

SPECIFIC LEARNING DISABILITIES**Dimitris Argiropoulos***University of Parma, Parma, Italy**E-mail: dimitris.argiropoulos@unipr.it, <https://orcid.org/0000-0001-5373-5893>*

This article reports the specific disorders and difficulties in school learning settings and its frequent and relevant problems, as outlined in psychological literature and pedagogical sciences. These definitions are recognized and fully contemplated by the Law in several European countries, including Italy, and treatment, educational and relational guidelines are proposed, to be considered in a logic of protection and promotion of the child's well-being (as a children or teen) with its specific learning disability. This document contains a first approach to the subject, aimed to inform and guide for the identification and distinction of this pathologies, which can coexist, and to limit their negative effects, which could compromise the child's growth and development, especially if addressed early. Specific learning disabilities are related to reading, writing and mathematical calculation; it is important that in a school context the operators are (in) formed, in order to face and guarantee every day the realization of student's learning and educational work in general.

KEYWORDS: Specific Learning Disabilities (LD), Dyslexia, Anorthography, Dysgraphia, Dyscalculia, Rehabilitation Treatment, Scholastic Facilitation, Psychomotor Functions, Family School Relationships

Learning disabilities represent a clinical area of interest, where important discoveries has been achieved over the past forty years thanks to numerous contributions both from scientific research and diagnostic investigation techniques.

In 1990 Hammill defined the general characteristics of Learning Disabilities (Hammill, 1990) based on the agreement reached by numerous associations of researchers and field experience: learning disability (LD) refers to a heterogenic group of disorders manifested by significant difficulties in the acquisition and use of listening skills, oral expression, reading, reasoning and mathematics, presumably due to dysfunctions in the central nervous system. Behavioural problems might coexist with learning disabilities, like self-regulation, social perception and social interaction, but those are not considered LD. Learning disability might occur in conjunction with other deficit factors or extrinsic influences (cultural, educational, relational poverty, etc.), but they are not the result of those conditions.

Italian Law 170/2010, recognizes dyslexia, dysgraphia, anorthography and dyscalculia as specific learning disabilities; they manifest themselves in presence of adequate cognitive abilities, in absence of neurological pathologies and sensory deficits, but may constitute a limitation for some activities of daily life. The aims of this law are: to guarantee the right to education, to promote scholastic success even providing adequate support

measures (compensatory instruments and dispensatory measures), to guarantee adequate training and to promote the development of the pupil's potential, to reduce relational and emotional discomforts by adopting forms of verification and evaluation appropriate to the training needs of the students, preparing teachers and raising parents' awareness to the problems related to Specific Learning Disabilities, increasing communication and collaboration between families, schools and Health Services during the educational path of the child, to promote early diagnosis and support rehabilitation and, finally, to ensure equal opportunities to develop skills in social and professional field.

Under this law relational and emotional dimension are crucial for improvement and recovery for those who face Learning Disabilities.

Which origin have specific learning disabilities? What they entail?

Learning Disabilities relate to a specific area, such as reading, writing or calculating, although in clinical practice it is more common to encounter association of multiple disorders (for example specific reading disorder, also called dyslexia, and specific of writing). However, these are distinct disorders, each with its own specific appearance and description.

LD have neurobiological origins and refer to a significant impairment in the development of skills related to school development, such as reading

(dyslexia), writing (anorthography and dysgraphia) and mathematical skills (dyscalculia). They have an evolutionary matrix, they aren't acquired but they are inherent in child, they always existed, that's why the child has never acquired certain skills. In Italy Learning Disabilities are called Specific Learning Disorders (Disturbi Specifici dell'Apprendimento, DSA). We talk about "disorder" and not "delay" or "difficulties"; delay and difficulties presuppose a time that is perhaps dilated to arrive to acquiring a competence, disorder means that instead of this competence we cannot get there, as if there were resistance to interventions and the automation of specific abilities (Vio, Tressoldi, Lo Presti, 2012). Even in main manuals diagnostic there is a discrete concordance in proposals' classification of these disorders: *"normal methods of question abilities acquiring are altered already in development starting phases . They aren't a consequence of learning lack opportunities and aren't due to an acquired brain disease. Rather, it is believed that disorders derive from abnormalities in cognitive processing largely related to some type of biological dysfunction"* (ICD-10, 2000).

Dyslexia manifests itself with worse precision and rapidity when reading out loud, therefore it's understood as a specific disturbance in automation of this ability; we can observe both an excessive slowness in reading and a considerable number of errors from a visual, phonological or lexical standpoint. It is observable how, in a dyslexic child, there is not a "lexical warehouse" to recover known words from memory. Dyslexic subjects, during reading, also fix prepositions, articles, conjunctions, etc. and have difficulty in switching lines as if they should always set again the starting point. Diagnosis is possible only at the end of the normal learning process for reading and writing skills, therefore at the end of the second grade of primary school. After the identification of suspected cases, the procedure followed in cases of presumed dyslexia involves a targeted recovery activity, after this the difficulties encountered can be communicated to families that will present an evaluation request to services in charge. The evaluation request is followed by diagnostic procedure, in case the disorder is confirmed a diagnostic certification document will

be redacted; families will be obliged to communicate it to the student's schools and they will proceed with the compilation of the Personalized Teaching Plan (Piano Didattico Personalizzato) which will indicate the possible compensatory instruments and the agreed dispensatory measures.

Anorthography refers to a deficit in encryption of orthographic code. This disorder involves phonographic coding skills and orthographic competence. According to the Tressoldi's model (Vio, Tressoldi, Lo Presti, 2012), following Writing Skills can be identified in:

- phoneme discrimination (ability to distinguish, for example, "form" to "from" or "prin" from "drin")
- phonemic analysis (ability to break down the word into his phonemes for example FAIRY → F-A-I-R-Y),
- graph-phoneme correspondence (write through instead of through),
- praxic speed,
- lexicon of words (the storehouse of known and automated words).

Dysgraphia is a deficit in grapheme realization, specifically of a motor nature. Writing is slower and not readable.

On the other hand, **Dyscalculia**, is a issue in the acquisition of automatisms that has to deal with calculation and/or processing numbers. Numerical competences are divided in two circuits: the approximate system (innate and independent of language) which includes subitizing's skills (the **subitizing** term was coined (Kaufman, 1949) and refers to the ability to distinguish quickly and accurately the quantity in a small number, objects or elements), of comparison between numerosity and ability to estimate; the exact system (dependent on language and learned through instruction) which corresponds to the counting and evolves towards the one-to-one correspondence between objects and numbers, stable order, abstraction, cardinality and irrelevance of order. the children learns, one after another, the numeric system and their transcoding, the semantic coding and then access the calculation system which includes operation's signs and their applicative meaning and the stock of arithmetic facts (tables, calculations until ten). Then comes the problem solving, which includes understanding and

solving math problems. So, there are two different profiles of dyscalculia, one is referring to the compromise of approximate system by basic skills, the other one is understood as a deficit of the executive and calculation procedures. Dyscalculia could be diagnosable only at the end of the third grade of primary school, when normal process of learning the calculation skills is finished.

Even if these disorders are related to biological maturation, this doesn't imply that affected children are simply at the lowest end of a normal continuum and that they will then regain lost ground over time, but depending from the range of difficulty experienced, the acquisition of the required skills might changing over time, but almost never reach the expected levels for age and/or schooling.

These difficulties occur in the early stages of child's learning, when he must acquire new skills such as reading, writing and calculating while starting from a neuropsychological set-up that does not favour automatic learning of these specific skills. These difficulties can persist marking through adolescence to adulthood.

This occurs also when rehabilitative and educational interventions have been carried out, which are nevertheless decisive to allow, even if slowly, path to improvement and most important, to guarantee appropriate learning conditions and opportunities. Disorders' evolution, in fact, are favoured by intervention's precociousness and adequacy, as well as by compensatory measures taken in the school pathway's context to favour learning.

Two types of actions are distinguished in Learning Disabilities' Treatment:

✓ Rehabilitation treatment, which aims to improve poor performance through specific cognitive training; in the last few years many multimedia software has been developed, being less boring to the children, they favour learning through a playful approach.

✓ School environment's facilitations and aid that serve to support children with Specific Learning Disorders are compensatory tools (technological tools that compensate encountered difficulties) and dispensatory measures (the student is exempted from

certain services considered "normal" for example reading aloud or using italics in written texts).

Taking care of child's psychological well-being, his emotional stability, the growth of his self-esteem must always be at the base of every action conceived and acted by those surround him, parents, teachers, rehabilitators, in order to create a solid and effective relationship framework. Unfortunately, sometimes this does not happen; Anger and repulsion towards reading or any other object of qualification emerges, the feeling of inferiority in comparison with other companions and hate for constant training caused by this sense of inadequacy.

Along the actions addressed to LD, there are actions address these disorders from a cognitive-behavioural point of view and embracing the idea that it is possible to have a positive intervention in a dynamic and amusing way. The basic idea comes from boys with LD transversal observation, especially from the psycho-motor point of view. Often, many of these children demonstrate characteristics (similar to each other) of an absolute lack of mastery of the pre-requisites, which are at the basis of general motor coordination and body schema's structuring. They appear awkward and clumsy and physical performance often falls below the average, as if not all the mechanisms favouring learning had been structured, even on a physical level as well as on a cognitive level. In careful consideration there are many similarities that lead to remembering child's development.

According to Piaget, the stages of cognitive development, in order are: sensorimotor stage, preoperational stage, concrete operation and, finally, formal operation. The phase of the lived and perceived body thus anticipates the phase of abstract operations. Furthermore: *"the whole knowledge construction, from simple to complex forms, non-verbal knowledge through images to verbal literary knowledge, depends on creating maps ability of what happens over time within our body, around our organism, to ours and to our body - one thing after another, which causes something else, repeated until infinity"* (Damasio, 1999).

The structuring of lived body experience anticipates, therefore, all the cognitive abilities that are created subsequently, at a temporal level.

But then, which are the pre-requisites that need to be enabled because they aren't structured in the period of their sensitive phase? Which characteristics can affect reading structuring, writing and calculation skills?

Seven key concepts

The psychomotor functions are defined by the ICF (International Classification of Functioning, Disability and Health, WHO, 2001), (this international classification integrated medical and social perspective of health and illness, indicating the functioning and participation of the person in the various contexts of life) as "specific mental functions controlling lateral dominance, posture, spatial-temporal organization and motor perseverance". Usually they are developed by child's environmental experiences, they produce automatic behaviours with sensory and perceptive integration of the stimuli and allow to perform actions by solid reference points; therefore, they constitute a learning structure and exercise of actions. These functions, in subjects with LD are disturbed due to a dyspraxia which in turn generates a sort of dispersion of cognitive energy: the child spends so much energy performing the actions that all his attention is catalysed towards execution, losing sight of the purpose of the exercise. The motion pre-requisites that are the basis of the success of learning structuring are therefore:

- ✓ Lateralization
- ✓ Spatial orientation
- ✓ Time orientation
- ✓ Proprioception
- ✓ General coordination
- ✓ Oculo-manual coordination
- ✓ Muscle tone

Lateralization is a progressive process that occurs during the child's development. It is thought that specialization or lateral prevalence has wide subjective variability: everyone seems to possess a different lateralized distribution of neuropsychological processes (Geschwind, 1972). Among these there is a motor predominance, whose most obvious expression is manual preference. Being decidedly right-handed or left-handed in motor actions, for example in shooting, aiming, precision

throws "is the original reference of every spatial orientation, both motor and graphic; it is the first link in orientations chain of and, if it is poorly consolidated, it will become a disorienting factor for all incoming neuro-perceptive and praxis-motor information" (Spezzi, Barbieri, Lodi, Vecchione, 2015). The occurrence of lateralization gives the learning subject full awareness of the directionality (foundation of writing, from left to right in our case) which in turn is the base for sequentiality and therefore of ordered recognition of the letters that make up words or the order of figures. The lateralization is therefore, a pre-requisite of spatial and temporal orientation.

Spatial orientation development is at the base of all topological conceptuality, of shape recognition, dimensions, directions, above-below, inside-outside, right-left, near-far concepts. All essential skills to be able to access reading, writing, mathematical stacking, recognition and orientation skills of geometric shapes. Recognizing alphabet's letters based on graphic form requires spatial orientation. The letter **A** differs from the letter **V** for the tip's orientation, **p** and **q** are mirrored in "belly" as well as **b** and **d**.

Temporal orientation is expressed in the concepts of sequentiality, temporality and rhythmicity. Rhythmic internalization sequence can help the reading process, but it can also create significant interconnections in numerical recognition sequences. The concept of "before" and "after" is the basis of chronological mental creation of sequences; to writing a text temporal organization is required as well as the succession of steps in mathematical resolution problems.

Proprioception is the ability to recognize our own body position in space and muscle's contraction state, regardless of the use of sight. It plays a fundamental role in complex mechanism of motor control. This ability is possible by the presence, in the human body, of kinaesthetic (or proprioceptive) receptors that are sensitive to postures changes and body segments. There are two types of receptors: one measures the variation of muscle's length (neuromuscular spindles) and the other the change in tension and expressed force (Golgi tendon organs). A good proprioceptive ability allows to acquire full

control of all body parts and to deal with increasingly complex motor actions. Proprioception is strongly interconnected with the ability to acquire automatisms.

By **general coordination** we mean the movement selection strategies. These strategies can be automatic or voluntary and are related to two anatomical and functional levels of nervous system. Automatic coordination is the first form of human movement, it automatically triggers at an unconscious level and is expressed in the globality of action. This type of coordination makes possible to create movement patterns that are consolidated through repetition and practice, creating automatisms.

Voluntary coordination is the conscious, desired form of movement and is generated by proprioceptive awareness of kinaesthetic information that the subject reaches through sensory feedback.

Human coordination means knowing how to manage in harmonious way our own strength, speed, mobility, both exteroceptive (coming from outside) and proprioceptive return information to achieve a desired and finalized movement.

Oculo-manual coordination is even finer, and refers to the same principles expressed for general coordination but with an attentive focus on eye-hand correlation. Aiming (using the pen on the sheet), spatiality, writing ability, lining up number in columns and gestures' fluency all depends on the good establishment of this capacity.

"**Muscle tone** is the operative substrate of every praxis: if it's too bland, will produce a soft and subtle motor intervention, unsuitable for various tools uses, typical of a renouncing and poorly convinced attitude; if too intense, the propensity to excess, hyperactivity, difficulty in adapting and listening will increase" (Geschwind, 1972). Very often children with LD show a hypotonic attitude and considerable difficulties in organizing motor gestures; a part of them, on the other hand, is hypertonic and uses excessive energy in their finalized actions, thus facing difficulties in action controlling, greater fatigue, inaccuracies due to rigidity and lack of body control. In both cases, exercises for tone regulation lead to a psycho-

physical improvement, limitation of emotional excesses, increase in adaptability, self-control, with a significant repercussion in social interactions and increasing self-esteem.

From these key concepts we can therefore think that their correct acquisition through careful "motor qualification" can contribute in mitigating specific learning disorders. Nothing is taken away from all interventions that have been implemented so far, training at the gym and domestic reinforcement are not substitutes, but are added on top, with the aim of reinforcing their effectiveness.

Training in cooperation with other boys, within a favourable environment, has a high socializing power. Targeted exercises, easy to carry out, leads children to success and this helps to create positive feelings and emotions, like effectiveness and mastery, which lead to a boost in self esteem. A positive self-image contributes in structuring a strong and determined personality, able to react to difficulties encountered in everyday life, in school and in peers' relationships.

Often rehabilitative treatment of LD have a cognitive-behavioural matrix, based on a diagnosis made through performance tests administration and subsequently calibrated training on functions deemed deficient. The focus arises on the kid's incapacity who is further highlighted and where he's asked to continue working on them; this modus operandi sometimes creates considerable frustration, anxiety, anger, up to the point of repulsion towards those activities on which he is asked to continue training. Motor approach widens the action's range of these treatments with the aim of strengthening and amplifying them. It also requires constant application and determination, so that the success of motor qualification must continue also through repetition at home of these exercises, but this constancy also expands in all processes of personal growth, self-determination, exercise of willingness to overcome the difficulty. The playful and informal context makes work enjoyable and pleasant. With good support this is widely possible. In the worst case, when there is no significant improvement, alas, it will be only good gymnastics.

Relational framework importance

"Self-esteem corresponds to the individual consideration that one has of himself" (Galimberti, 1999). This consideration is also developed through unconscious evaluation attributed thought others by itself. Adult must always bear in mind that his behaviour towards the child influences positively or negatively the image that child has of himself. Any important adult, parent or teacher, can never underestimate importance of the given judgment, of implicit or explicit message sent and repercussions that they could have.

A LD boy faces difficulties that may seem insurmountable to him: structuring of school teaching, test moments and interrogations, confrontation with his classmates, rigidity of some teachers that aren't aware of the real problems, difficulty to keep attention in classroom and on homework, and this can have a very negative influence so much it can lead him into escape, avoidance and defensive behaviours.

At the basis of learning process there is the knowledge on how to perceive, as a parent, this series of problems, knowing how to deal with them together with child without expressing negative judgments, knowing how to reshape expectations of scholastic surrender, becoming aware that their own child, despite having an intelligence in the norm, is weak and must be helped through aspects that common world considers, in previous era, as "normally learned". In pilot project that I've illustrated in its essentiality, parents have an active role in following children's domestic exercises and are invited to play with them. Now, not dwelling on the utility of this project even for adults, I just emphasize how much this practice can lead to consolidation of the relationship between parent and child, where the parent enters the real context of child's experience and child will feel followed, protected and supported. "The communicative dynamics that are activated in true and real game between child and parent have an enormous emotional-communicative strength that allow child and parent to discover and rediscover of each other, to know each other more and more deeply, to trust and to trust the other, sharing and accepting similarities and dissimilarities" (Lodi, Barbieri,

Buiani, Seghi, 2014). However, not all parents are able to interact positively; this is where therapist figure comes up as a mediator and facilitator of communication.

Teacher plays an active role, equally significant, into school context. This figure, first, is involved in the learning process; he is responsible for identifying student's strengths and support him in its weaknesses. He is the first source for the recovery of child's skill not learned or only partially learned. Teacher must know problems and know how to intervene; with this statement we not only consider "bureaucratic" preparation in Personalized Teaching Plan's drafting but also scrupulous adherence to what has been set up without prejudice, without passing negative messages that could harm student's self-esteem. A prepared teacher is one who knows how to teach in an inclusive manner, who knows how to prepare manageable lessons for each class member, who creates suitable support material, who knows and knows how to use all the learning channels (visual, auditory and kinaesthetic). A good teacher is also one who knows how to create a constructive relationship with the family, and seeks constructive confrontation with the parents.

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СПЕЦИФІЧНІ РОЗЛАДИ НАВЧАННЯ**Дімітріс Аргіропулос***Університет Парма, Італія*

У статті розглянуто специфічні розлади й труднощі в процесі шкільного навчання, а також найбільш часті та актуальні проблеми, що викладено в психологічній літературі й педагогічній науці. Ці визначення визнано і повністю передбачено Законодавством декількох європейських країн, включаючи Італію, та запропоновано рекомендації щодо лікування, освіти й реляційних орієнтирів, які повинні розглядатися в логіці захисту і сприяння благополуччю дитини (як дітей, так і підлітків) зі специфічною нездатністю до навчання. Цей документ містить перший підхід до предмету, спрямованого на інформування й керівництво по виявленню та розмежування цих патологій, які можуть співіснувати, й обмеження їх негативних наслідків, які можуть поставити під загрозу зростання та розвиток дитини, особливо в разі раннього втручання. Конкретні порушення навчання пов'язані з читанням, писемністю й математичним рахуванням. Є важливим, щоб в шкільному контексті оператори були поінформовані для щоденної взаємодії та гарантії реалізації навчальної та виховної роботи учня в цілому.

КЛЮЧОВІ СЛОВА: специфічна нездатність до навчання (НН), дислексія, анортографія, дисграфія, дискалькулія, реабілітаційне лікування, шкільна фасилітація, психомоторні функції, сімейно-шкільні стосунки

СПЕЦИФИЧЕСКИЕ НАРУШЕНИЯ ОБУЧЕНИЯ**Димитрис Аргіропулос***Університет Парма, Італія*

В статье рассмотрены специфические расстройства и трудности в процессе школьного обучения, а также наиболее частые и актуальные проблемы, изложенные в психологической литературе и педагогической науке. Эти определения признаны и полностью предусмотрены Законодательством нескольких европейских стран, включая Италию, и предложены рекомендации по лечению, образованию и реляционным ориентирам, которые должны рассматриваться в логике защиты и содействия благополучию ребенка (как детей, так и подростков) со специфической неспособностью к обучению. Этот документ содержит первый подход к предмету, направленному на информирование и руководство по выявлению и разграничению этих патологий, которые могут сосуществовать, и ограничению их негативных последствий, которые могут поставить под угрозу рост и развитие ребенка, особенно в случае раннего вмешательства. Конкретные нарушения обучения связаны с чтением, письмом и математическим счетом. Представляется важным, чтобы в школьном контексте операторы были информированы для ежедневного взаимодействия и гарантии реализации учебной и воспитательной работы учащегося в целом.

КЛЮЧЕВЫЕ СЛОВА: специфическая неспособность к обучению (НО), дислексия, анортография, дисграфия, дискалькулия, реабилитационное лечение, школьная фасилитация, психомоторные функции, семейно-школьные отношения
