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# Dyslexia in L2 learning: comparison between languages and linguistic anxiety

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*Abstract:*

In contemporary society, multilingualism is an increasing reality, and the study of foreign languages has a primary role in the educational policies of many countries. Furthermore, in the last years there has been a particular interest in specific learning disorders, so multilingual competence in subjects with dyslexia is an extremely interesting aspect to investigate. After a short introduction on learning disorders, this article examines the definition of dyslexia, both acquired and developmental type, and analyzes the neurophysical, neuropsychological and cognitive matrix hypotheses on the origin of the disorder. Given that learning to read and write is a fundamental stage in a child's life, reading and writing skills are explored in this work, together with the related disorders. In addition, the most problematic topics in learning a foreign language for dyslexics have been identified as well as the different impact that the characteristics of a language may have on the expression of the disorder, carrying out a short comparison between Italian and some foreign languages studied in school. Looking back over the main theories that have been dealing with this subject, it has been argued about the barriers that learners with dyslexia may find in learning a foreign language.

Keywords: *Dyslexia, Linguistic Anxiety, Orthographic Opacity, Phonological Awareness, Second Language Acquisition*

## *1. Introduction*

Specific Learning Disorders (SLD) is one of the most relevant aspects not only in the psycho-pedagogical field, but also in the medical-pediatric field and it has been subject of study since a long time. In Italy, research and theoretical publications have been active since the 1970's, but it is in the last decade of the XX century that this topic has had an exponential increase. Postgraduate courses or Masters have been established, continuous research and a massive publication have been developed. Furthermore, it is worth mentioning the work conducted by clinicians in the context of the

Consensus Conference, summarized in the *Raccomandazioni per la pratica clinica dei disturbi specifici di apprendimento* of 2007, which defined the diagnostic path of these disorders, collecting theoretical and operational definitions to take action (Chiappetta Cajola and Traversetti 2017).

In the academic field the Italian law, Legge n. 170/2010, should be mentioned, which identifies dyslexia, anorthography, dysgraphia and dyscalculia as Specific Learning Disorders and also assigns both to the national education system and universities the task of identifying the most appropriate didactic forms and evaluation methods in order to make students with SLD achieve educational success. The legislation was then specified thanks to *Le linee guida per il diritto allo studio degli alunni e degli studenti con disturbi specifici di apprendimento* from MIUR (2011). In recent years there has been a significant increase in diagnoses compared to the past. This does not mean that before there were fewer subjects with SLD, but those who suffered from it were often labeled as "lazy"; today however the disorder has been recognized and a path has been identified in order to follow and facilitate the dyslexic in learning.

In the North American context, the term *learning disability* identifies various issues concerning cognitive development and school learning, "non imputabili primariamente a fattori di handicap mentale grave e definibili in base al mancato raggiungimento di criteri attesi di apprendimento rispetto alle potenzialità generali del soggetto" (Cornoldi 2007: 10). In Italy, the term collects various meanings as it can refer to very different situations: in the most general sense it includes any condition that expresses "special needs", while more specifically this term can be used to refer to cases of "slight intellectual disability" or cases in which specific learning disorders are evident and are related to problems in learning the skills of reading, writing and calculating (Zanobini and Usai 2008). Specificity is a characteristic of SLD, since the disorder affects a specific skill domain in a significant but limited way, and it does not affect the general intellectual functioning.

### *1.1 Specific learning disorders*

Specific learning disorders concern issues that emerge in fields related to school education, such as reading, writing and calculating. In 2007 with the official presentation of *Raccomandazioni per la pratica clinica dei disturbi specifici di apprendimento*, developed using the Consensus Conference method, a significant step forward was taken in defining these disorders more precisely, here below listed:

- Reading disorder. Generally, it is an evolutionary dyslexia, a specific disorder in the automation (speed) and in the correctness of the reading.
- Writing disorders. We can distinguish them in two types:
  - Anorthography: is a disorder in the correctness of writing, understood as a process of transcription between phonology and graphemic representation of the word, to be distinguished from morph-syntactic accuracy.
  - Dysgraphia: is defined as a specific disorder in the manual realization of graphemes and therefore in graphism, of which calligraphy represents an emblematic exemplification.
- Mathematical learning disorders. These are disorders related to calculation problems (dyscalculia), logical reasoning, problem solving, and spatial reasoning (geometry). Sometimes it affects in a non-differentiated way its various aspects, which involve very heterogeneous cognitive processes that hardly have something in common between them. The inclusion in a single category comes from the fact that many students manifest such forms of generalized discomfort.[1]

[1] In the DSM-IV and ICD-10 diagnostic manuals, all forms of mathematical learning were put together, while the latest version of the ICD limits the disorder of calculus (dyscalculia) to its specific aspects, excluding all those related to other problems.

The Consensus Conference also identified the typical features of SLD:

- Developmental feature of the disorder.
- Different expression of the disorder in the different stages of evolution of the skill examinee.
- Constant association with other disorders (comorbidity).
- Neurobiological character of procedural anomalies characterizing SLD; they interact in an active way with the environmental factors in determining the appearance of the disorder.
- The specific disorder must have a significant and negative impact on school adaptation and/or everyday activities.

Talking about comorbidity, it should be noted that, in general, the condition of dyslexia is often linked to that of anorthography and these, in turn, are associated with a condition of dyscalculia or other neuro-developmental disorders, such as a specific speech disorder, attention-hyperactivity deficit disorder, or behavior or mood disorder. Comorbidity may not always be present, so before taking a position regarding the common etiopathogenetic models among these disorders, it is necessary to understand why they can manifest both in a joint or isolated way (Cornoldi 2007). Currently the most prudent position seems to be the one adopted by Consensus, which consists in considering the presence of disorders as co-occurrences without taking position about the hypotheses of a common etiopathogenetic factor.

In *Le line guida per il diritto allo studio degli alunni e degli studenti con disturbi specifici di apprendimento* of MIUR (2011), there is a reference to the individualized and personalized teaching method, which involves the use of compensatory tools and exemption measures, with the aim to ensure that students with SLD can achieve educational success. "Individualized" didactics means the intervention calibrated on the individual, rather than on the entire class or on the small group, which becomes "personalized" when addressed to a particular learner. Among the compensatory measures, educational and technological tools that replace or facilitate the required performance in the skill deficit, we can indicate: speech synthesis, recorder, and video writing programs with spell checkers, calculator and other technologically less advanced tools such as tables, formularies and concept maps. The exemption measures are instead interventions that allow the student not to perform some tasks which, due to the disorder, are particularly difficult and do not improve learning. An exemption measure may consist, for example, in not having a student with dyslexia reading a long text, as the exercise, due to the disorder, does not improve his/her reading performance. Or it is possible to allow students with SLD to take advantage of more time for the performance of the tests, or to be able to perform the test on a content that is disciplinarily significant but reduced, since the disorder engages them for longer than their classmates in the decoding phase of the test items.

## *2. Developmental dyslexia and acquired dyslexia*

It is necessary to distinguish between acquired dyslexia and developmental dyslexia. In the case of acquired dyslexia it happens that a subject able to read without any difficulty, begins to make mistakes or fails to recognize words. Usually these are difficulties due to some pathological event that has resulted in lesions in the cortical areas involved in the transcoding process. It occurs in an adult subject, but there may be cases of acquired dyslexia even in children (Stella 2004).

Developmental dyslexia (DD) instead, it is found in children from birth and manifests itself at the beginning of the learning process of reading. In case of acquired dyslexia, the damage

can have much more limited consequences than the congenital condition. Often the first one only affects reading or some of its aspects, such as the recognition of new words, while in case of developmental dyslexia, the disorder is more extensive and especially at the beginning may affect the whole writing system.

The possibility of re-education is also different: in the case of acquired dyslexia it is a matter of regaining a function that the subject already possessed, while in the case of DD the subject must acquire a function that does not yet possess, by using a neurobiological system that has peculiarities that affect learning. Therefore, in the second case, there is nothing to repair or replenish, but measures must be used to facilitate the acquisition of the transcoding process and its automation. So, it would be more correct to talk about techniques of assisted education, rather than re-education.

### *2.1 Developmental dyslexia*

If we want to define developmental dyslexia based on the criteria of definition by exclusion that characterizes the official nosography, DD can be described as "un disturbo manifestato nell'apprendimento della lettura nonostante istruzione adeguata, in assenza di deficit intellettivi, neurologici o sensoriali e con adeguate condizioni socioculturali" (Sabbadini 1995: 411). If we want to search for the primary characteristics of DD, the task of defining it is more complicated, as it is considered a complex disorder attributable to very different causes. According to some authors it is a defect of a specific superior cortical function, according to others it is attributable to a language disorder sometimes manifested, sometimes very difficult to identify before schooling, or a deficit in phonological processes, or it also could be caused by a defect in automation processes.

Beyond the hypotheses on the nature of the disorder, there are commonly shared elements such as:

a) DD is a specific disorder as it occurs as an isolated disorder compared to other cognitive performances, which are generally good, and in subjects free from other deficits or inadequate socio-economic and relational conditions.
b) It occurs in subjects without clinically detectable brain injury. It is present from birth, even if the most evident manifestations may appear only with schooling.
c) The clinical definition of DD often includes also the writing disorders (dysgraphia and anorthography) and those of numerical code and calculation (dyscalculia; Sabbadini 1995).

Developmental dyslexia shows itself as a learning disorder that persists throughout the subject's lifetime, although it changes in various degrees of expressiveness based on the severity of the disorder, the cognitive characteristics of the subject, and the educational and relational opportunities that the subject receives. DD initially shows itself with a difficulty in learning the writing and only in a second moment it affects also the reading, but during development there is a more substantial reduction in writing problems than in reading problems. By analyzing the performance of dyslexics, some researchers have hypothesized that their reading difficulties are in fact the manifestation of a learning delay and that, therefore, are not attributable to a specific disorder. As a matter of fact, with time and exercise, there is a significant improvement in the speed and accuracy of decoding for most of dyslexics, this would demonstrate that there is a delay and not a deviation from the course of normal development. However, despite improvements, developmental dyslexics always maintain significant decoding difficulties even when adults.

A child with a delay repeats continuously his mistakes, very slowly tends to eliminate them and he/she is able to memorize the new acquisitions, while the child with specific reading disorder fails to include in his/her diagrams the result of learning. Often it also happens that a new acquisition occurs at the expense of an old one that seemed acquired; these effects are not typical of the delay, but rather of a specific disorder. The World Health Organization has identified five conditions that must exist in order to define a reading disorder as developmental dyslexia. These are very precise criteria which must all be fulfilled (Stella 2004):

1. The intellectual level of the subject with reading disorder must be within the normal range (I.Q. greater than or equal to 85).
2. The reading level must be significantly distant from the one of a child of the same age or same attended class. It should be less than the II standard deviation expected for the age or class attended.
3. The subject must not have neurological or sensory disorders that may justify reading difficulties as an indirect consequence.
4. The disorder must be persistent, despite adequate schooling and specific educational interventions.
5. The reading disorder must have consequences on schooling or in social activities where the use of reading and writing is required.

Since from the earliest descriptions of children with dyslexia, it was hypothesized that dyslexics formed a group with peculiar characteristics, not only cognitive but also neurological. In the last decades of the last century, we have tried to investigate if the brain of dyslexic has structural alterations, carrying on studies on patients with developmental dyslexia, both through traditional methods such as autopsy studies, and new methods for the study of brain morphology and the functioning of the Central Nervous System, such as dynamic neuroimages: PET (tomography and positron emission) or MRI (functional magnetic resonance). Before the introduction of these new instruments it was the American neurologist Galaburda (1989) who discovered, through autopsy, the existence of small alterations of the brain areas involved in language processing, in order to demonstrate that all these small changes in the neuronal substrate could be the cause of functional deficits such as dyslexia. Specifically they have been described as: "sia alterazioni del pattern di asimmetrie cerebrali di aree linguistiche, sia malformazioni corticali minori della corteccia perisilviana. In particolare, il planum temporale era simmetrico in tutti i cervelli esaminati, mentre nel cervello normale presenta nel 70% dei casi un'estensione maggiore a sinistra che a destra" (Sabbadini 1995: 415).

The morphological alterations of the perisylvian cortex highlighted by the works of Geschwind and Galaburda (1985) concerned the presence of ectopias, a term used to indicate that neurons are not in their place. In fetal brain, during pregnancy, it happens that cortical neurons move in a wide migratory movement, from the area where they are formed, up to their final position in the different layers of the cortex; in dyslexic neuronal migration is abnormal (Dehaene 2007).

### *2.2 Hypotheses on dyslexia*

The theory of neurodiversity is based on three fundamental assumptions. The first is related to the fact that the brain must be understood as an ecosystem in which the individual parts (such as the ability to organize, to face the problems and to adapt) are compensated and integrated one

with each other. The second assumption is that the disability model is not universal; as a matter of fact, dyslexia is seen as a deficit in cultures that center on literacy by considering writing and reading as predominant abilities. The third assumption, finally, states that success occurs when the brain and the environment adapt to each other; the brain adapts to the requests of the environment, the environment to those of the brain. Failure leads to mismatching and social disadvantage, unrelated conditions from the neurological disorder, but which have much to deal with the will and the ability of the people around the subject to welcome and enhance this dysfunction.

The first hypothesis is neurophysical, whose studies date back to the 1960's but arrive up to the present day; as a matter of fact, in the last fifty years, brain regions that could form the basis for the neuroanatomical origins of dyslexia have been identified. This theory analyzes the individual areas of the brain and the mechanisms that could lead to dyslexia, highlighting particularities in the following areas:

- Cerebral cortex: in a normally developed brain the left hemisphere is larger than the right one, while in the dyslexic subject this asymmetry is not detected, which could be characterized in a perfect symmetry or again in an asymmetry in reverse (Geschwind and Galaburda 1985). In addition, the brain of a dyslexic person shows very small differences in the location of brain areas, and these small differences are more marked in the area intended for language (Galaburda 1989, 2005).
- Magnocells: other studies have reported signs that the dysfunction may result from a small difference of the "linguistic signal" transmission. Both auditory and visual signals are transmitted to the brain in two different ways; through the magnocellular path, that is where the signal is transmitted quickly, and the parvocellular one, that is the most important one for the elaboration of the details. In the dyslexic subject the difficulties are at magnocellular level, consequently the information is not transmitted at the necessary speed (Talcott *et al.* 1998, 2000; Stein 2001, 2003).
- Cerebellum: cerebellum is a part of the brain considered to be the one that allows the functioning of the set of abilities, both motor and linguistic-cognitive. With regard to language, the cerebellum seems to be involved at least in oral production and reading. This would also explain why children suffering from this dysfunction report differences in eye movement during reading, and some awkwardness in coordination and fine movements (Nicolson and Fawcett 2008).

Another hypothesis is the one of neuropsychological origin, which has been involved in analyzing the different types of dyslexia and has led to identify three types of dyslexia:

- phonologic, linked to grapheme-phoneme conversion. This happens when the graphic form of the words has not yet been memorized by the student or if the student encounters unknown words. The consequences of this type of dyslexia are a low degree of phonological awareness and difficulty in deciphering new words;[2]
- superficial, that is the ability to connect the graphic form, the phonological one and the meaning of an item. The main result of this dyslexia is the slow reading;
- deep dyslexia, which includes both ways. This type is not very frequent and can also cause semantic errors.

[2] Phonological awareness refers to the ability to manipulate the sounds of language through processes of fusion, deletion and synthesis of phonemes.

This categorization has received confirmation regarding of the acquired dyslexia while, in order to frame also the developmental dyslexia in this descriptive model, it is essential to consider the following variables:

- dimension of development: learning has always taken place under altered conditions, therefore in the evolution of differentiation the subject can use different strategies according to situations and needs;
- formation of the cognitive and learning style: each subject develops his own strategies to solve the problems of everyday life, starting from his/her own abilities and avoiding his/her own limits. The dyslexic subject develops these skills by maturing a style that best suits him, whether it is a visual-semantic or auditory-phonological one (Daloiso 2012).

Finally, we find the hypothesis of a cognitive matrix that attributes dyslexia to individual differences in phonological processing (Snowling 1987). At the basis of a correct development in the field of reading and writing, a previous development of phonological awareness is necessary, which allows a set of operations necessary for written encoding and decoding. Numerous studies confirm the link between dyslexia and low phonological awareness, but this hypothesis is not able to explain all the difficulties of the dyslexic subject. Above all, it cannot explain all the differences, for example why a child reads slowly but accurately and another child reads the exact opposite. In this regard, the hypothesis of the double deficit tries to provide an answer by stating that at the origins of dyslexia we can find two very distinct deficits: the first one concerning the phonological side, the other one concerning the rapidity of recovery of already known words. The first problem leads to inaccuracy in reading the second instead to a slow but accurate reading (Wolf and Bowers 1999).

Among the most recent research there is *the hypothesis of the automation deficit* (Nicolson and Fawcett 2008) which resumes the weaknesses of other theories, especially those related to the phonological deficit and double deficit. Both theories, as a matter of fact, focus on the linguistic dimension and do not explain the difficulties that a dyslexic subject may encounter in the non-linguistic tasks, for example: calculate quickly, remain in balance on one foot while being blindfolded, etc. This theory consists in considering dyslexia as a lack of automation of some processes; the listed tasks have some common denominators with normal dyslexia disorders:

- the activities must be automated, so that they can be done without thinking too much about what should be said or done;
- involve implicit memory,[3] which allows the unconscious internalization of some procedures, which, once learned, require a minimum effort (Cardona 2010);
- involve the cerebellum.

Learning a foreign language (L2) involves interfacing with different cultural models, so that different cognitive scripts[4] may correspond to the same situation in a different culture. The main difficulty for foreign language students is to transfer the scripts acquired in the native language into the new culture they are studying with the further complication of cultural plurality, as in the case of English and Spanish and, in a less marked way, in German. By implementing

[3] Implicit memory allows the internalization of procedures that mind and body have learned to implement in an increasingly automatic and unconscious form and are stored there much of the oral skills in the native language: both idiomatic expressions, both words and recurring communicative acts are memorized unconsciously.

[4] Theory of cognitive scripts (Nelson 1986), according to which, interacting with the environment, the child learns to associate its pragmalinguistics rules to each communicative situation.

the vision of Nicolson and Fawcett (2008), dyslexic student may not have fully automated the scripts of his/her own culture and learning new *scripts* would be an advantage allowing him/her greater adaptability and flexibility.

Building a picture of all three hypotheses together is quite complicated, since the research did not provide clear conclusions yet, but it has highlighted aspects that can be shared such as: the fact that dyslexia leads to the formation of a learning style; that it originates from a neurodiversity and causes a difficulty in the automation of some tasks, the most difficult to automate are the ones of linguistic nature (phonological and orthographic dimension), mnemonic nature (counting and naming things quickly) or mobility nature (coordination or complex tasks).

### *3. Analysis of reading and writing skills*

The learning of reading and writing is a fundamental step in a child's life, who is surrounded by the written language since childhood, so learning to decode writing is essential to interact with the environment. These skills combine written signs with meanings by exploiting the linguistic knowledge of the speaker, specifically the phonological, morphosyntactic and lexical knowledge that is part of his/her mental grammar or internal language. It is assumed that learning, reading and writing skills have a separate status from the acquiring of language system. While the acquisition of native language depends on an innate, biologically determined system, reading and writing are the result of a teaching *ad hoc* that involves the child's general learning abilities (Baldi and Savoia 2017). In this sense, writing and reading are considered as a product of the cultural evolution of man:

> Non si tratta, perciò, di meccanismi cognitivi innati per la lettura/scrittura ma il risultato dell'utilizzo di capacità cognitive preesistenti, specializzate per il riconoscimento di oggetti. È con l'addestramento che gli esseri umani hanno imparato a sfruttare queste capacità per riconoscere le forme delle lettere e delle parole e tradurre i suoni nel linguaggio scritto. (*Ibidem*: 110-111)

The alphabetical system is used to write European languages and nowadays many other languages of the world. It comes from Roman writing and is based on a conventional relationship whereby each letter or certain combinations of letters corresponding to a phonological segment. It should also be added that alphabetical writing systems may have irregularities, as they have been established on the basis of conventions which have changed over time. Even in a language with transparent and regular writing as Italian there are discrepancies in the correspondence between letters and sounds (Baldi and Savoia 2018).

Learning to read consists in connecting two brain systems present in the child: the visual perception of forms and the language areas. According to the model of neuronal recycling, writing is progressively fixed in the brain of the future reader and it must be placed in an optimal space where already functioning circuits are reconverted to another function. Subsequently, there is a reconversion which involves the transformation of a function which had its own usefulness in our evolutionary past, into a new and more useful function in the present cultural context (Dehaene 2007). In the specific case of reading learning, it takes place a reconversion of the networks of neurons initially dedicated to the visual perception of objects; Reading should progressively converge towards the left occipitotemporal region, and later take, over the months, a specialization for the written text and the interconnection with the other temporal, parietal and frontal regions.

Dehaene (*ibidem*) also analyzes the period preceding reading learning, as he argues that learning to read is possible only because the child's brain already has acquired a large part of

the appropriate neuronal structures. He also adds that the linguistic and visual development of the child, even before he begins to read, plays a fundamental role in the good preparation of the brain for reading. Since the first months of his/her life, he/she possesses an exceptional competence for the analysis of language and it is shown that even from the first day of life, he perceives linguistic contrasts and has a very special attention for the prosody of his/her native language. In addition, brain imaging of 2- or 3-month-old children has shown that the child's language skills are already resting on a cortical network of the left hemisphere, the same that is activated in the adult during language processing. Specifically, in our childish brain, it happens that:

> The upper left temporal region analyzes the sounds of the language, while the upper left temporal sulcus already shows a hierarchical organization, probably linked to a progressive analysis of phonemes, words and phrases. Even the lower left frontal region, the Broca area, a region traditionally implicated in the production of the word and in the analysis of grammar, is activated in the three-month-old child during the listening of sentences, even if at that age he does not produce anything but indistinct sounds. (*Ibidem*: 229)

These initial preconditions are subsequently transformed into learning; During the first year, the network of language areas gradually specializes under the influence of the native language. As soon as the child begins to read, in the age of 5 or 6, he/she has a detailed representation of the phonology of his/her language, a vocabulary of a few thousand words, and he also knows the main grammatical structures. Obviously, he does not know that he has the rules of representation, but they are already in the set of neuronal circuits of oral language, ready to deal with the written text.

At the same time, the child's visual system is structured. We know that since the first days of life, he/she pays particular attention to faces, which seem to activate, as in the adult, a part of the right occipitotemporal region. This specialization becomes even greater during the first year of life and continues for about ten years. Around the age of 5-6, when the child learns to read, it is likely that the ventral visual system is still in a period of intense plasticity in which the functional specialization is far from being stabilized. This is a particularly favorable phase for the acquisition of new visual objects such as letters and words.

To learn how to understand and speak their native language, children do not need any particular teaching, although adults perform an important tutoring function that, if properly exposed to the language, children will be able to speak it sooner or later. The written language, on the other hand, is based on a complex system of correspondences between sounds and symbols. Therefore its learning is not natural but needs a direct teaching that explains the rules necessary to interpret the graphic symbols and bring them back to the knowledge that the child already owns.

Understanding a word in oral form is very different from decoding a written word, however both processes require the activation of lexical foreknowledge. As a matter of fact, every time we listen to or read a word our memory is activated, which gives us access to our lexical foreknowledge and allows us to understand the meaning of what we read or hear. Although the studies in the psychology of reading have not produced numerous developmental models dedicated to the description of the stages of development crossed by the child in his/her path as a reader, the main evolutionary theories allow us to outline the essential stages of reading-writing, composed by distinct but connected abilities:

1. Logographic phase.
2. Semi-phonetic phase.
3. Alphabetical phase.

4. Spelling stage.
5. Lexical phase.

This path is characterized both by *bottom-up* processes, according to which the child proceeds from the formal analysis of the letters to their semantic interpretation, and by *top-down* strategies, in which the child starts from semantic interpretation in order to arrive to the analysis of form and they are particularly productive. The context is, in fact, an essential variable right in the early stages of reading learning: the inexperienced reader seems to use more contextual information to decode the text (Camaioni 2001). With the lexical phase the reader can be considered able to process the written code automatically because, thanks to the construction of a large lexical background, the child will achieve an accurate reading-writing skill without the need to resort to the grapheme-phoneme conversion strategy if not for unknown words.

In accordance with the adult[5] models, we can assume that upon completion of this evolutionary path, a specific module is formed into the child's mind in order to manage decoding of writing. The modular perspective to cognitive processes, inaugurated by Fodor (1983), postulates the existence in the human mind of distinct and independent modules that manage the higher cognitive functions such as attention, vision, language, etc. The theory of modularity has an innate nature as it states that such modules are innate, that means they are inscribed already in the genetic patrimony of each person. However, later it was discussed that some of the modules could be acquired on the basis of a particular external input, as in the case of reading. This hypothesis then had numerous confirmations in the study of subjects with acquired dyslexia, who presented particularly specific deficits in some reading processes and not in the other skills.

This module would work through two distinct and autonomous procedures:

a) The visual path: through which it is enough to recognize letters to recover the orthographic representation of a word as well as the meaning and phonetic form. It can only be used for known words, whose spelling, semantics and phonetic information are already stored;
b) The phonological path: the subject recognizes the letters, recalls to the memory the associated phonological units and reconstructs the correct pronunciation of the word. The expert reader only uses it in the presence of unknown words.

Being able to decode a written text is a necessary but not sufficient condition to understand the content; *bottom-up* strategies guarantee superficial decoding (from detail to general), while *top-down* strategies (from general to particular) allow the understanding of content. However, it is necessary to emphasize that the two ways are not sequential, in fact it is not true that the text is first decoded and then it is understood; often the two processes are simultaneous and influence each other (Daloiso 2012).

### *3.1 Reading disorder*

As we have already seen, reading-writing disorders are one of the largest categories of learning disorders, (cfr. Sections 2.1, 2.2); the first issues to be highlighted regarding the pro-

[5] In particular, the modular model of double access postulated by Coltheart (1981), which is still the most accredited in the neuropsychological field.

cess of reading and understanding a text are two: the first is one can be linked to a difficulty in the decoding of written words, that is the ability to read a text fluently and correctly; while the second one consists in the understanding of what is read, that means a set of skills that allow the subject to create an image of what he is reading. In this case it should be noted that a child with reading disorders will have no problem in understanding a written text if it will be presented to him in an oral way.

Children with problems understanding a written text require specific attention in order to develop that ability, and have a lower performance than children without this dysfunction, but it is still possible to spot some difficulties:

- Linguistics: as, for example, in case of an unknown word it is possible that the student may not be able to analyze it on the morphosyntactic level, by assigning it to a category (nouns, adjectives, verbs, etc.). He may also have difficulty in putting it into the right context and thereby demonstrating the understanding dysfunction;
- Textual: reading a text and searching for certain answers and information;
- Mnemonic: that is to be able to capture the important information and to omit the irrelevant ones: thus creating an overload of information and having even more difficulties in the study;
- Metacognitive: reading requires the activation of strategies that allow the student to control in a conscious way the process of understanding, something in which a dyslexic subject is lacking.

Another problem of reading is that of "letter by letter" dyslexia, in other words, when a child presents this disorder, he/she can read a word only after having named the individual letters that compose it. The student must be able to perform visual analysis of the individual grapheme without being able to reproduce the sound of it and link it with the other letters.

Many disorders generally associated with written language, such as dyslexia, also affect oral skills, are related to linguistic input and should not be confused with cognitive problems. Understanding the language input is crucial during the first phase of learning grammar, when a consideration on the language is required. It is exactly in this phase the function that Noam Chomsky calls Language Acquisition Device (LAD) is activated, adapted to the glottodidactic practice by Krashen and Terrel (1983). In the oral comprehension of a linguistic input, for some students with dyslexia it is difficult to segment the units of meaning in the communicative flow and to reach a real metalinguistic competence. These difficulties in oral comprehension will be present in the student throughout school, with particular incidence at the stage of first exposure to languages, a period in which basic language competence is formed. In addition, the student perceives a higher speed of speech than the rest of their classmates and over the time it becomes a disadvantage that will generate frustration, low self-confidence and decreased motivation (Triolo 2016).

The useful element to predict the learning success of a L2 are: age, quantity and quality of language exposure; in cases of inadequate development of the L1 it is necessary to operate a hyper-learning of the L2 in order to provide the necessary linguistic material to reach the minimum level identified by Cummins[6] (Celentin 2016). Generally, the learning of the L2 takes place in

[6] There is a minimum level of fluency that must be reached both in L1 and in L2 to allow bilinguals to make the best use of cognitive and linguistic stimuli. The development of both languages allows growth from the linguistic and cognitive point of view, suggesting the hypothesis of inter-dependence between languages affirming that what

formal contexts in which, as we have already pointed out, the teacher plays an important role, so his/her choices at the methodological and didactic level have a big influence in the learners with dyslexia. Therefore, it is essential to understand the individual differences and considerate them in educational choices in order to avoid the creation of additional barriers for the learner. There are three different approaches that gave results in the last seventy years for dyslexic learners: the structuralism approach, the communicative approach and the educational-communicative approach.

*4. Dyslexia in comparison between languages*

Most studies on dyslexia are Anglo-Saxon, therefore, the prospect of difficulties was initially believed as universal, without considering the effect that phonological properties, orthography and morphology of a specific language may have in the development of reading skills. Thanks to the cross-linguistic data that we have, we know that some languages actually amplify the manifestations of dyslexia, while others attenuate them. The subject's skills may be more or less developed, depending both on the foreign language he decides to study and his native language. As a matter of fact, if a child chooses to learn a language very similar to his/her own, he/she will have less difficulty because he has already acquired the necessary strategies in his/her own language. However, if the chosen language is very different from his/her own the issues will increase, obviously. The factors affecting the relationship between dyslexia and foreign language are the following (Daloiso 2012):

- Orthographic transparency: affects the manifestations of dyslexia, so theoretically, a dyslexic student of a transparent orthographic language, while studying a shallow or deep-orthographic language can show signs of slowness but also of non-accuracy, a characteristic that generally he/she does not have in his/her native language;
- Linguistic affinity: which means the degree of similarity between two languages, which usually depends on a genetic relationship or typological similarities, and can be:
  - phonological: the degree of similarity that can be observed by comparing the phonological system of the native language to the foreign one;
  - morphosyntactic: for morphosyntax we mean that set of properties related to the nominal and verbal systems of a language that makes it similar or not to the student's native language;
  - lexical: that means the degree of formal and semantic similarity between the words of a foreign language compared to the native language.

The case of English shows that there is a certain degree of lexical affinity with Italian due to the many words in the English lexicon that have origins from French, Latin, Greek and Italian; in addition, the Italian language is embracing in its lexical repertoire many terms from English, also known to those who do not know the language. Italian has strong phonological, morphosyntactic and lexical affinities with both Spanish and French; on the contrary, it has as a very low affinity with German.[7] The fact that some languages amplify or mitigate the manifestations of dyslexia is linked to the fact that some languages encourage transfer[8] of those

is learned through one language is transferable to the other. Only the superficial aspects of languages are different while the aspects related to cognitive development are the same.

[7] For example, German and Italian are two languages distant from the morphosyntactic point of view because German has rules of lexical composition that needs the use of declinations.

[8] The linguistic transfer consists in moving the habits that have been consolidated in their native language in L2.

strategies already acquired in L1, while others force the student to learn other strategies more functional to the new language. In *Linee guida per il diritto allo studio degli alunni e degli studenti con disturbi specifici di apprendimento* by MIUR (2011) is reported that:

> Poiché la trasparenza linguistica […] influisce sul livello di difficoltà di apprendimento della lingua da parte degli studenti con DSA, è opportuno che la scuola, in sede di orientamento o al momento di individuare quale lingua straniera privilegiare, informi la famiglia sull'opportunità di scegliere – ove possibile – una lingua che ha una trasparenza linguistica maggiore. (19)

However, these considerations should not lead to the wrong conclusion that some languages are too difficult to be learned; with a good teaching methodology it is possible to learn them in the proper way (Balboni 2008). In addition, it is possible to make a comparison between Italian and foreign languages studied at school with the aim of creating a scheme to guide teachers in understanding the degree of difficulty that may involve studying the foreign language for the student.

| | Trasparenza ortografica | AFFINITÀ LINGUISTICA CON L'ITALIANO | | |
|---|---|---|---|---|
| | | Fonologia | Morfo-sintassi | Lessico |
| Francese | Moderata | Moderata | Alta | Alta |
| Inglese | Bassa | Bassa | Moderata | Moderata |
| Spagnolo | Alta | Alta | Alta | Alta |
| Tedesco | Alta | Bassa | Bassa | Bassa |

Table 1. Orthographic transparency and linguistic affinity with Italian (Daloiso 2012: 75)

While reading patterns in L1 allow us to formulate hypotheses and to explain the relationship between low levels of comprehension and existing cognitive-linguistic processes, the same cannot be said for research related to the comprehension of the written text in L2. If the process of reading worked in a similar way, the models analyzing the difficulties could also be applied to multilingual students. Instead, differences between languages can cause a different development in skills involved in the comprehension of a written text, depending on the linguistic background. Research aimed at identifying similarities and differences in different linguistic contexts is crucial in determining whether predictive models related to L1 can also be applied to multilingual contexts and whether they need to be modified or integrated (Grech, Sadeghi and Everatt 2016).

Starting from an analysis of the most relevant linguistic theories regarding the universality of reading processes, we can say that the written decoding is based on a universal processe that presents elements of variability linkable to the areas of phonology and spelling, which depend on the target language that you want to learn. The potential impact of these variables is particularly significant in the study of learning how to read in a foreign language and deserves a careful consideration.

### *4.1 Phonological awareness*

Phonological awareness is one of the central aspects in most disorders and to be able to make a diagnosis it is necessary to know the age of the first exposure to the L2. As for phonological

variables, most psycho-linguistic studies say that the stages of development of phonological awareness are more or less the same in all children, despite the language they are exposed to. Therefore, the path proceeds from the highest level, from the word to the syllable, up to the analysis of individual phonemes. The *Grain Size Theory* (Ziegler and Goswami 2005)[9] stands out in the field of psycholinguistics studies and is based on the observation that the human brain is not programmed to read but rather to understand the communicative messages transmitted in the oral way. The brain, therefore, is not only able to process a language at a phonological level from the early stages of development but also uses phonological processing to learn how to decode the script. The human being has developed an area of the brain engaged in visual analysis of the form of words, which seems to be connected with the area of phonological analysis (Paulesu *et al.* 2010).

It is known that syllabic awareness develops before the learning to write begins (Ziegler and Goswami 2005), however, different languages can make children more sensitive to different syllabic structures: for example, while in many languages including Italian, Spanish and Chinese, the most frequent syllabic structure is CV, in other languages such as English and German more articulated structures are common. As for English, the most frequent syllabic structure is CVC (dog), which consists in over 40% of monosyllabic words, followed by CCVC (slow), CVCC (fast) and CCVCC (climb). This shows that each child identifies the most frequent syllabic structures in his/her language in a very simple way (Daloiso 2012).

The ability to analyze syllables is a universal stage, but the speed of development depends on the type of language. Again, the comparison between Italian and English is emblematic: on the one hand, Italian is an isosyllabic language, so syllables are to be pronounced with the same duration; on the other hand, English is a stressed-time language which means that the stressed syllables have a longer duration, while the others are reduced. Therefore, we can say that, unlike in Italian, in English "mission", "omission" and "emission" if pronounced in a context are practically homophonic, because the unstressed syllables have a reduction of the vowel, which is pronounced with an indistinct sound. In a stressed-time language, such as English (or German), the child has more issues in distinguishing the different syllable in order to use it as a unit of phonological analysis: it follows that syllable awareness emerges earlier in children of isosyllabic languages than in the ones, of the same age, of stressed-time languages (Duncan *et al.* 2006).

Another aspect that affects the development of phonological awareness is the sound profile. Each language is composed by a large set of sounds: the vowels are the loudest sounds that we can produce, followed by the semivowels, for example /w/ that we find in the Italian *uomo* and in the English "wine". Liquid and nasal consonants are more sonorous (/l/ /r/ /n/ /m/) than the deaf obstructing ones like /p/. If we analyze the composition of these sounds in different languages, it appears that Italian is a very sonorous language, considering the high distribution of vowels both at word level, considering that almost all Italian words end in vowel, and at syllable level being CV the most frequent structure. English is, in some ways, an opposite case to Italian, considering the predominance of consonant sounds at the end of the syllable and word.

The sound profile of each language affects in two ways the development of children's phonetic discrimination skills: the first influence has to take into consideration each specific language, meaning that the child, exposed to a more sonorous language, is more able to dis-

[9] Zieger and Goswami's theory believes that to understand cross-linguistic differences in reading, it is necessary to go into the meta-phonological development of different languages, at various levels (grain sizes) starting from the syllable up to the single phoneme, which are the universal characteristics of all languages.

tinguish the most sonorous syllabic structures. A second influence can be considered universal and could be resumed as follows: in any language, within the same word, the child manages to differentiate in a better way the syllables composed by contrasting phenomena at the sound level than the ones with many sound phonemes inside. For this reason, a child can perform more easily the phonological analysis of the word "cat" than "while", because in the second one the phonemes are all very sonorous.

A third variable that seems to influence the level of phonological awareness in children is the phonological closeness, or degree of similarity, between two words: apparently children develop a greater capacity of discrimination for groups of words characterized by a high phonological proximity, for example in Italian *casa, caso, cosa, cola, calo*; in English "sin", "keen", "mean", "bean". This is due to the fact that in each language some combinations of sounds are more productive than others, so the child must sharpen his/her discriminatory skills precisely towards those more frequent sounds that generate distinctions of meaning. It is also noted that in many cases phonological proximity produces rhymes, so exposure to specific combinations of sounds in a language also influences the ability to discriminate and create rhymes.

These data reveal that cross-linguistic variability in the development of phonological awareness affects more the contents in terms of sounds, which the child is able to manipulate, depending on the phonological properties of each language. On the other hand, there are no significant differences in the type of phonological analysis skills, since all children, at about the same age, are able to manipulate the sounds of their languages at the level of syllable, incipit-rhyme and phoneme. A substantial cross-linguistic difference emerges, however, at the level of manipulation of individual phonemes. While the ability to analyze the syllable and the incipit-rhyme structure emerges from the age of four, the ability to analyze individual phonemes seems to emerge at different times, in different languages, and appears influenced by contact with the written code. As a matter of fact, since in natural communication we do not hear single phonemes but a continuous flow of sounds, children are able to isolate single sounds when they start to relate them to the corresponding letters. It has been noted that in languages with greater coherence~~,~~ in the connections between letters and sounds, the ability to manipulate individual phonemes appears earlier, already at the turn of the fifth and sixth years of life.

An interesting aspect is that in multilingual subjects with linguistic disorders, the areas of fragility identified in one language are also present in the other acquired language. For example, a subject with a phonological awareness deficit in L1 shows elements of fragility in the same area even in L2, though the manifestations of fragility may change depending on the characteristics of L1 and L2. In fact, even in the case of similar languages, such as Italian and Spanish, slightly different manifestations have been discovered for the same disorder.[10] It has been suggested that the non-coincident linguistic behaviors of Italian and Spanish subjects with a linguistic disorder are caused in part by the different prosodic properties of the two languages[11] (Celentin and Daloiso 2017).

### *4.2 Orthographic transparency*

From the point of view of the relationship between pronunciation and spelling, it is possible to distinguish between transparent orthography languages, or superficial languages, which

[10] As for morphosyntax, for example, Spanish speaking children tend to replace clitics and articles with other inappropriate forms, while Italian children of the same age tend to omit these forms.

[11] In Italian, the distinction between strong and weak syllables is not very marked as it is in Spanish.

tend to be uniquely related to phonemes and graphemes, and shallow or deep-orthographic languages, which are characterized by an even more complex relationship between oral and written form. To the first category belong Italian, Spanish, German, and Greek, and to the second group belong French and English. This is summarized in the following classification table of alphabetic languages according to the opacity of their spelling system and syllabic structure (Jiménez 2012: 27).

| | | Orthographic Opacity | | | | |
|---|---|---|---|---|---|---|
| | | Transparency | | | | Opacity |
| Sillabic Structure | Easy | Finnish | Greek | Portoguese | French | |
| | | | Italian | | | |
| | | | Spanish | | | |
| | Complex | | German | Duch | Danish | English |
| | | | Norwegian | Swedish | | |
| | | | Icelandic | | | |

Table 2. Classification table of alphabetic languages

The orthographic depth hypothesis, which emerged in the 1990s, initially argued that the degree of complexity of the relations between phonemes and graphemes in a language influenced the development of reading strategies: using the double-entry model of Coulthard (1981), transparent orthography languages would support sub-lexical strategies, that are phonological, thanks to the high correspondence between pronunciation and writing, while shallow or deep-orthographies languages would support lexical strategies, or the reading of the words "in block", since the phoneme-grapheme conversion does not work because of the irregularities of the language.

However, the original formulation of this theory did not find any solid experimental evidence: in particular the "strong" hypothesis does not explain why in transparent orthography languages, as in Italian, children are able to understand the correct accent of words, which is often not graphically marked: for example *leggere* can be both a verb or an adjective and only reading the words "in block" can clarify this ambiguity.

In its most recent formation, the orthographic depth hypothesis argues that in all languages, shallow or deep-orthographic ones or transparent orthography ones, reading involves both lexical and sub-lexical processes; however, the degree of activation of these strategies changes according to the type of spelling: transparent orthography language readers, as a matter of fact, seem to use more the sub-lexical (phonological) method, while shallow or deep-orthographic language readers of the same age, primarily use the lexical (visual) method. This "weak" version of the hypothesis seems to find confirmation in several languages, including Italian, English, German, Spanish, Greek and Turkish (Daloiso 2012).

In addition of affecting the types of processes, the degree of orthographic transparency also influences the speed of development, that is the time that children spend in the different stages of the learning path previously listed. This means that a 7-year-old Italian student generally reads with an almost perfect degree of accuracy, while an English child reaches the same level around the age of 10-11. Furthermore, according to a comparative research aimed to investigate the degree of reading accuracy in a sample of children from 14 European countries at the end of

the first year of literacy, German subjects were found to be 98% accurate, Italians and Spanish were 95% accurate, and the British were in last position with 34% (Seymour, Aro and Erskine 2003). So, although the specific reading disorder has a neurobiological origin, linguistic and environmental variants affect its characterization and frequency. A study showed that 47% of dyslexic Spanish speakers showed superficial dyslexia and only 22.8% phonological dyslexia, while the opposite occurs with English speakers with dyslexia. In addition, it has been found that languages with a transparent orthographic system have a greater decrease in reading speed and a less difficulty in accuracy (Matute and Guajardo 2012).

Cross-linguistic research suggests to consider the orthographic depth as a variable (Frost and Katz 1992), alternatively, to consider the degree of complexity of the relations between phonemes and graphemes in the spelling of a language. English, with its 44 phonemes and hundreds of possible spellings, is a deep-orthographic language, opposite to other languages such as Italian and Spanish; for example, the Italian phonological system has about 30 phonemes, corresponding to 21 graphemes. Italian has a high degree of orthographic transparency, which facilitates the conversion grapheme-phoneme in reading, despite the correspondence between symbols and sounds is not always perfect. This aspect simplifies learners of the same degree of transparency languages who can activate already acquired mechanisms, but it also facilitates learning for all the foreign learners who, due to their limited lexical background, choose the phonological pathway to decode. Italian is an alphabetical language with progression from left to right, which facilitates students with European native language, but can create representation problems for Arabic speakers, which have the opposite progression, for Chinese speakers, due to logographic writing, and for the Japanese ones, whose mixed alphabetic writing is ideogrammatic and with progression from top to bottom. Additionally, capital letters in Italian are distinctive and identify proper names and the beginning of sentences, but in some European languages their use is different, for example in German are used for all nouns, while other languages such as Arabic do not distinguish between upper and lower case letters, therefore, problems may arise in the use of punctuation (Melero Rodríguez 2015).

Spanish is also considered one of the languages with a transparent orthographic system for reading, which consists of: 27 graphemes, 5 digrams and 2 diacritic signs (acute accent and dieresis). This helps reading learning especially for Spanish children, who at the end of the first year of primary school correctly read 94.72% of words and 88% of pseudo-words. In contrast, English children read only 33.89% of words and 29.26% of pseudo-words correctly, due to the deep-orthographic system (Matute and Guajardo 2012). Already in 2002, the study conducted by Defior, Matos and Cary showed that the reading time of pseudo-words by first and second grade Spanish-speaking children is lower than the reading time of Portuguese children, whose language, even if it has a transparent orthographic system, is deeper than Spanish. However, it is important to add that the transparency of the Spanish orthographic system concerns reading but not writing. The phoneme-grapheme conversion is less consistent because the phoneme itself can be represented by two or more graphemes without any rule determining which one is the most appropriate. As a matter of fact, Spanish-speaking children acquire reading skills before writing skills and achieve the roof-effect in reading as early as the second year of primary education, while for writing we must wait for the fourth grade (Arfè, Dockrell and Berninger 2014).

French is considered as a medium opaque language with 190 graphemes in order to make 35 phonemes; for example, to write the sound [o] in French we can find the following twelve graphic combinations: *o*, *ot*, *ots*, *ocs*, *au*, *aux*, *aud*, *auds*, *eau*, *eaux*, *ho*, ô. French has conversion rules which, once they have been automated, make it possible to read and write even unknown words correctly. Nevertheless, for a dyslexic student French is particularly difficult because through these phoneme-grapheme conversion rules it is possible to write correctly

only about 50% of the words. The remaining words can only be read correctly through the lexical way, that is, having already in mind the sound image of the word itself. These are words defined as irregular (such as *fusil*, *tabac*, *femme*) in which the relationships between grapheme and morpheme are not typical and do not meet the conversion rules. If these words do not already belong to the reader's orthographic lexicon, regularization errors will occur, for example, the words will be read by generalizing the known conversion rules. For the French language, the mechanisms which need attention are the methods of using the cedilla, the cases in which /g/ and /c/ are soft or hard, or complex graphemes (Celentin 2012).

### *4.3 Important linguistic areas in learning of an L2*

The important linguistic areas in learning of an L2 are: phonetics and phonology, morphology, vocabulary, syntax and pragmatics; for each of them it is useful to highlight possible issues or strengths that may affect students with SLD (Cappa *et al.* 2012):

- Phonetics and phonology: when we learn a foreign language, we must learn sounds that often do not exist in our native language; such sounds are not part of our phonemic inventory and can cause difficulties in both perception and production. Phonetic skills are often forgotten in language teaching, but are very important especially in the case of students with SLD. The language teacher should bring the attention of the student on similarities and differences in the sounds of the studied language to exercise the discrimination as well as production, since phonetic skills are the first that the child acquires in the native language but are not learned as spontaneously in an L2. These are issues, especially for many students with dyslexia, who usually tend to transfer into the language they are learning all the phonological difficulties they have in their native language. Learners struggle to get the phonetic models of the new language implicitly through simple exposure, so learning new sounds also requires explicit teaching. For this reason, teacher should, through targeted exercises, help the student in the discrimination and production of the sounds of the new language in order to develop a phonological awareness. It is defined as the ability to elaborate the sounds of the oral language, or the ability to analyze and manipulate the linguistic structure of words, with both appropriate verbal or non-verbal stimuli.
- Vocabulary: the most recent approaches to language teaching-learning give priority to communicative competence and give to vocabulary a central and priority role over syntactic aspects of the language. As a matter of fact, it has been stated that "l'acquisizione di un repertorio lessicale, seppur ristretto, può consentire una forma basilare di comprensione e di comunicazione, su cui potranno progressivamente inserirsi le conoscenze e competenze sintattiche" (Cappa *et al.* 2012: 10). Especially in the early stages of language learning, the teacher must suggest a particularly motivating vocabulary for students, which is as related as much as possible to their hobbies, needs, and other aspects of their daily life. In the case of students with dyslexia, the acquisition can be particularly difficult, both because of a possible deficit in the working phonological memory,[12] and because of difficulties in lexical learning due to an explicit memory deficit.[13]

[12] The phonological working memory allows to store acoustic information for a short time in order to make the correct conversion between graphemes and phonemes.

[13] Explicit memory is the one that keeps of the knowledge learned in a conscious and controlled way through study, repetition, and elaboration.

- Morphology: morphological and morphosyntactic aspects of language, as well as phonetic and phonological aspects, are learned mainly in an unconscious way in L1 and partially also in L2. Such aspects cause issues in dyslexic student in both L1 and L2. For this reason, they need to be taught in an explicit way also in L2.
- Syntax: it is important that teacher explains the differences between the syntactic constructions that may exist in different languages. Furthermore, it is essential that the consideration on syntax is preceded by a practical use of the studied structures, this must take place only after that these structures have already been assimilated as a communicative behaviour. This applies to all students but especially to the ones with dyslexia, as they may have more difficulty in recovering and using syntactic rules due to a deficiency in working memory.
- Pragmatic: as stated earlier, according to modern glottodidactics the language is understood not only as a system of rules but also as an instrument of action. Therefore language skills develop in communicative situations and are used for pragmatic purposes such as saying hello, asking for information, thanking, talking about something etc. Normally students with dyslexia have no difficulty in this area, so it is important the valorization of the pragmatic dimension in the context of language teaching-learning. Though, this may be a kind of compensation for linguistic processing difficulties. It is important that the teacher promotes more the comprehensibility of the message and the appropriateness in the communicative situation rather than assessing its correctness from the syntactic point of view. It should also be added that while there are no particular theoretical impediments to the development of socio-pragmatic skills in foreign languages, it must be considered that dyslexia can also affect the psychological level, causing frustration, depression and reluctance to communicate. Therefore, it is obvious that the development of the socio-pragmatic dimension can only take place in the presence of a serene and relaxed learning environment, in which the student is not penalized and mocked when he tries to communicate. (Daloiso 2012)

*5. Problems and barrier*

The dyslexic student, who is determined to learn a new language, shows a lot of curiosity and interest in learning as the foreign language is often interpreted by the learner as a second chance to demonstrate their skills. Often this initial motivation gradually shades away because of the issues the student may find on his/her path (Kormos and Kontra 2008). In losing the motivation, the student will cross more and more difficulties and, due also to the lack of the necessary supports, will tend to recreate its own barrier of protection even in the foreign language. In this path, which we can name psychological, the teacher plays a very important role in motivating the learning process; according to the emotional theory of the input of Schumann (1999, Schumann *et al.* 2004), the student evaluates the input of the teacher according to the following criteria:

- novelty: differences between the teacher's input and its own expectations;
- intrinsic pleasure: evaluation of the sense of pleasure or displeasure caused by the input, a positive evaluation helps the subject to get closer to the language to learn;
- relevance in comparison to its needs and goals: input assessment based on the obstacles or facilitation related to their social, cultural or training goals;
- viability: evaluation of the input according to its own abilities;

- psycho-social security: determine the situation according whether it can strengthen its social image or whether it harms it. (Daloiso 2012)

However, the evaluation of the input is often viewed in a negative way because the expectations are too high and are not reached in the expected time. Once the curiosity for the new language has gone away, it is much more difficult to learn it because the strategies acquired in the native tongue cannot be applied to it. It is very important for dyslexic student to reach serenity in learning new things, making the studying of the foreign language a pleasant and fun activity and not as a duty related to school success. The student must learn methods, techniques and approaches suited to his/her difficulties. Dyslexia also causes socio-affective problems, such as emotional insecurity and low self-confidence that could lead to anxiety, generally when there are challenging tests and tasks. Anxiety can be either of a character type, which is independent from the different situations, or a situational type, in other words linked to specific situations. According to some researchers, however, there is also a sort of "linguistic anxiety" which has a situational nature and it occurs especially in some cases of linguistic task such as:

- reading out in front of the whole class;
- reading out and simultaneously translating and answering questions;
- learning by heart and repeating in front of an audience;
- memorizing lists of words;
- answer questions quickly;
- improvising dialogues. (*ibidem*)

This state of anxiety can also cause a loss of communication and distraction tendencies as well as deep psychological damage; in addition, dyslexic learners tend to have a very high level of linguistic anxiety in all their activities (Kormos and Kontra 2008). As a result, it is possible to say that this state of anxiety represents the consequence of a school failure for a dyslexic student, whereas, in the case of a student without any disorder, it is the anxiety that causes school failure. Considering the obstacles related to dyslexia, the subject often thinks that the learning of a new language is extremely difficult on the cognitive level and therefore he gives up.[14] Today, thanks to the appliance of specific methods, the dyslexic student is able to reach a certain level of competence in the L2 even if some linguistic barriers could form, such as the mnestic barrier related to implicit memory.[15]

The emotional dimension pervades the entire learning environment and, for the dyslexic learner, the learning context becomes the keystone of the entire approach to teaching. If the student is emotionally involved the memorization of explicit information increases (Fabbro 2004) but, on the other hand, too strong emotional experiences can cause explicit memory systems to collapse due to the release of corticosteroid hormones that cause the blocking of the hippocampus and therefore the activation of the affective filter (Krashen in Balboni 2011). Consequently, an early intervention in the learning phases of a language allows to exploit the implicit memory and to use the language in an automatic way. For a consciously learning of words in the new language, it is necessary to activate explicit memory and ensure an appropriate

[14] It is important to clarify that speaking of cognitive level is not intended as a diminution of the abilities of the dyslexic learner facing a foreign language, but it is simply to emphasize that it is a complex process involving different dimensions simultaneously and that therefore requires to be carefully managed.

[15] The student must compensate with conscious control what he cannot automate.

environment, for example, a methodology based on *cooperative learning* (Lamberti 2010) can help the student.

The science of education of language has conceived many approaches to language teaching, the most common methods are linked to the communicative vision of the language. In Italy, Balboni's communication skills model (2008) illustrates the issues that dyslexic students might have. As far as language skills are concerned, text comprehension is a cognitive process that everyone has to carry out to understand a concept. Therefore, dyslexia does not prevent the student from reaching a good level of understanding, but can make the path more difficult by testing his/her patience and willing. Dyslexic students may also have problems in oral comprehension and production, although this is less common. In relation to levels of understanding, the dyslexic student and the student who does not have this disorder should not be put on the same level. Both of them start from a global level, pass through every other level and, finally, arrive in a deep understanding one. The only difference is that one of the two will take longer to reach the last level; it is only a matter of time and not of skills.

In accordance with the theories introduced by the functional and pragmatic linguistics, language skills develop in communicative situations and are used for precise pragmatic purposes, acquiring a socio-pragmatic character. Therefore, to reach a certain level in a language and so to be able to learn it better, the student must be able to experience it. He/she must have opportunities to use it in all actions that involve communication. In a functional way, then, it does not matter if it is grammatically correct but rather the fact of being understood by others, achieving his/her goal by being able to exchange messages. We can therefore affirm that the socio-pragmatic abilities are a communicative compensation regarding the other areas that turn out more complex.

Meta-linguistic competence has to be added to the previous skills. In the formal learning of a new language the student learns to analyze it and compares it with his/her native language searching for similarities and differences. This is a real consideration on the language, and it is one of the aspects on which the teacher must pay particular attention because the bigger problems are in the lower levels of analysis and, if ignored, they can also occur at higher levels. The student formulates and validates his/her own rules that will help him understand the language and to formulate sentences correctly. When a non-dyslexic student learns a new language, he starts by studying the morphosyntactic rules, such as word formation, tenses and verbal modes, etc. For a dyslexic student, the process takes place in a different way.

In addition, verbal language is often combined with gestures and expressions that helps to understand the language and, for this reason, we can say that a person is fully competent in a language only when he/she is able to integrate verbal language with the use of body and objects and has proper behavior. In this case, the subject must be capable to observe the different cultures and note the different behaviors used in actions.

## *6. Conclusions*

In this text we defined the concept of dyslexia, both developmental and acquired, and we reviewed the main studies on the subject. On the biological level, we know that dyslexia is classified as a neurodevelopment disorder, with a probable genetic and hereditary basis that manifests itself clearly during the literacy process, but is already present in the subject since birth. Neuro-anatomic and neuro-physic research has tried to identify in which brain areas or neuronal circuits the disorder occurs. In the didactics some operative definitions of the disorder have been advanced, dedicated to those who are interested in language education, which

considered the different theories on dyslexia. On the other hand, on the behavioral level; there are relevant studies that have identified the signals present in different ages to highlight risk factors in order to arrive at a timely diagnosis.

In addition, we have analyzed reading and writing skills highlighting specific disorders; however, this demonstrates the need to do a deeper research into different languages and spelling systems. Research on reading learning in an L2 has focused more on the pedagogical and didactic aspects than on empirical research or theoretical models, regarding the learning and development processes of understanding in another language in learners with dyslexia.

Differences between the languages and the language learning experiences highlight that the skills involved in the written text develop differently depending on the linguistic background; therefore, the considerations of linguistic influences will lead to a better understanding of the linguistic and reading-writing performance of dyslexic learners. The identification of similarities and differences in the various linguistic contexts are necessary to understand if the predictive models referring to L1 can also be used for L2.

For this reason, it is crucial to focus more on the processes related to the consideration of the language in order to make more autonomous learners, trying to ensure the learning of L2 but also the achievement of other skills such as, for example, thinking on the strategies to be applied. Often the dyslexic student struggles with anxiety and demotivation that should not be seen as causes of dyslexia but rather are linked to school failure; an inadequate teaching can have negative consequences on the emotional, mnemonic and linguistic aspect.

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