at p > 0,05	
Subtest 3	t= 0 statistically insignificant at p > 0,05	
Subtest 4	t= 0,549 statistically insignificant at p > 0,05	
Subtest 5	t=-0,229 statistically insignificant at p > 0,05	
Subtest 6	t=-0,415 statistically insignificant at p > 0,05	

Subtest 7	t= -0,337 statistically insignificant at p > 0,05
Subtest 8	t= 0,235 statistically insignificant at p > 0,05
Subtest 9	t= -0,679 statistically insignificant at p > 0,05
Subtest 10	t= 0 statistically insignificant at p > 0,05
Subtest 11	t= 0,868 statistically insignificant at p > 0,05
Subtest 12	t= -0,663 statistically insignificant at p > 0,05
Subtest 13	t= -0,410 statistically insignificant at p > 0,05
Subtest 14	t= 0,469 statistically insignificant at p > 0,05
Subtest 15	t= -0,210 statistically insignificant at p > 0,05
Subtest 16	t= 0,353 statistically insignificant at p > 0,05
Subtest 17	t=-0 statistically insignificant at p > 0,05
Subtest 18	t= -0,392 statistically insignificant at p > 0,05
Subtest 19	t= -0,221 statistically insignificant at p > 0,05

We found out that the differences between the averages in the pre-test obtained by the students from both groups are not statistically significant, at p > 0,05. In four cases (1,3,10 and 17 subtests) the scores of both groups are identical. This means that, in the pre-test phase there are no significant differences between the groups, which indicates that the studied groups have the same level of development of the instrumental functions.

The experimental stage was conducted after the assessment stage (the exploratory stage) was finished and consisted in designing and implementing a complex psychoeducational intervention program, whose main objective is to stimulate the poor instrumental functions and develop the cognitive processes of the students from the experimental group. The post-test conducted in the experimental stage was administered during the 2011-2012 school year. As a first step, we compared the averages obtained by the students from the two groups. Our purpose was to check if there are any statistically significant differences between the two phases: the pre-test and the post-test. We wanted to learn if the intervention program applied to the experimental group was effective and improved the students' instrumental functions.

The statistical descriptive methods (the averages and the standard deviation) showed that the most significant differences appeared in all Sindelar's subtests applied to the students in the experimental group. This aspect gave us a positive feedback on the instrumental

enhancement program and the cognitive processes stimulation applied to the experimental group. The chart below shows the differences in the averages scored by the students in the two groups after the therapeutic intervention:

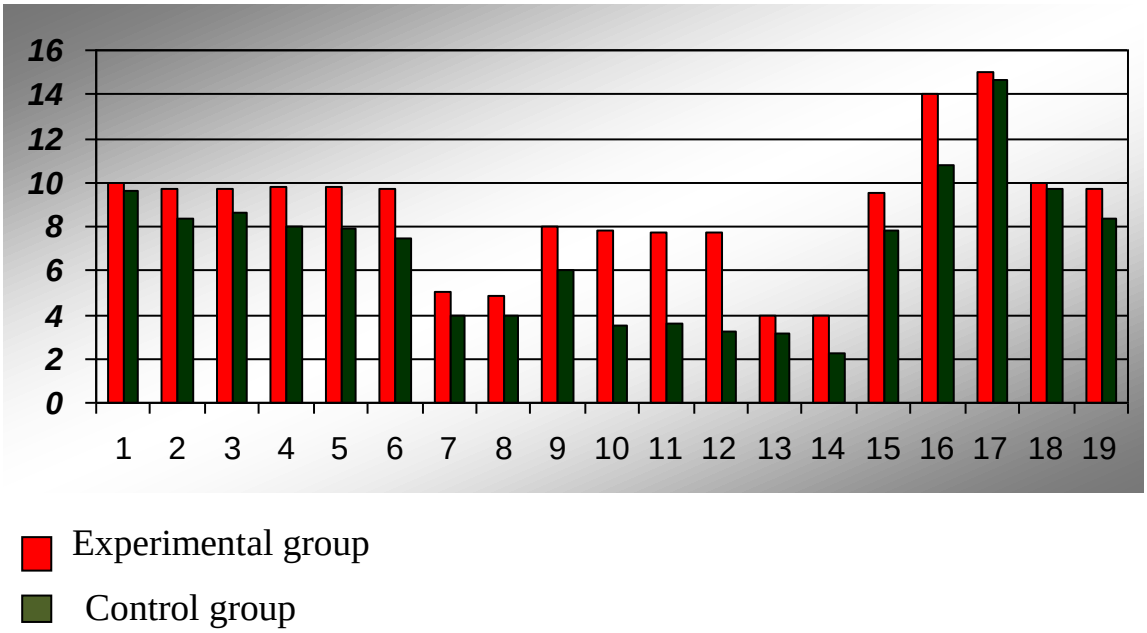


Fig. 4: *Comparison of the results obtained by the experimental and control groups in the* ***post-test*** *in the 19 subtests of Sindelar's method*

The averages obtained by the participants from both groups in the post-test were compared by using the comparison t test for independent samples. We used this method to determine if there are statistically significant differences between the results of the students from the two groups. The table below presents the t-test values.

Table X.7: *Comparison of the results obtained by the students of the experimental and the control groups in the* ***post-test***

Sindelar's subtests	**Experimental group (N=12)**	**Control group (N=12)**
Subtest 1	t=2,15 statistically significant at p < 0,05	
Subtest 2	t=6,18 statistically significant at p < 0,01	
Subtest 3	t=2,61 statistically significant at p < 0,05	
Subtest 4	t= 4 statistically significant at p < 0,01	
Subtest 5	t=3,64 statistically significant at p < 0,01	
Subtest 6	t= 4,28 statistically significant at p < 0,01	
Subtest 7	t= 4,69 statistically significant at p < 0,01	
Subtest 8	t= 4,02 statistically significant at p < 0,01	

Subtest 9	t=5,13 statistically significant at p < 0,01
Subtest 10	t=23,04 statistically significant at p < 0,01
Subtest 11	t= 7,28 statistically significant at p < 0,01
Subtest 12	t= 8,80 statistically significant at p < 0,01
Subtest 13	t= 2,80 statistically significant at p < 0,01
Subtest 14	t= 3,65 statistically significant at p < 0,01
Subtest 15	t= 2,05 statistically significant at p < 0,05
Subtest 16	t= 2,39 statistically significant at p < 0,01
Subtest 17	t= 1,77 statistically insignificant at p > 0,05
Subtest 18	t= 1,91 statistically insignificant at p > 0,05
Subtest 19	t= 2,54 statistically significant at p < 0,05

If we look at the above table we notice that in 17 of the 19 cases, the averages of the experimental group are statistically significant at $p<0,05$ or $p<0,01$. The conclusion of this statistical analysis is that the individualized therapeutic intervention program applied to the experimental group was successful and helped the children improve their poor instrumental functions and develop their cognitive processes.

The conclusions resulting from the analysis and interpretation of data are:

• both groups obtained approximately the same results in the pre-test;

• the experimental group scored better in all Sindelar's tests after the therapeutic intervention program was applied;

• statistically significant post-test differences can be noticed between the results of the experimental group and those of the control one;

• the control group results remained the same in the post-test as in the pre-test, and in some cases the results were even lower in the post-test than in the pre-test or increased slightly in the 7, 8, 9, 11, 13, 15, 16, 17, 18, 19 Sindelar's subtests;

• Subtests 17 and 18, which assess the focused visual attention and the auditory-verbal attention, showed no significant differences between the groups. This could be explained by the fact that the regular school tasks are designed to develop students' visual and auditory attention and improve these skills. Both the students from the experimental group and those from the control group had been exposed to first grade curricula, so both were influenced by the school activities.

As we wanted to determine if the differences between the results scored by the two groups are statistically significant we used the analysis of mixed variance two-way ANOVA. We chose this statistical analysis technique in our experiment because the two groups are uncorrelated independent samples (control group - experimental group) and correlated pairs (the same sample in the pre-test and post-test). The statistical analysis was done for each subtest of Sindelar's method using the statistical program IBM SPSS version 20.

The analysis and interpretation of the results obtained by the students evidenced the conclusion that poor or inefficient instrumental functions can lead to written language disorders. However, an early intervention can prevent the appearence and the trouble of dyslexia, can improve the students' cognitive development and avoid school failure. We can conclude that the psychoeducational intervention program was effective in developing the poor instrumental functions. Thus, our first experimental hypothesis - **The introduction of a cognitive stimulation program for the development of the poor instrumental functions of the students at-risk of dyslexia, leads to the improvement of school performance. –** has been confirmed. The experimental group's good results are due to the implementation of a complex psychoeducational intervention program based on the development of the poor or dysfunctional instrumental functions that can cause written language disorders. We can say that the null hypothesis is revoked because the positive changes which occurred in the students' cognitive development were not due to circumstantial and random factors but to the therapeutical intervention that led to the significantly increased results of the experimental group as compared to the control group. The rejection of the null hypothesis leads to the acceptance of the value of justice of the hypothesis formulated at the beginning of our research. We highly recommend the implementation of an early educational intervention program based on the development of the poor instrumental functions for the prevention of dyslexia and school failure.

We can say that the results obtained in the experimental post-test indicate the efficiency of the intervention and the improvement of the students' achievement. This statement is supported by the significant thresholds which are lower than 0.05 in each case, evidenced-based by statistical calculations. It also demonstrates that positive changes occurred in the experimental group.

During the second semester of the school year 2012 we reassessed the same students from both groups in order to validate the results of the experimental intervention made in the previous school year (**the re-test stage**).

By retesting the students we sought to verify their long-term knowledge acquisition and reconfirm the research hypothesis. We reassessd the students in February, for two

reasons: to observe the intervention program effectiveness in the development of the instrumental functions and to see if the students had maintained their efficiency in time. The assessment method was Sindelar's test. To see if the differences in averages are statistically significant in the re-test we used the statistical method of analysis of mixed variance two-way ANOVA with repeated measurements (pre-test and post-test, pre-test and re-test, post-test and re-test) for both experimental groups. The results for the 19 subtests of Sindelar's methos are the following:

Subtest 1: $F(1,22) = 5.65$ statistically significant result at $p < 0.05$

Subtest 2: $F(1,22) = 16.61$ statistically significant result at $p < 0.001$

Subtest 3: $F(1,22) = 7.43$ statistically significant result at $p < 0.05$

Subtest 4: $F(1,22) = 8.18$ statistically significant result at $p < 0.05$

Subtest 5: $F(1,22) = 19.32$ statistically significant result at $p < 0.001$

Subtest 6 : $F(1,22) = 25.87$ statistically significant result at $p < 0.001$

Subtest 7: $F(1,22) = 9.55$ statistically significant result at $p < 0.01$

Subtest 8: $F(1,22) = 7.01$ statistically significant result at $p < 0.05$

Subtest 9: $F(1,22) = 23.37$ statistically significant result at $p < 0.001$

Subtest 10 : $F(1,22) = 119.68$ statistically significant result at $p < 0.001$

Subtest 11 : $F(1,22) = 124.77$ statistically significant result at $p < 0.001$

Subtest 12: $F(1,22) = 66.27$ statistically significant result at $p < 0.001$

Subtest 13: $F(1,22) = 11.15$ statistically significant result at $p < 0.005$

Subtest 14: $F(1,22) = 5.65$ statistically significant result at $p < 0.05$

Subtest 15: $F(1,22) = 3.30$ statistically significant result at $p < 0.01$

Subtest 16: $F(1,22) = 3.25$ statistically significant result at $p < 0.01$

Subtest 17: $F(1,22) = 0.10$ s statistically ignificant results at $p > 0.5$

Subtest 18: $F(1,22) = 2.92$ statistically significant results at $p > 0.10$

Subtest 19: $F(1,22) = 6.82$ statistically significant result at $p < 0.05$

The analysis of these data shows that the intervention program introduced for the development of the instrumental functions was effective in the case of the students from the experimental group, because they scored significantly higher averages than the students from the control group and the results were not due to chance.

In the last stage of the research we assessed the students from both groups with **LDDI** (**Learning Disabilities Diagnostic Inventory**) – a method which helps identify intrinsic processing disorders in children. This assessment tool gave us a very important feedback on the students' achievement in reading and writing. Learning Disabilities Diagnostic Inventory was applied when the students finished the second grade and after we re-tested the

instrumental functions. LDDI is a reliable and valid norm-referenced inventory composed of six independent scales: Listening, Speaking, Reading, Writing, Mathematics and Reasoning. We were not interested in the Maths area, so we skipped this scale. Each scale contains 15 items that describe specific types of behavior associated with learning disabilities in a particular content area. Assessors read each item and select a number that best represents the frecquency with which the individual exhibits the behavior described by the item (1=most frequently, 9=most rarely). Raw scores are calculated for each scale by adding the ratings of all items. The raw scores are then converted to stanines and percentiles using normative data. The LDDI results allow the assessors to see the extent to which students' skill patterns in a particular area (for instance, reading) are consistent with those of individuals known to have a specific learning disability in the same area (reading, writing). The purpose of LDDI is to identify specific learning disabilities such as written language disorders by analyzing a set of observable and definitive symptoms in such a way that that particular disability can be delimited from other conditions (such as low intellect, poor motivation) with which it is often confused.

The comparison of the results obtained by both groups (the experimental and control groups) indicated differences between school performance in the reading and writing areas. The analysis and interpretation of students' scores showed the following facts: the application of LDDI to students in the second grade, when they have already learnt and mastered reading and writing, is relevant because it indicates and identifies the students with learning difficulties in reading and writing and provides a complex and comprehensive profile of those defficient areas.

The students from the control group scored very low and were placed significantly, below expectations. They displayed a great variety of written language disorders in comparison with the students from the experimental group: poor reading skills, poor word recognition, poor reading comprehension, incoherent and bad written content, slow writing. The data analysis shows the efficiency of the early intervention psychoeducational program aimed at developing the instrumental functions. We can say that there is a direct link between the instrumental functions and the school performance.

The results of the students from the experimental group were not due to chance. Thus, our second hypothesis, - **Initiating and using a cognitive stimulation program of the instrumental functions on students at-risk of written language disorders leads to the improvement of school performance** – has been confirmed.

The conclusion of our research is : ***"The students who are at-risk of written language disorders tend to improve their academic performance if they are helped to develop their poor instrumental functions."***

We believe that the originality of our approach consists in:

1.Personal contributions :

We think that our research work is relevant for all specialists (school psychologists, speech pathologists or special education teachers) who work with students with learning disabilities and for theses children's parents for a better understanding of the written language disorders.

In order to understand the manifestations of dyslexia and dysgraphia we studied the theoretical bibliography and many experimental studies. Our contribution is important because we make a very good comprehensive analysis and synthesis of the knowledge regarding this subject so far. Starting from the theoretical studies we have searched the best early screening methods to assess children at-risk of developing dyslexia or dysgraphia. The screening methods used in our study are new, not too well known to specialists. Some of them were translated and adapted from other languages into the Romanian language. We think that one of our original approaches was finding these assessment tools. We consider that the research has a strong impact on the first grade and even kindergarden students' development who may encounter difficulties in the future in the process of learning reading and writing because of their poor instrumental functions. The subject of the instrumental functions is not familiar to many specialists because they are newly discovered in school psychology .

The screening methods and the assessment tools used in this research have a practical value in school assessment, proving useful tools for the early identification of children at-risk of written language disorders. Starting from the information obtained in the exploratory stage, we designed and used a complex psychoeducational intervention program for each student. Its purpose was the development of the poor instrumental functions and the enhancement of the cognitive processes with the help of new, unknown techniques and new therapeutical methods such as game-exercises for cognitive stimulation, Sindelar's method and the use of alternative teaching methods for reading and writing designed by the psychologist I. Meixner. An early intervention will prevent poor school performance and will avoid school failure.

2.Research limits:

We do not claim to have exhausted this subject in the present research, as we worked with a small number of students. The fact that the psychoeducational program presented in our research proved its effectiveness shows that it can be applied to a larger number of participants.

3. Future research directions:

We believe that the evaluation samples selected for our work can be used in the assessment of students from the elementary grades and the results can be tracked longitudinally for the elementary school as well.

Taking the screening tools used in our research as a starting point, in the future, indivudual rehabilitation and education plans for students at-risk of leanrning difficulties can be developed in order to prevent the appearance of the specific symptoms of written language disorders.

BIBLIOGRAPHY

Aaron, P.G. (1991), Can reading disabilities be diagnosed without using intelligence tests?, *Journal of Learning Disabilities*, 24, 3, 178-186.

Aiken, L. R. (1989), *Psychological testing and assessment* (8th ed.).Boston: Allyn&Bacon.

Ackerman, P., T.&, Dykman, R.A., (1993), Phonological processes, confrontation naming, and immediate memory in dyslexia. *Journal of learning Disabilities*, 26, 597-609.

Adams, M.J., (1990), *Beginning to read: Thinking and learning about print*. Cambridge, MA, MIT Press.,

Affolter, F., (1972), *Aspekte der Entwicklung und Pathologie von Wahrnehmungsfunktionen.*Padiat. Fortbild K. Praxis, Vol. 34. Pag. 49-55 (Karger-Basel).

Ajuriaguera J, Auzias M., (1980), *Scrisul copilului*, vol.I, II, EDP, Bucuresti

Ajuriaguera J. (1953), Les dyslexies d'évolution, problème théoriques et pratiques de neuropsychiatrie infantile. *Annales médico-psychologiques,* 1,4, 540-551.

Albu A., Albu C., (1999), *Elemente de psihomotricitate,* Spiru Haret, Iasi,

Alegria, J., Leybart, J., Mousty, P., (1994), Acqusition du language écrit et troubles associés: évaluation, remédiation et théorie, in J. Grégoire et B. Piérart (eds.), *Evaluer les troubles de la lecture:les nouveaux modèles théoriques et leurs implications diagnostiques*, Bruxelles, De Boeck, 105-126.

Alegria, J. , (1997), "Metaphonologie, acquisition du language ecrit et problemes connexes", *Reeducation orthophonique*, p. 192 ,

Alegria, J. (1988), L'aquisition de la lectrure: aspects cognitifs. *Questions de logopédie*, 19,3, 99-122.

Alegria, J., Pignot, E. And Morais, J., (1982), „Phonetic analysis of speech and memory codes in beginning readers". *Memory and Cognition,* pp. 451-456.,

Allport, F. ,(1967), *Theory of perception and the concept of structure: A review and critical analysis*, John Willey, New York.,

Allport, D. , (1980), Patterns and actions: cognitive mechanism are content-specific, In G. Claxton (Ed.), *Cognitive psychology:New directions*. London: Routledge and Kegan Paul.,

American Psychiatric Association - APA (1989), *Manuel diagnostique et statistique des troubles mentaux.* Paris:Masson.

American Psychiatric Association – APA (1996), *Manuel diagnostique et statistique des troubles mentaux*, trad. Française du DSM-IV, Paris, Masson.

Anastasi, A.,& Urbina, S. (1997) *Psychological testing* (7th ed.) Upper Saddle River, NJ: Prentice-Hall.

Annals of Dyslexia (2003) / An Interdisciplinary Journal of the International Dyslexia Association, Founded in memory of Samuel T. Orton, vol. 53

Annals of Dyslexia (2004) / An Interdisciplinary Journal of the International Dyslexia Association (Promoting literacy through research, education, and advocacy, vol. 54, No. 2

Annals of Dyslexia (2005) / An Interdisciplinary Journal of the International Dyslexia Association, in memory of Samuel T. Orton, (Promoting literacy through research, education, and advocacy, vol. 55, No. 2

Annals of Dyslexia (2006) / An Interdisciplinary Journal of the International Dyslexia Association, vol. 56, No. 1

Anca, M. , (2002), *Logopedie*, Presa Univeritara Clujeana, Cluj-Napoca.

Anca, M., (2007) , *Metode şi tehnici de evaluare a copiilor cu CES,* Presa Universitară Clujeană.

Anca, M. (2007), Logopedie, Presa Universitară Clujeană, ediția II.

Andronescu, Ş., Cadmos, (1966). *Scurtă istorie a scrisului*, Editura Ştiinţifică, Bucureşti.,

Aron Rubin, J. (2009), *Art-terapia. Teorie şi tehnică*. Volum coordonat de Preşedenţia Asociaţiei Americane de Art-Terapie. Ed. Trei, România.,

Arnheim, R. (1979), *Arta şi percepţia vizuală. O psihologie a văzului creator*. Ed. Meridiane, Bucureşti.,

Auzias, M. (1970), *Les troubles de l'ecriture chez l'enfant*, Delachaux et Niestle, Neuchatel.,

Badian, N.A. (1997), Dyscalculia and Non Verbal Disorders of Learning, in H.R. Myklebust (ed.) *Progress in Learning Disabilities*, New York, Stratton, 235-264.

Baddeley A. D. (1996), *Working Memory*, Londres, Oxford University Press.

Baddeley, A. D., Gathercole, S., Papagno, C. (1998), The phonological loop as a language learning device. *Psychological Review*, 105, 58-173.

Bakker, D. (1979), "Hemisferic differences and reading strategies" : the dyslexia ?,*Bulletin of the Orton Society, 29, pp. 84-100,*

Bakker, (1980), *Ortographic awareness.* In U. Frith (Ed.), Cognitive Processes in Spelling. London: Academic Press.,

Bakker , D. (1992), "Neuropsychological classification and treatment of dyslexia", *Journal of Learnig Disabilities, 25.,*

Balow, I. (1963), "Lateral dominance characteristics and reading achievement in the first grade", *Journal of Psychology,55.,*

Barron, R. W.(1980), Visual-orthographic and phonological strategies in reading and spelling. In U. Frith (ed.), *Cognitive Processes in Spelling*. London: Academic Press, 1980.

Bartok Eva (coord.)(2010), "*Eu citesc mai bine! Îndrumător pentru tratarea tulburărilor lexico-grafice",* S.C. OSLI S.R.L., Târgu-Mureș.

Bastian, H. C. (1869), *"*On the various forms of loss of speech in cerebral disease". *British and Foreign Medico-Chirurgical Review, 43, pp. 209-236,*

Barber, D. (1988). Applied cognitive psychology. London: Methuem

Beck, I.L., McKeon, M.G., Sinatra, (1991), Revising social studies texts from a text-processing perspective : Evidence of improved comprehensability. Reading Research Quarterly, 27, 251-276.

Bejan, L. Drugaş, I., Hărdălău L. (2010), *" Aplicaţii practice în logopedie şi psihologie şcolară",* Ed. Primus, Oradea.,

Bell, M.A., Fox N. A. (1992), The Relation Between Frontal Brain Electrical Activity and Cognitive Development During Infancy, *Child Development*, 63, 1142-1163.

Benga O., (2004) , *Dezvoltarea cogniţiei sociale la copii*, Teză de doctorat, UBB,.

Bender, L (1938), A visual motor gestalt test and its clinical use, *American Orthopsychiatric Association of Research Monographs*, 38.

Bender, L. , (1957), Specific reading disability as a maturation lag, *Bulletin of the Orton Society, 7, pp. 9-18.*,

Benson, D. (1979), The third alexia, *Archives of Neurology*, 34, 327-331.

Benton, H. Levin, G. Moretti si D. Riva (coord), (1987), *Neuropsicologia dell'eta evolutiva.* Developmental neuropsychology, FrancoAngeli, Milano,.

Bernicot, J. (1992), *Les actes de langage chez l enfant*, PUF, Paris.,

Best, M. , & Demb, J.B.(1999), Normal planum temporale asymmetry in dyslexics with a magnocellular pathway deficit. *Neuroreport*, 10, 607-612.

Birch, H. G. , Belmont, L , (1964) , *Auditory-visual integration in normal and retarded readres,* International Journal of Orthopsychiatry, 34.,

Bishop, D.V.M., (1990), *A prospective study of relationship between specific language impairment, phonological disorders and reading retardation,* Journal of Child Psychology and Psychiatry, 31, pp. 1027-1050,

Bishop, D.V.M., Adams, C., (1991), *What do referential communication tasks measure?*, Applied Psycholinguistics,12.,

Bishop, D. (1992), The underlying nature of specific language impairment. *Journal of Child Psychology and Psychiatry*, 33, 3-66.

Bishop, D. (1999), *Third International Symposium Speech on Language Impairments: From Theory to Practice Marsh*, Londres, London House.

Black, F. W. (1973), Reversal and rotation error by normal and retarded readers. *Perceptual and Motor Skills,* 36, 895-898.

Boder, E. *(*1971), *Developmental dyslexia: Prevalaing diagnostic concepts and a new diagnostic approach. In H.R. Myklebust (Ed.),* Progress in Learning Disabilities, vol. 2, New York: Grune and Stratton.,

Boder, E. *(*1973), *Developmental dyslexia: A diagnostic approach based on three atypical reading-spelling patterns.* Developmental Medicine and Child Neurology, 15, pp. 663-687,

Bogdan –Tucicov, A. Chelcea, S. Golu, M., (1981) , *Dicţionarul de psihologie socială,* Ed. Ştiinţifică şi Enciclopedică, Bucureşti.,

Borel-Maisonny , (1966), *S. Langage oral et ecrit*, Pedagogie des notions de base,

Borel-Maisony, S., (1967), Troubles de perception et dyslexie, *Reeducation orthophonique, 29.*,

Borel-Maisony, S. ,(1979), *Langage oral et ecrit II. Epreuves sensorielles et tests de langage*, ediţia a VII-a, Delachaux et Niestle, Neuchatel.,

Bosse, M.L., (2005), De la retion entre acquisition de l'ortographe lexicale et traitement visuo-attentionnel chez l'enfant, *Reeducation ortophonique, 222, pp. 9-31,*.

Boşcaiu, E. (1983), Îndrumător pentru dezvoltarea vorbirii în colectivităţile de copii, UBB, Cluj

Bouton, C.P. (1976), *Le developpment du language. Aspects normaux et pathologiques*, Masson, Paris.,

Botez, M.I. (1996), *Neuropsyhologie clinique et neurologie du comportement*, PUM, Paris, Masson, 2 ed.

Bowers P. G., Wolf, M. (1993), Theoretical links among naming speed, precise timing mechanisms and orthographic skill in dyslexia. *Reading and Writing: An Interdisciplinary Journal, 5,* 69-85.

Bowers P.G.,(1993), Text reading and rereading: Predictors of fluency beyond word recognition. *Journal of Reading Behavior, 25,* 133-153.

Brigance, A.H. (1991), *Victory! A complete, contemporary reading series*. East Moline, IL: LinguiSystems, Inc.

Bryant, P.E. and Bradley, L., (1980) , *Why children sometimes write words which they do not read.* In U. Frith (Ed), Cognitive Process in Spelling. London: Academic Press.,

Burlea, G., Burlea, M., (coord.),(2004), *Dicţionar explicativ de logopedie*, Sedcom Libris, Iași.

Burlea G., (2007), *Tulburările limbajului scris-citit,* Ed. Polirom, Iaşi, Ştiinţele Educaţiei,

Broca, P. (2001), Remarks on the seat of faculty of articulate language, followed by on observation of aphemia. In W. Becthel, P. Mandik, J. Mundale (Eds.), *Philosophy and the neurisciences: A reader* (p. 87-99), Oxford, UK: Blackwell Publishers.

Burlea, G., Burlea M., Milici, R.,C., Burlea, A., Zanfirache A., Mereuță, M. (2011), Dicționar explicativ de logopedie, Ed. Polirom, Iași.

Burke Walsh, Kate, (1998) , "*Predarea orientată după necesităţile copilului*", Step by step-România,

Bush, G., Whalen, P. Rosen, B., Jenike, (1998) ,The countig stroop: An interference task specialized for functional neuroimaging-validation study with functional MRI. Human Brain Mapping, 6, 270-282.

Calavrezzo, C. (1967), *Metode si procedee pentru corectarea disgrafiei si dislexiei* , EDP ,

Calavrezzo si N. Toncescu, Păunescu, C. (coord), (1998)., *Tulburarile limbajului scris*, EDP, București.

Caramazza, A. ,Hilis, A. (1992), For a theory of remediation of cognitive deficits. *Neuropsychological Rehabilitation, 3,* 217-234.

Caramazza, A.,&Miozzo, M. (1997), The relation between syntactic and phonological knowledge in lexical access: Evidence from the tip-of-the-tongue phenomenon. *Cognition,64,*309-343.

Carlson, N. (1993), *Psychology. The Science of behavior*, Allyn and Bacon, Boston,

Casalis, S. (1997), ' *Reconnaissance visuelle des mots et dyslexie de l'enfant', Reedcation orthophonique, 192, pp. 37-51.,*

Casalis, S. , (2000) 'Predire at depister precocement les dyslexies de l'enfant : quelques question theorique et methodologique', *Reeducation orthophonique,204, p.19-35.,*

Casalis, S. , Cole, P., Royer, C. (2003) , 'Traitement morphologique et lecture : une strategie compensatoire pour les dyslexiques', *Glossa, 85, pp. 4-18.,*

Chassagny, C. (1971), *La reeducation du language ecrit,* Neret, Paris.,

Chișu S. (2007), "Labour Migration Effects on Family and Children", lucrare prezentată în cadrul Școlii de vară, organizată la Lodz, Polonia, 2007, publicată în vol. *Social Inclusion and Exclusion in Education,* in Bonfield T., Doyle J., Kiefer S. (ed.)

Chișu S. (2008), „Identificarea timpurie a simptomelor dislexico-disgrafice", lucrare prezentată la *Conferința Națională Tendințe psihopedagogice moderne în*

stimularea abilităţilor de comunicare, 3-5 Oct. 2008, Cluj-Napoca. Publicată în *Studii de psihopedagogie specială*, coord. Maria Anca, Ed. Casa Cărții de Știință, vol. I.

Chișu, S., Chișu, A. (2009), „Stimularea și dezvoltarea motivației copiilor cu tulburări de limbaj cu ajutorul unor metode interactive de expresie vizual-plastică, în vederea optimizării procesului de recuperare logopedică", în *Studii de psihopedagogie specială – Tendințe psihopedagogice moderne în stimularea abilităților de comunicare*, coord. Maria Anca, Ed. Casa Cărții de Știință, vol. II, p.87-97.

Chișu, A. (2011), *"Identificarea timpurie, diagnosticarea și corectarea tulburărilor de limbaj scris la copii prin intermediul mijloacelor de expresie vizuală" (teză de doctorat).*

Chassagny, C. (1966), *Manuel pour la reeducation de la lecture et de l'orthographe.* Paris: Neret.

Chomsky, N., (1996), "*Cunoasterea limbii*", Ed. Stiintifica, Bucuresti.,

Chomsky, N., (1970) Reading, writing and phonology, *Harvard Educational Review*, 40, p. 287-309.

Cioca, V. (2007), „*Imaginea şi creativitatea vizual-plastică*", Ed. Limes, Cluj-Napoca,

Clocotici, V., Stan, A. (2000) , Statistică aplicată în psihologie, Ed. Polirom, Iași.

Cofer, C. N., Appley, M.H. (1967), *Motivation: theory and research*, John Wiley, New York, Londra.

Cohen, K. (1981), The Development of Strategies of Visual Search, in D. Fischer, R. Monty et J. Senders (eds.), *Eye Movements:Cognition and Visual Perception*, Hillsdale, N.J., Earlbaum, 271-288.

Cohen, J. (1988), *Statistical power analysis for the behavioral sciences* (2end ed.). New York: Academic Press.

Cohen, M., Town, P., & Buff, A. (1988). Neurodevelopmental differencies in confrontational naming in children. *Developmental Neuropsychology, 4,* 75-81.

Corkin, S. , (1974), Serial-ordering deficits in inferior readers,*Neuropsychologia, 6,*

Colin, V. (1966), *Povestea scrisului*, Editura Tineretului, Bucureşti.,.

Coltheart, M (1979), When can children learn to read – And when should they be taught? In T. G.. Waller and G.E. Mackinnon (Eds.), *Reading Research: Advances in Theory and Practice*, Vol. 1. New York: Academic Press.

Coltheart, M. (1980), Reading, phonological recoding, and deep dyslexia, In M. Coltheart, K.E. Patterson and J.C. Marshall (Eds.), *Deep Dyslexia*. London: Routledge and Keagan Paul.

Coltheart, M. (1981), The MRC psycholinguistic database. *Quartely Journal Of Experimental Psychology, 33A,* 497-505.

Coltheart, M. (1982), The psycholinguistic analysis of acquired dyslexia: some illustrations. In D. E. Broadbent and L. Weiskrantz (Eds.), *The Neuropsychology of Cognitive Function*. London: The Royal Society.

Coltheart, M., Patterson, K. E. and Marshall, J.C. (Eds.)(1980) *Deep Dyslexia*. London: Routledge and Keagan Paul.

Coltheart, M, Sartori, G., & Job, R. (1987), *The Cognitive Neuropsychology of Language*. London: Lawrence Erlbaum Associates.

Coon, D. (1983), *Introduction to psychology.Exploration and application*, West Publishing Company, St. Paul.,

Coon, K.B., Waguespack, M.M., & Polk, M.J. (1994) *Dyslexia Screening Instrument*. San Antonio, Tx: Psychological Corp.

Corkin, S. (1974) Serial-ordering deficits in inferiors readers, *Neuropsychologia, 6.*

Cossu, G., Marshall, JC (1990) , "Are cognitive skills a prerequisite for learning to read and write?", *Cognitive Neuropsychology, 7.*,

Critchley, M. (1970), *The Dyslexic Child*, Heinemann, Londra.,

Critchley, M. (1975), Specific developmental dyslexia. In E. H. Lenneberg and E. Lenneberg (Ed), *Foundations of Language Developmental*, Vol. 2, New York: Academic Press.

Critchley, M. and Critchley (1978), E.A. *Dyslexia Defined*. London: William Heinemann Medical Books.

Crososchi, C. (2012), „*Căsuța cu litere și jucării, material adaptat pentru limba română după metoda Meixner"*, coord. Adorjan K. Și Hodicska T., ed. S.C. OSLI S.R.L., Târgu-Mureș.

Crotti, E., (2010), *Desenele copilului tău. Interpretări psihologice*, Ed. Litera, Bucureşti.

David, D. (2006), Metodologia cercetării clinice. Fundamente, Ed. Polirom, Iași.

Debray-Ritzen P. (1979), *Comment dépister une dyslexie chez un jeunne écolier?* Paris, Nathan.

DeHirsch, K., Jansky, J., & Langford, W. S. (1966) *Predicting reading failure*. New York: Harper&Row.

Demetrescu, C., (1966)., *Culoarea, suflet si retina*, Ed. Meridiane, Bucuresti,

Dempsey, D. , Zimbardo, P., (1978), *Psychology and you*, Scott, Foresman and Company, Glenview, Illinois.

Démonet J. F. (1997), Le traitement du language, in S. Dehaene (ed.), *Le Cerveaux en action. Imagerie cérébrale fonctionnelle en psychologie cognitive,* Paris, PUF, 159-184.

Denckla, M.B., Rudel R.G. (1976), Rapid Automatized Naming (R.A.N.) Dyslexia Differentiated from Other Learning Disabilities, *Neuropsychologia,* vol. 14, Grande-Bretagne, Pergamon Press, 471-479.

Dowing, J.E. (2005), *Teaching literacy to students with significant disabilities. Strategies for the K-12 inclusive classroom*, Corwin Press, California, USA,

Downing, J. And Leong, C.K. (1982), *Psychology of Reading*. New York: Macmillan.

Drew, A.L. (1956), „A neurological appraisal of familial congenital word blindness", *Brain*, 79.,

Dunn, L. M., & Dunn, L.M. (1981), *Peabody picture vocabulary test-revised*. Circle Pines, MN: American Guidance Services.

Eden G.,Vanmeter , J. Rumsey, (1996) , Abnormal processing of visual motion in dyslexia revealed by functional brain imaging, *Nature, 382*, pp. 66-69.,

Eden, G. Jones, K. M., Cappelli, K. Gareau, L., Wood, F. B. Zeffiro, T. A. ,Dietz, N. A.E, Agnew J.A., Flowers (2004), Neural changes following remediation in adult developmental dyslexia. *Neuron*, 44, p. 411-422.

Edfeld, A. W. (1971) *Test de Reversal***.** Paris: Editions du Centre de Psychologie Apliquée. (2 edition)

Ellis, A. W. (1979), Developmental and aquired dyslexia: some observations on Jorm . *Cognition, 7*, pp. 413-420,

Ellis , A. W. (1982), Modality-specific repetition priming of auditory word recognition. *Current Psychology Research*, 2, 123-128 .,

Ellis, A. W. (1982), *Normality and Pathology in Cognitive Functions*, London : Academic Press.,

Ellis , A. W. (1983) , Wernicke's aphasia and normal language processing: A case study in cognitive neuropsychology, *Cognition.*,

Ellis, A. W. , Milles, T. R., **(1984)** , A lexical encoding deficiency: Experimental evidence. In G. Th. Pavlidis and T.R.Miles (ed), *Dyslexia Research and its Applications to Education*. London..

Ellis, A. W., (1984), *Reading, writing and dyslexia: A Cognitive Analysis*, Lancaster, UK.,

Ellis, A. W. (1989), The cognitive neuropsychology of developmental (and aquired) dyslexia: A critical survey. *Cognitive Neuropsychology*, 2, 169-205.

Enăchescu, C. (1996), '*Neuropsihologi*e', Editura Victor, Bucuresti,

Estienne, F., **(1977)**, *L'enfant et l'ecriture*, J.P. Delarge, Paris,

Estienne, F. , (1992), Le bilan de la reeducation du langage ecrit, *Academia*, Louvain-la-Neuve.,

Estienne, F ((1999), *Méthode d'initiation a l'ecrit pour les dyslexiques et les dysorthographiques*. Paris. Masson.

Fabini, D., (2006), "*Receptarea în artele vizuale. Implicaţii în terapia prin artă*", Ed. Casa Cărţii de Ştiinţă Cluj-Napoca.,

Fayol, M., Bombert J. E. , Lecocq P.(1992), *Psychologie cognitive de la lecture.* Paris, PUF.

Ferrand, P., (1995), 'Evaluation du role de l'information phonologique dans l'identification des mots ecrits'*, L'Annes psychologique, 95, pp. 293-315.,*

Ferrand, P., (2000), 'Necessite du depistage et du traitement precoce en orthophonie', *Reeducation orthophonique, 204, pp. 3-19,*

Ferre A., (1961), *Les tests a l'ecole*. Paris. A. Colin.

Fevrier, J. , (1984), *Histoire de l' ecriture*, Payot, Paris.,

Filipescu V. (coord), (1983) , Instrumente și modele de activitate în sprijinul pregătirii preșcolarilor pentru integrarea în clasa I, E.D.P. București

Fink, E., (1996), *Le jeu comme Symbole du Monde*, Minuit, Paris,.

Fischer, P.E. (1995), Speed drills for decoding automaticity. Farmington. ME:Oxton House Publishers.

Fodor, J., (1983), *The modularity of mind*. Cambridge, MA: MIT Press.

Fodor, J. (2000) *The mind doesn't work that way: The scope and limits of computational psychology*. Cambridge, MA: MIT Press.

Frederickson, N. , Frith, U. , Reason, R. (1997), *The phonological assessment batery (PhAB),* Windsor, UK: NFER-Nelson.

Frith, U., (1980) , *Cognitive Processes in Spelling*. London: Academic Press,

Frith, U. , (1985) , *Beneath the surface of developmental dyslexia,* în K. Petterson, M. Coltheart şi J.C. Marshall (coord.), Surface Dyslexia, Lawrance Erlbaum, Hillsdale, pp. 301-330.,

Frith, U. , (1986), A developmental framework for developmental dyslexia, *Annals of Dyslexia*, vol. XXXVI, pp. 69-81.,

Frith, U.,(2002, September). An embarrassment of riches:Current theories of dyslexia. Paper presented at the meeting of the Rodin Remediation Academy on the Art of Reading-Texts, Pictures, Cultures, Munich.

Frostig, M. (1973), *Test de développement de la perception visuelle*. Paris: Editions du Centre de Psychologie Apliqueé.

Fletcher, J.M., Shaywitz, S.E., Shankweiler, D.P., Katz, L.,Liberman,I.Y.Stuebing, K.K., Francis,D.,J. Fowler, A. E., & Shaywitz, B.A. (1994) Cognitive profiles of reading disability:Comparaisons of discrepancy and low achievement definitions. *Journal of Educational Psychology*, 25, 6-23.

Galaburda, A., Corsgilia, J. (coord.), (1987) "Planum temporale asymmetry : reapraisal singe Geschwind and Levitsky", *Neuropsychologia, 25.*,

Galaburda, A. M. (1994), Developmental dyslexia and animal studies: At the interface between cognition and neurology. *Cognition*, 50, 133-149.

Galaburda, A. M, Livingstone, M.(1987), Evidence for a magnocellulaire defect in developmental dyslexia. *Annals of the New York Academy of Science,* 682, 70-82.

Galaburda, A. M., LeMay, M., Kemper, T.L., & Geschwind, N. (1978), Right-left asymmetries in the brain. *Science, 199,* 852-856.

Galaburda, A.M., & Kemper, T.L. (1979). Cytoarchitectonic abnormalities in developmental dyslexia: A case study. *Annals of Neurology, 6*,94-100.

Gallagher, A., Frith, U., & Snowling, M.J. (2000). Precursors of literacy delay among children at genetic risk of dyslexia. *Journal of Child Psychology and Psychiatry and Allied Diciplines, 41*, 202-213.

Galifret-Granjon, N. (1954), Comparaison d enfants dyslexique et normaux a une epreuve de motricité manuelle, *Enfance, 7.*,

Galifret-Granjon, N (1958), Test d'orientation Droit-Gauche, baterie Piaget-Head, In Zazzo, R. (Ed.), *Manuel pour l'examen psychologique de l'enfant*. Neuchatel: Delachaux et
Niestle. (3 edition).

Galifret-Granjon, N, & Santucci, H. (1977), Test adapté de Kohs-Goldstein.In Zazzo, R. (Ed.). *Manuel pour l'examen psychologique de l'enfant*. Neuchatel: Delachaux et Niestle. (3 edition).

Geiger, G., Lettvin, J., Zegarra-Moran, O. (1998*)*, Task determined strategies of visual processes, *Cognitive Brain Reasearch,*

Gerard, C.L , (1998), Troubles du language oral et trouble de la lecture, in A. Van Hout, *Les dyslexies*, editia a II-a, Masson, Paris.,

Geschwind, N. (1982), Why Orton was right. *Annals of Dyslexia,* 23, 13-30.

Geschwind, N (1982), The biology of cerebral dominance. Implications for cognition. *Cognition,* 17, 193-208**.**

Geschwind, N. , Behan, P. , (1984), Laterality, hormones and immunity, în N. Geschwind şi A. Galaburda, Cerebral Dominance, *Harvard University Press, Cambridge*.,

Geschwind, N. , Behan, P., (1965), Cerebral lateralisation: biological mechanism association and pathology, Archives of Neurology, 42.,

Geschwind, N., & Galaburda, A. M. (1985c). Cerebral lateralization. Biological mechanisms, associations, and pathology: III. A hypothesis and program for research. *Archives of Neurology, 42*,634-654.

Gesell, A. (1970)-*Studies In Child Development*, Jesson Press

Gherguț, A. (2006), *Psihopedagogia persoanelor cu cerințe speciale. Strategii diferentiate și inclusive în educație*, Ed. Polirom, Iași.

Gherguț, A. (2011), *Evaluare și intervenție psihoeducațională. Terapii educaşionale, recuperatorii și compensatorii,* Ed. Polirom, Iași.

Girolami-Boulinier, A. (1966), 'Prevention de la dyslexie et de la dysorthographie, *Delachaux et Niestle', Neuchatel.,*

Gibson, J., Ivancevich, J., Donnelly, J., (1997), *Organisations*, Boston: Irwin McGraw-Hill.,

Gleeson M. , (2007), *Lecture Notes*. Limerick, Ireland, Mary Immaculate College.,

Gombert, J.E., (1992), *Activite de lecture et activites associees*, în M. Fayol (coord.), Psychologie cognitive de la lecture, PUF. Paris.,

Golu, M. , (2000), *Fundamentele psihologiei*, Ed. Fundaţiei România de Mâine, Bucureşti.,

Goleman , D. , (1998), *Working with emotional intelligence*, Bantam Books, New York,.

Goldstein, B. H., & Obrzut, J.E. (2001), Neuropsychological treatment of dyslexia in the classroom setting. *Journal of Learning Disabilities*, 34,276-285.

Gorman, Ph., (2004) , *Motivation and emotion*, Routledge, Taylor Group, Londra, New York.

Goswami, U., (2002), „Phonology, reading development, and dyslexia: A cross-linguistic perspective". *Annals of Dyslexia, 52, 141-163.*,

Grégoire, J & Piérart, B., (1994) , *Evaluer les troubles de la lecture*, Bruxelles, DeBoeck Universite.,

Habib, M. (1996), Les mécanismes cérébraux de la lecture : un modèle en neurologie cognitive. m/s synthèse, *Medicine/Sciences*, 12, 707-14.

Habib, M. (1997), « Le cerveau du dyslexique », *Reeducation orthophonique*, 192, Paris, pp. 9-21.,

Habib, M. (1997), *Dyslexie : le cerveaux singulier*. Marseille, Solal.

Halgreen, B. , (1950), „Specific dyslexia (congenital word-blindness) : a clinical and genetic study", *Acta of Psychiatric Neurology Scandinavica, 65.*,

Hammill, D. Goodman, C., Wiederholt, J., (1974) , Visual-motor processes: can we treat them?, *The Reading Teacher*, 27, pp. 469-478.,

Hammill, D. D., Bryant, B., R., (1998) , Learning Disabilities Diagnostic Inventory , Pro-ed, Austin, Texas, USA.

Haynes, J.C., Naioo, S, (1991), *Children with Speech and Language Impairment*, MacKeith Press, Londra.,

Haynes, J. Y., (1986), Composantes emotionnelles propres aux enfants qui presentment des troubles specifique de l'apprentissage, *Seminaires de Medicine Scolaire, CXV, 9-15.,*

Hărdălău, L. Drugaş, I., (2010)– *Logopedie prin jocuri şi exerciţii* , Ed. Primus, Oradea.,

Hărdălău, L. Drugaş, I., Bejan, L., (2009), *Aplicaţii practice în logopedie şi psihologie şcolară*, Ed. Primus, Oradea.

Heaton R.B. (1981), *Wisconsin Card Sorting Test:Manual*, Floride, Psychological Assessment Ressources Inc.

Hecaen, H. (1972), *Introduction à la neuropsychologie,* Larousse, Paris.

Hermann, K. and Voldby, H., (1946), „The morphology of handwriting in congenital word-blindness." *Acta Psychiatrica et Neurologica*, 21, 349-363.,

Hinshelwood, J. , (1917), *Congenital Word Blindness*, H.K. Lewis, Londra.,

Hoien, T. (1988), La dyslexie: point de vue developpemental et processuel, *Les Cahier du CTNERHI*, ianuarie-martie, 41.,

Holdevici, I. (2007), *Ameliorarea performanţelor individuale prin tehnici de psihoterapie*, Ed. **Orizonturi.**

Huffman, K., Vernoy, M. Williams, B. Vernoy, J., (1991), *Psychology in action*, John Wiley and Sons, New York.,

Hughes, J. R. (1982), The electroencephalogram and reading disorders. In R.N. Malathesa and P. G. Aron (Eds.), *Reading Disorders: Varieties and Treatments*. New York: Academic Press.

Huyghe R, (1971), Puterea imaginii, Ed. Meridiane,Bucureşti.

International Reading Association (2003). *Investment in teacher preparation in the United States*. Newark, DE:Author

Hirsch, K., Jansky,J.(1972), *Preventing reading failure :Prediction, diagnosis, intervention.* New York : Harper and Row.

Kaufmann, W. E., & Galaburda, A. M. (1989), Cerebrocortical microdysgenesis in neurologically normal subjects : A histopathologic study. *Neurology*, 39, 238-244.

Kaufmann, A., S., & Kaufmann, N.L. (1998*), Kaufman test of educational achievement*. Circle pines, MN : American Guidance Services.

Khomsi, A. (2003) , *Lecture de mots et comprehension* (L.M.C.), Les Edition du Centre de Psychologie Appliquee, Paris.,

Kreindler, A. (1977), *Agnozii şi apraxii*, Editura Academiei, Bucureşti.,

Kulcsar, T. , (1978), *Factorii psihologici ai reuşitei şcolare*, Editura Didactică şi Pedagogică, Bucureşti.,

Kussmaul, A. , **(1884**), « Die storungen des Sprache, in Ziemssen » (ed), *Hanbuch der Spezielle Pathologie und Therapie*, Leipzig 12 (traduction francaise (1884) Les troubles de la parole. Paris)

Lacert P., Sprenger-Charolles L. (1997), Spécificité des troubles phonologiques et métaphonologiques dans la dyslexie du développement, *Approche neuropsycholgique des aprentissages chez l'enfant* (ANAE), 42, 73-83.

Lebrun Y. (1990), Mirror Reading and Mirror Writing in Schoolchildren, *Approche neuropsychologique des apprentissage chez l'enfant* (ANAE), 2, 177-182.

Lefavrais P., (1957)- *Test de l'Alouette***.** Paris. Centre de Psychologie appliquée.

Lezac, M. D. (1976)- *Neuropsychological Assessment*, New York, Oxford University Press.

Liberman, I.Y., (1982), A language oriented view of reading and its disabilities, în H. Myklebust (coord.), *Progress in Learning Disabilities, Grune and Stratton, New York.,*

Lichteim, L. (1885), On aphasia. *Brain 7*, 433-484

Linebarger, M.C. (1990), Lexical processing and sentence comprehension in dyslexia.In A.K. Caramazza (Ed.), *Cognitive neuropychology and neurolinguistics: Advances in models of cognitive function and impairment* (p. 55-122). Hillsdale, NJ:Erlbaum.

Livingstone M. S., Rosen G. D. Drislane, F.W. Galaburda, A. M. (1991) , Psychological and Anatomical Evidence for a Magno-Cellular Defect in Developmental Dyslexia, *Proceeding of the National Academy of Sciences,* 88, 7643-7947.

Lobrot, M., (1973) « *Troubles du langage ecrit et remedes* », ESF, Paris,

Lobrot, M (1973), *Lire.* Paris. Editions sociales Françaises.

Lovegrove, W. J. , (1993) „Weakness in the transient visual system. A causal factor in dyslexia?", în P. Tallal, A. Galaburda, R. Llinas Riascos, C. von Euler (coord.), „Temporal Informationprocessing in the Nervous System: Special Reference to Dyslexia and Dysphasia", în *Annals of the New York Academy of Sciences*, 682, New York Academy of Sciences, New York.,

Lovinescu, A.V. (1979), "*Jocuri –exerciţiu pentru preşcolari „*, E.D.P. , Bucureşti.,

Lurçat, L. (1974), « *Etudes de l'acte graphique »* , La Haye, Paris,

Luria, A. R. (1970), The Functional Organisation of the Brain, *Scientific American*, 222, 66-78.

Luria, A. R. (1973b), *The Working Brain, an Introduction to Neuropsychology*, New York, Basic Books Inc. Publishers.

Lussier, F., Flessas, J. (2001) , *Neuropsychologie de l' enfant – Troubles développementaux et de l' apprentissage*, Dunod, Paris.

Jakobson, R. (1963), „*Essais de linguistique generale*", Minuit, Paris,

Johns, G. (1998), „*Comportament organizational*", Ed. Economică, Bucureşti,

Johnson, D.J. (1982), Programming for dyslexia.The need for interaction analyses, in *Annals of Dyslexia, vol. 32*, 61-70.

Johnson, H.M. (1994). Deductive reasoning. Annual Review of Psychology, 50, 109-135.

Jurcău, N. (coord.), (2001)"*Psihologia educaţiei*", U.T.Press, Cluj-Napoca,.

Jung, C.G , (1968) "*Man and his symbols*", Dell Publishing, USA,

Malchiodi, C.A. (2002), „*The soul's palette. Drawing on Art's transfomative power for health and well-being*"., Shambhala, Boston, USA,.

Marcelli, D. , (2003) „ *Tratat de psihologia copilului*", Editura Fundatiei Generatia, Bucuresti.,

Marshall, J.C. (1986), "The description and interpretation of aphasie language diorder", *Neuropsychology, 24/5,*.

Marshall, J.C., Newcombe (1973), Patterns of paralexia: A psycholinguistic approach, *Journal of Psycholinguistic Research*, 2, pp., 175-199.

Maslow, A. H. , „A theory of human motivation", *Psychological Review, 50*, pp. 370-396.

Mcniff, S. (2004), *Art heals. How creativity cures the soul*, Shambhala, Boston, USA,

Mcniff, S. (1988), *Fundamentals of art therapy*, Charles C.Thomas, Illinois, USA,

Meyer M.S., Wood F.B., Hart L.A. Felton R.H. (1998), Selective Predictive Value of Rapid Automatized Naming in Poor Readers, *Journal of Learning Disabilities*, vol. 31, 106-117.

Mettellus, J. (1996)

Miles, E. (1997), Dyslexia may show a different face in different languages. *Dyslexia, 6*, 193-201.

Miles, T.R. (1997), *The Bangor dyslexia test*. Wisbech, Cambs:Learning Development Aids.

Miles, T.R., & Miles, E. (1999), *Dyslexia: A hundred years on* (2nd ed.),Buckingham, UK: Open University Press.

Milici, R. (2003) „Deficitul fonologic în dislexie. Intervenţii pentru dezvoltarea abilităţilor de procesare fonologică.", *Revista Medico-Chirurgicală a Societăţii de Medici şi Naturişti*, vol. 107, Iaşi,

Miu, A., Olteanu, A. (2002) , *'Neuroştiinţe'*, vol. I, Dacia, Cluj-Napoca,

Mitrofan, N., Mitrofan, L. (2005), Testarea psihologică. Inteligența și aptitudinile, Ed. Collegium, Polirom, Iași.

Mocrette, D. (1999) , 'Les habiletes psycholonguistiques des personnes illettrees', *Glossa, 67*, pp. 30-47.,

Monfort, M. (1999) 'Conscience phonologique et lectrure chez l'enfant dysphasique', *L'orthophoniste, 191, pp. 19-25,*

Morais, J. , (1987) " The relationship between segmental analysys and alphabetic literacy : an interactive view", *Cahier de Psychologie Cognitive*, vol. 7, 5.,

Morgan S. B. (1988), Child Neuropsychology and Cgnitive Developmental Theory, in J.M. Williams,C.J. Ling (eds.), *Cognitives Approaches to Neuropsychology*, New York, Plenum.

Morton, L. , (1994) "Interhemisferic balance patternes detected by selective phonetic dichtonic laterality measures in four clinical subtipes of reading-disabled children", *Journal of Clinical and Experimental Neuropsychology, 16*.,

Moldovan, I. (2002), '*Probleme de logopedie'*, Presa Universitară Clujeană, Cluj-Napoca,

Moldovan, I. (2006), *Corectarea tulburărilor limbajului oral*, Presa Universitară Clujeană.

Mousty P., Leybaert, J., Alegria J., Content, A., Morais J., (1994)- BELEC: Une Baterie d'evaluation du langage écrit et de ses troubles. In Gregoire J., Pierart, B. (eds.) *Evaluer les troubles de la lecture.* Paris-Bruxelles, De Boeck.

Mucchielli, R., Bourcier, A. (1979) , *Educateur ou therapeute : une conception nouvelle des reeducations*, ESF, Paris.

Mucchielli, R., Bourcier, A. (1966), *La dyslexie, maladie du siecle*, ESF, Paris,.

Mucchielli, A. (1981), *Les Motivations*,.Presses Universitaires de France, Paris,

Munhall, KG, (2001), „Functioning imaging during speech production", în *Acta Psychologica, 107,*

Murray, E. (1964), *Motivation and emotion*, Prentice Hall , Englewood Cliffs, New Jersey.,

Mussen, P., Rosenzweig, M. , Aronson, E., Elkind, D., Feshbach,S., Glickman, S., Murdock, B. JR, Wertheimer, M. (1973), *Psychology*, Lexington,

Marshall, J.C. (1986), "The description and interpretation of aphasie language diorder", *Neuropsychology, 24/5.,*

Morais, J. (1987), « The relationship between segmental analysys and alphabetic literacy : an interactive view », *Cahier de Psychologie Cognitive, vol. 7, 5.*,

Morgan, W. P. , (1896) "A case study of congenital word blindness". *British Medical Journal. 2, 1378.*,

Morton, L. , (1994) "Interhemisferic balance patternes detected by selective phonetic dichtonic laterality measures in four clinical subtipes of reading-disabled children",*Journal of Clinical and Experimental Neuropsychology, 16.*,

Morton, J. (1980), *The logogen model and orthographic structure.* In U. Frith (ed), Cognitive Processes in Spelling. London: Academic Press,

Naidoo, S. (1981), Teaching methods and their rationale. In G. Pavdilis and T.R. Miles (Eds.), *Dyslexia Research and its Applications to Education*. New York : John Wiley.

Neisser, U. (1974), *Kognitive Psychologie*.Klett.

Neveanu, P.P. (1978), *Dicţionar de psihologie*, Ed. Albatros.

Newton, M. (1970) A neuro-psychological investigation into dyslexia. In A. W. Franklin& S. Naidoo (Eds.), *Assessment and teaching of dyslexic children*. London: ICAA.

Nicolson, R.I., Fawcett, A.J.,&Dean.P. (2001), Developmental dyslexia:The cerebellar deficit hypothesis. *Trends in Neuroscience*, 9, 508-511.

Norrie, E., Hermann, K. (1958), Is congenital word-blindness a hereditary type of Gerstmann's syndrome?, in *Psychiatric Neurology*, 136, 59-73.

Olson, D. R. (2003). *Psychological theory and educational reform: How school remakes mind and society.* Cambridge, U.K.: Cambridge University Press.n, D. R., & Kamawar,

ORGANISATION MONDIALE DE LA SANTE (1995) *Classification statistique internationale des maladies et des problemes de santé connexes*, 10, mise a jour, Genève.

Orton, S. T. (1937), *Reading, Writing and Speech Problem in Children*, Norton, New York.,

Osho (2006), „*Creativitatea-descătuşarea forţelor interioare*", Ed. Pro Editură şi Tipografie,.

Patterson, K.E., Marshall J., Coltheart M.V. (1980), *Surface Dyslexia: Neuropsychological and Cognitive Studies of Phonological Reading*, Londres, Lawrence Erlbaum.

Patterson, K.E. (1981), Neuropsychological approaches to the study of reading. *British Journal of Psychology, 72*, p. 151-174.

Patterson, K.E. (1982), The relation between reading and phonological coding: Further neuropsychological observations. In A. W. Ellis (Ed.), *Normality and Pathology in Cognitive Functions*. London: Academic Press.

Patterson, K.E., Shewell C. (1987), Speak and spell: Dissociation and Word Class Effects, in M. Coltheart, G. Sartori, et R. Job (eds.), *The Cognitive Neuropsychology of Language*, Londres, Lawrence Erlbaum Associates.

Pascual-Leone, A., Amedi, A. Fregni, F., Merabet, L.B. (2005), The plastic human brain cortex. *Annual Review of Neuroscience*, 28, 377-401.

Paulescu, E., Frith, U. (1998). The neural correlates of the verbal component of working memory. *Nature*, 362, 342-345.

Pavlidis, G., (1981) , Do eye movements hold the key to dyslexia*?,Neuropsychologia, 19, 57-64,*

Pavlidis, G. , (1981), Sequencing, eye movements and the early objective diagnosis of dyslexia. In G. Pavlidis and T. R. Miles (Eds.), *Dyslexia Research and its Applications to Education*. Chichester: John Wiley.

Pavlidis, G.T. (1982), Sequencing, eye movements and the early objective diagnosis *of* dyslexia. *Dyslexia Research and its Applications to Education.Chichester, UK.,*

Pavlidis, G. T. (1986), "The role of the eye movements in the diagnosis of dyslexia", in *G.T. Pavlides si D.F. Fisher, Dyslexia : Its Neuropsychology and Treatment, Willey, New York.,*

Păunescu, C. (1984), *Tulburările de limbaj la copil*, Ed. Medicală, Bucureşti,

Piaget , J., Inhelder, B., (1966) , *L'image mentale chez l'enfant*. Paris, PUF,

Piaget, J., Inhelder, B. (1962), *Psychologie et pedagogie*. Paris, Denoel-Gonthier.

Pirozzolo, F. (1979), The Neuropsychology of Developmental Reading Disorders, *Praeger, New York.,*

Pirozzolo, F., (1981), Neuropsychological and Cognitive *Processes in Reading. New York: Academic Press.,*

Pirozzolo, F. (1982), The neurobiology of developmental readin disorders. In *Reading disorders: Varieties and Treatments. New York: Academic Press,*

Piérart, B. (1988), Troubles instrumentaux-troubles des apprentissages scolaires. In J. Rondall, & Pierart (Eds*.), Psychopédagogie de l'éducation spécialisée* (vol.1,p. 75-115). Bruxelles:Labor.

Piérart, B (1994), Les modèles génétiques et les dyslexies. In A. Van Hout, & F. Estienne (Eds.): *Les dyslexies: décrire, évaluer, comprendre, traiter*. Paris:Masson.

Plaza, M. , (1998) "Impact des difficultes precoce de langage sur la conscience phonologique d'enfants scolarises en grande section de maternelle*", ANAE, 48,* pp. 93-98.

Plaza, M. , (1999) « *Sensibilite phonologique et traitement metaphonologique : competences et defaillances », Reeducation orthophonique, 197,* pp. 13-35.,

Plaza, M. , (2000), Influence des competences phonologiques, mnesiques et syntaxiques sur l'apprentissage de la lecture et son dysfonctionement *», Reeducation orthophonique, 204,* pp. 35-53,

Pânişoară, G., I.O, (2008), Motivarea eficientă - Ghid practic, Editura Polirom, Iaşi,

Pieron, H. (2001), Vocabularul psihologiei, Univers Enciclopedic, Bucureşti.,

Popa, M. (2010) , Statistici multivariate aplicate în psihologie, Ed. Polirom, Iași.

Preda, V. (coord.), , (2007) "*Elemente de psihopedagogie specială*", Ed. Eikon, Cluj-Napoca,.

Preda, V. , (2006) "*Terapii prin mediere artistică",* Ed. Presa universitară clujeană, Cluj-Napoca.,

Rabinovich, R.D. (1968), In A. H. Keeney & V. T. Keeney (Eds.*), Dyslexia; diagnosis and treatment of reading disorders.* Saint Louis: Mosby.

Rapin, I., Allen, D. (1988) , Syndrome in developmental dysphasia and adult aphasia, in: Plum F. (ed), *Language, communication and the brain. New York, Raven,* pp 57-75.,

Radu, I. (coord.), Miclea, M. (1991) „*Creativitatea şi arhitectura cognitivă",* Ed. Sincron, Cluj-Napoca.,

Rayner, K. , (1978) « Eye movements in reading and information processing », *Psychological Bulletin, 85.,*

Reitan R. M. (1969). *Manual for Administration of Neuropsychological Test Batteries for Adults and Children,* Tucson,AZ: Reitan Neuropsychological Laboratory**.**

Rey, V., Sabater, C. (2003) ' La dictee d'enonce : un outil pour depister un enfant dyslexique ? Approche phonologique et morphologique', *Reeducation orthophonique, 213,* pp. 131-151.,

Rey, V., Sabater, C., Cormis, C. de , (2001) "Un deficit de la conscience morphologique comme predicteur de la dysorthographie chez l'enfant presentant une dyslexie phonologique », *Glossa, 78.*,

Robertson, J. (2000), Neuropsychological intervention in dyslexia:Two studies on British pupils. *Journal of Learning Disabilities*, 33, p. 137-148.

Romagny, D.A. (2005) , 'Reperer et accompagner les troubles du langage.*Outils practiques, mesurer pedagogiques, adaptatives et reeducatives'*, Edition Chronique Sociale, Lyon.,

Rondal, J.A. (1995), « Specificite syndromique langagiere dans le retard mental », *Reeducation orthophonique, 184*, pp. 359-379,

Rocco M., (2001), Creativitate şi inteligenţă emoţională, Ed. Polirom, Iaşi,

Romagny, D.A. (2005), 'Reperer et accompagner les troubles du langage.Outils practiques, mesurer pedagogiques, adaptatives et reeducatives', Edition Chronique Sociale, Lyon,

Rondal, J.A. (1995), „ Specificite syndromique langagiere dans le retard mental „, *Reeducation orthophonique, 184*, pp. 359-379.,

Rose-Marie de Premont , (2004) „*Desenul- Ghid practic*", Ed. Teora, Bucureşti,

Rosetti, A., Lăzăroiu, A., (1982), Introducere în fonetică, Ed. Științifică și Enciclopedică, București.

Roşca, Al. (coord.), (1976), *Psihologie generală*, Ed. Didactică şi Pedagogică, Bucureşti.,

Roșca, M. , (1972), Metode de psihodiagnostic , E.D.P. București

Rubin, (1974). Phonological knowledge and naming ability in children with reading disability. *Reading and Writing: An Interdisciplinary Journal, 1*, 393-404.

Rubin, G.S., Becker, C.A., & Freeman, R.H.(1979), Morphological structure and its effect on visual word recognition. *Journal of Verbal Learning and Verbal Behavior,18,* 757-767.

Rubinstein, L. (1971), *Existență și conștiință*, Editura Științifiică, București.

Rugel, P.(1974), WISC subtest scores of disabled readers. *Journal of Learning Disabilities*, 7, p. 57-64.

Saffran, E. D. (1982), Neuropsychological approaches to the study of language. *British Journal of Psychology*, 73, p. 317-337.

Salade, D. (1973), „*Educaţia prin artă şi literatură*", EDP, Bucureşti,.

Salvia, J., Ysseldyke, J.E. (1988), *Assessment in special and remedial education*, Houghton Mifflin, Boston.

Serrano, J. A. (1988), *Reflexions sur une pratique de la psychosomatique. Revue de Medecine Psychosomatique, 29,16, pp. 41-52.,*

Seymour, P.HK. (1986), *Cognitive Analysis of Dyslexia*, Londres, Routledge and Keagan.

Seymour P.H.K. (1990), „Developmental Dyslexia", in *Cognitive psychology, an International review*, New York, Eysenck, John Wiley and Sons, 135-196.

Shapiro, K.L. , Ogden, N., Lind-Blad, F. (1990), "Temporal processing in dyslexia", *Journal of Learning Disabilities,* 23.,

Silva, P.A. , (1987) "*Epidemiology, longitudinal course and some associated factors, an update"*, in M. Rutter si W. Yule (coord.), Language Development and Disorders, MacKeith Press, Londra.,

Sindelar, B. (1982), *Lernprobleme an der Wurzel packen. Trainingsprogramme gegen Lernstorungen.* Unter Mitarb v. Rind W., Wien.

Sindelar, B. (1987), *Training zur akustischen Aufmerksamkeit***,** Wien, Eigenverlag.

Sindelar, B. (1990), *Verbal-akustisches Gedachtnistraining,* Wien**,** Eigenverlag.

Sindelar, B. (1994), *Teilleistungsschwachen,* Wien**,** Eigenverlag.

Singleton, C.H., Thomas, K.V., & Leedale, R.C. (1996/1997), *COPS 1 cognitive profiling system. DOS and Windows editions*. Newark, NJ: Chameleon Educational Systems Ltd.

Sprenger-Charolles, L. (2005), "Les procedures d'acces aux mots ecrits: developement normal et dysfonctionnements dans la dyslexie developpementale *»*, *Reeducation orthophonique, 222, pp. 9-31.*,

SPSS Inc. (2013) *SPSS for Windows* (Version 20.0) Chicago, IL :SPSS.

Sillamy, N. (1996), *Dicţionar de psihologie*, Univers Enciclopedic, Bucureşti.,

Shapiro, K.L. , Ogden, N., Lind-Blad, F. (1990), "Temporal processing in dyslexia", *Journal of Learning Disabilities,* 23.,

Smith G., M., (1971) , Ghid simplificat de statistică pentru psihologie şi pedagogie, E.D.P. București.

Snowling ,M.- Development and variation in developmental dyslexia. *In* Reading and Spelling: Development and Disorders. Hulme,C. and Joshi,M., Editors. Lawrence Erlbaum Associates, Mahwah, New Jersey; 1998; chapt no. 10, 201-218. 0-8058-2773-0.

Stanovich, K. E. (1986), Cognitive processes and the reading problems of learning disabled children: Evaluating the assumption of specificity. In J.K. Torgesen, & B. Y. L. Wong (Eds.), *Psychological and educational perspectives on learning disabilities,* (p. 87-131), San Diego, CA: Academic Press.

Stanovich, K.E. (1988), Explaining the differences between the dyslexic and the garden-variety poor readers: The phonological-core variable-difference model. *Journal of Learning Disabilities, 21*, 590-612.

Steers, R. , (1988) „*Introduction to organizational behavior",* Glenview, Scott, Foresman and Co.,

Stella, G. (1996), *La dislessia. Aspetti clinici, psicologici e riabilitativi*, Stampa Tipomonza, Milano.,

Stein, J.F., & Talcott, J. (1999). Impaired neuronal timing in developmental dyslexia – The magnocellular hypothesis. *Dyslexia, 5*, 59-77.

Şchiopu, U. (2002)– „*Introducere în psihodiagnostic*", Editura Fundaţiei Humanitas, Bucureşti.,

Şchiopu U. (1997), - „*Dicţionar de psihologie*" ,Ed. Babel, Bucureşti.,

Taft,M., (1979), Recognition of affixed words and the frequency effect. *Memory and Cognition, 7*, 263-272.

Taft, M. (1991), Interactive-activation as a framework for understanding morphological processing. *Language and Cognitive Processes, 9*, 271-294.

Tajan, A. (1992), *La graphomotricité*, PUF, Paris**.**

Trabasso, Magliano (1996) , Conscious understanding during comprehension Discourse Processes, 21, 255-287.

Tomatis, A. (1977), "*Educazione e dislessia*", Omega , Torino,

Tressoldi, P. (1991), "*I disturbi strumentali di lettura e crittura*", in C. Cornoldi, I disturbi dell'apprendimento, Il Mulino, Bologna,

Thomson, M. E. (1982), The assessment of children with specific reading difficulties (dyslexia) using the British Ability Scales. *British Journal of Psychology*, 73, p. 461-478.

Ungureanu, D. (1998),"*Copiii cu dificultăţi de învăţare*", EDP, Bucureşti,

Van Hout, A., (1981), La Dyslexie, son diagnostic et ses classifications, apport des méthodes neuropsychologique et neurolinguistique. *Louvain médical*, Bruxelles,100, 337-351.

Van Hout, A., (1990), La Dyslexie : conception actuelle en neurologie et en neuropsychologie. In : Zavialoff N., *La Lecture*. Paris, L'Harmattan, 196-200.

Van Hout, A., Giurgea D. (1991), The effects of piracetam in dyslexia. *ANAE*, Paris, 2, 145-152.

Van Hout, A., Estienne, F. (1994), *Les dyslexies: décrire, évaluer, expliquer, traiter*. Paris, Masson.,

Van den Broek, P.W. (1994), Comprehension and memory of narrative texts. *In Handbook of Psycholinguistics.* (pp. 539-583) Hillsdale, NJ: Erlbaum.

Vellutino, F.R. (1979), *Dyslexia:Theory and Research. Cambridge*, Mass: MIT Press,

Verza, E. (1973), „*Conduita verbală a şcolarilor mici"*, Editura Didactică şi Pedagogică, Bucureşti,

Verza, E. (1977), „*Dislalia şi terapia ei*", EDP, Bucureşti,

Verza, E., (1983) „*Disgrafia şi terapia ei*", Editura Didactică şi Pedagogică, Bucureşti,

Verza, E. (2003) „*Tratat de logopedie*", Ed. Fundaţiei Humanitas, Bucureşti,

Verza, E. (2002), „*Introducere în psihopedagogia specială şi asistenţă socială*", Editura Fundaţiei Humanitas, Bucureşti,

Verza, E. (2009), Tratat de logopedie, Ed. Semne, vol.II, București

Verza, E. (coord.), (2009), Revista de psihopedagogie, Ed. Fundației Humanitas, vol. 1, București

Verza, E. (coord.), (2010), Revista de psihopedagogie, Ed. Fundației Humanitas, vol. 2, București

Verza, E. (coord.), (2011) , Revista de psihopedagogie, Ed. Fundației Humanitas, vol.1, București

Vigliocco, G. (2000). Language processing: The anatomy of meaning and syntax, Current Biology, 10, R78-R80.

Vrăjmaş V., Stănică S. (1997) „*Terapia tulburărilor de limbaj*", EDP, Bucureşti,

Vrăjmaş, E. (coord) (2007) „*Să învăţăm cu… plăcere. Fişe de exerciţii logopedice în comunicarea orală şi scrisă*.", EDP, Bucuresti,

Wagner, R. K., Torgesen, J.K., Rashott, C.A. (1999), *Comprehensive test of phonological awareness* (CTOPP). Austin, TX:Prod-ed.

Wernicke, C., (1977), *Der Aphasische Symptomencomplex*. Breslau: Cohn and Weigart.

Wimmer, H. , **Mayringer, H., & Landerl, K. (2000)**, The double-deficit hypothesis and difficulties in learning to read a regular orthography. *Journal of Educational Psychology,* 92,668-680.

Wolf, M. & Bowers, P.G. (1999), The double-deficit hypothesis for the developmental dyslexias. *Journal of Educational Psychology*, 91, 415-438.

Wolf, M., Bowers, P.G., Biddle, K. (2001), Naming speed processes, timing, and reading:A conceptual review. *Journal of Learning Disabilities*,33, 387-407.

Woodcock, R.W. (1998), *Woodcock reading mastery test-revised* (WRMT-R).Circle Pines, MN:American Guidance Services.

Zangwill O. Blakemore C. (1972), Dyslexia: reversal of eye movements during reading. *Neuropsychologia*, 10, 371-373.

Zlate, M. , (2000) „*Introducere în psihologie"*, Ed. Polirom, Iaşi,

Zlate, M. (2000) „*Fundamentele psihologiei*", Ed. Pro Humanitate,Bucureşti,.

Zurif, E.G. and Carson, G. (1970), Dyslexia in relation to cerebral dominance and temporal analysis. *Neuropsychologia*, 8, p. 351-361.

Xiang, H. Lin, C., Ma, X. Zhang, Z. Bower, J. Weng, X. (2003), Involvement of the cerebellum in semantic discrimination: An fMRI study. *Human Brain Mapping*, 18, 208-214.

On-line bibligraphy

Popa, M. (2010), *Statistici multivariate aplicate în psihologie*, Ed. Collegium, Polirom,

calculator online al intervalelor de încredere, http://faculty.vassar.edu/lowry/prop2_ind.html

The International Dyslexia Association (2005), http://www.interdys.org

3rd International Multilingualism & Dyslexia Conference, **Limassol, Cyprus (2005),**

www.3rd-dyslexia-international.org

Swabey, A. (2003), *Dyslexia and the Magnocellular System***,**

http://www.statvoks.no/forward/index_articles.html

Huster R., Stefan Debener, Eichele T., Herrmann C.(2012)

Methods for Simultaneous EEG-fMRI: An Introductory Review, *The Journal of Neuroscience, 32 (18) : 6053-6060,* www.science-education.nih.gov.

International Reading Association (2012), http://www.reading.org

Sound Linkage: An Integrated Programme for overcoming language difficulties, www.myprimary.co.uk/rapidpreview/index.aspx

E-learning for dyslexic pupils, www.calldysc.eu

Testul Bender, http://www.scribd.com/doc/77901811/Testul-Bender-A-si-B, accesat în 6/9/2009

Eden. G., Zeffiro, T.A. (1998) – *Neural systems affected in Developmental Dyslexia Revealed by Functional Neuroimaging;*

www.georgetown.edu/publications/eden_zeffiro_neuron_review_98.pdf

www.colbert.k12.al.us

www.neuro.read.net

www.jamesbattle.com

www.thebrain.mcgill.ca

www.dislexic.ro