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DYSLEXIA AND SECOND LANGUAGE LEARNING
State of the art and future perspectives at Pisa University

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“Ognuno è un genio. Ma se si giudica un pesce dalla sua abilità di arrampicarsi sugli alberi, lui passerà l’intera vita a credersi stupido.”

Albert Einstein

CONTENTS

INTRODUCTION

The focus of this thesis is the foreign language learning in students with dyslexia.

The first chapter begins with the commonest definitions of dyslexia that, according to the World Federation of Neurology, can be described as "a disorder manifested by difficulty in learning to read despite conventional instruction, adequate intelligence and sociocultural opportunity". Then, I deal with the historical evolution of the researches on dyslexia and on the statistical incidence of this disturb in different Nations, depending on the language spoken.
After a distinction between 'acquired' and 'developmental', I focus on developmental dyslexia and on its classification in 'phonological dyslexia', that inhibits the correct grapheme-phoneme conversion; 'surface dyslexia', that impedes to automate the reading process; and 'deep dyslexia', that has a great incidence on both the phonological route and the lexical-semantic route, with a significant impact on many aspects that contribute to a fluent and accurate reading.
A paragraph is dedicated to the signs and symptoms of dyslexia and to the question of the assessment. Dyslexia has been traditionally diagnosed on the basis of the *discrepancy criterion*: a child is unable to learn to read despite his or her intelligence (measured by means of IQ tests), the absence of hearing impairment and of neurological and/or sensorial problems, and an adequate education. However, this criterion remains controversial and is not totally accepted.
Afterwards, I briefly report on the neurobiological basis and the main theories developed to explain the causes of dyslexia: the 'phonological deficit hypothesis', the 'cerebellar theory', the 'magnocellular theory' and the theories that relate dyslexia to problems of the memory systems.

The first objective of the second chapter is to provide an overview of the process of language acquisition in children. I begin with a list of the neurobiological factors implicated in the development of language and of the stages of first language acquisition. According to several studies, language has a critical period associated

with its emergence: the acquisition will fail if it is attempted either before or after the critical period, which extends from birth to the beginning of puberty.

A short description of the two main theories about language development follows: the 'formal approach' that emanates from Chomskian generative grammar, and the 'usage-based approach' that derives from the Cognitive Linguistics researches.

Afterwards, I deal with the reading acquisition that involves a process of matching distinctive visual symbols to units of sound and I make a list of the main stages of reading development: logographic, semiphonetic, alphabetic, orthographic and lexical phase. According to the dual route model (Coltheart, 1978), when this developmental process is completed, children have a specific module in their brain, dedicated to written decoding, and two strategies at their disposal: the lexical route that exploits the memorized orthographic form of the words; and the indirect/phonological route that involves the use of grapheme-phoneme conversion. Nevertheless, there are alternative approaches to the dual route model.

Children with dyslexia show evident difficulties since the early stages of reading development. Furthermore, many researchers suppose that developmental dyslexia may manifest differently depending on the orthography that is being learned: a more persistent phonemic deficit would be predicted for dyslexic children learning to read in irregular or "deep" orthographies, such as English, than for dyslexic children struggling to read more regular orthographies, such as Italian. Reading is a traumatic practice for many dyslexics, but they must be encouraged to read day by day.

The last part of the second chapter is dedicated to second language learning. After a list of the main theories on second language learning, particularly the 'nativist' and the 'environmentalist' theory, and after an analysis of the stages of the learning process, I reflect on the importance of linguistic errors, now considered universal, creative strategies in language learning, and on the concept of 'interlanguage'. Interlanguage can be defined as a language system used by the foreign language learner, which is neither his or her first language, nor the foreign language; it is a third language, with its own grammar, its own lexicon and so on. Lastly, I deal with the critical periods and the relationships between second language learning and neurobiological and memory systems.

Chapter three, together with chapter four, is the heart of the entire thesis, since it deals with the difficulties encountered by dyslexic students in the second language learning. Dyslexic students, in fact, not only find it difficult to learn grammar and write a foreign language, but often exhibit severe difficulties with phonological coding, that is grapheme-to-phoneme conversion, and vice versa. Furthermore, foreign language learning employs intensive memorization, both short-term memory and long-term memory: dyslexic students have difficulties both in storing words and in recalling them, and this is an obstacle for the development of the language learner's interlanguage. Consequently, dyslexic students exhibit a low level of motivation and a high level of linguistic anxiety.

The challenge for the teachers of modern languages is to make the language as motivating as possible, reassuring the dyslexic students that success is possible.

A single, universal, optimum method for teaching and learning modern languages, does not exist; instead, there are many approaches that are later described in the chapter. Teachers now recognize the necessity to adopt an assorted approach, which integrates elements from the variety of methods offered.

The analysis of students with special needs, dyslexic learners included, starts with a stage of observation: teachers should examine the student identifying his or her linguistic difficulties and their favourite learning modalities. This observation stage culminates with the elaboration of an Individualized Education Plan (IEP) that establishes aims, methodologies, evaluation criteria and the compensatory and dispensatory measures that should be adopted.

The last part of the chapter deals with 'dyslexic friendly' materials, in terms of both new technologies and didactic instruments. With regards to 'dyslexic friendly' books, it is important the DEAL, a project concerning the foreign language learning to dyslexic students developed by a group of researchers of the University Ca' Foscari of Venezia. This group, guided by Professor Michele Daloiso, is successfully developing new specific didactic methodologies for dyslexic students.

The aim of the final chapter is to examine the initiatives taken by the Italian Universities in order to provide an adequate academic education to dyslexic students. After an analysis of the Italian law, in particular the law 170/2010, and of the international legislation in the field of education to students with special needs,

I focus my attention on the present situation at University of Pisa where a dedicated office, the ‘Sportello Dislessia’, has been recently established.
At the end of the chapter, I examine the difficulties provoked by the study of a foreign language, in particular English, through the answers given by five students of the University of Pisa to a questionnaire that I gave them to complete.

In conclusion, the purpose of this thesis is not to understand whether dyslexic students can study a foreign language or not; the main objective, instead, is to find adequate methods and didactic instruments to let dyslexic students reach a good level in second language learning, focusing the attention, in particular, on the university system.

CHAPTER 1

1.1. *Defining dyslexia*

Dyslexia is a learning disorder that makes it difficult for a person to read, write and spell.
Definitions of dyslexia, used by education authorities, schools and associations, are abundant, but sometimes they can appear vague and general and, for this reason, they can be misinterpreted.

The term "dyslexia" is derived from the Greek: the prefix *dys* means "poor or inadequate", and *lexis* means "words" or "language". Therefore, dyslexia literally denotes a "difficulty with words".
Defining the disorder is very important for both teachers and researchers because it provides information on the nature of the difficulties and allows to develop strategies for intervention.

The World Federation of Neurology (1968) defined dyslexia as:

> *a disorder in children who, despite conventional classroom experience, fail to attain the language skills of reading, writing and spelling commensurate with their intellectual abilities.* (Waites L., 1968, 18:21-2)

In 2002, the "International Dyslexia Association" (IDA) published the complete definition of dyslexia which comes from over 20 years of research:

> *Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge".* (IDA, 2002)

In a recent publication, Gavin Reid speaks of dyslexia as follows:

> *Dyslexia is a processing difference, often characterized by difficulties in literacy acquisition affecting reading, writing and spelling. It can also have an impact on cognitive processes such as memory, speed of processing, time management, co-ordination and automaticity. There may be visual and/or phonological difficulties and there are usually some discrepancies in educational performances.*
> *There may be individual differences and individual variation and it is therefore important to consider learning styles and the learning and work context when planning intervention and accommodations.* (Reid, 2009)

There are many different dimensions to dyslexia and, for this reason, a single universally accepted definition has not yet been achieved. There is, however, some agreement on the constellation of factors that can contribute to dyslexia. Everatt and Reid (2009) highlight the range of factors that are currently associated with dyslexia:

- Structural and functional brain-related factors (Galaburda and Rosen, 2001; Hynd et al., 1995)
- Genetic factors affecting the developmental migration of magnocells in utero and influencing their subsequent function (Stein, 2008)
- Genetic correlations (Gilger, 2008)
- Procedural timing of sequences in task accomplishment (Fawcett e Nicolson, 2008)
- Processing speed (Wolf and Bowers, 1999)
- Inter-hemisphere transfer (Breznitz, 2008)
- Difficulty in automatising skills (Fawcett and Nicolson, 1992)
- Working memory difficulties (Jeffries and Everatt, 2004)
- Phonological deficit (Snowling, 2000)
- Language features – orthographic transparency (Wimmer, 1993; Share, 2008; Everatt and Elbeheri, 2008)
- Comorbidity between learning disabilities (Bishop and Snowling, 2004; Visser, 2003)
- Literacy achievement levels and the role of IQ in diagnosis (Siegel and Lipka, 2008; Joshi and Aaron, 2008; Wagner, 2008). (Reid, 2009:3)

These aspects may affect our views about dyslexia, and each of these factors can be considered a guideline for any assessment and intervention.

1.2. Historical perspective and statistical incidence on dyslexia

Identified by Oswald Berkhan in 1881, the term 'dyslexia' was later coined in 1887 by Rudolf Berlin, a German ophthalmologist practicing in Stuttgart, to describe the clinical case of an adult patient with a reading disability caused by a cerebral injury.
In 1895 a eye-specialist surgeon, James Hinshelwood, published a series of articles in medical journals about a congenital phenomenon defined "word blindness"; Hinshelwood asserted that the primary disability was in visual memory for words and letters, and described symptoms including letter reversals, and difficulties with spelling and reading comprehension.
In 1920, Samuel T. Orton, considered as the "Father of Dyslexia", significantly contributed to the growth of attention towards reading and spelling disabilities and later created a relevant research movement in the United States.
From 1925 to 1946 he published many papers on a syndrome unrelated to brain damage that made learning to read difficult. Orton observed that reading deficits in dyslexia did not seem to stem from strictly visual deficits. He believed the condition was caused by the failure to establish hemispheric dominance in the brain.

In the 1970s, dyslexia began to be considered a deficit in phonological processing or difficulty in recognizing that spoken words are formed by discrete phonemes. Affected individuals have difficulty in the association of these sounds with the visual letters that make up written words.
In 1979 Galaburda and Kemper, and Galaburda et al. 1985, from the results of some autopsies, observed anatomical differences in the language center in the brain of dyslexics, and a similar work of Cohen et al. (1989) suggested abnormal cortical development, which was presumed to occur before or during the sixth month of foetal brain development.

During the 1980s and 1990s the development of neuroimaging technologies, such as PET (Positron emission tomography) and functional magnetic resonance imaging (fMRI), allowed the dyslexia research to progress. Employing various experimental approaches and paradigms (e.g., the detection or judgment of rhymes, nonword reading, and implicit reading), new studies have localized dysfunctional phonological processing in dyslexia to left-hemisphere perisylvian regions, especially for the alphabetic writing system (Paulesu et al., 2001; for a review, see Eden and Zeffiro, 1998). However, it has been demonstrated that in nonalphabetic scripts, where reading places less demands on phonemic processing and the integration of visual-orthographic information is crucial, dyslexia is associated with under activity of the left middle frontal gyrus (Siok et al., 2004).

In Italy about 2-2.5 percent of individuals are dyslexic, even if we could find other percentages because different criterions of diagnosis have been used and the identification of reading disorders can be influenced by several factors (Stella, 2010:47). The most elevated percentage of dyslexic children is reached during the third year of Primary School.

Italian is considered a transparent language because its orthographical system is quite regular. For this reason the percentage of Italian dyslexic individuals is clearly lower than other countries in which opaque languages are spoken. It is the case of English or French whose phonemes can be represented by different graphemes that, moreover, can be spelled and pronounced in different ways according to words.

1.3. Classifying dyslexia

There is a distinction between "developmental dyslexia" and "acquired dyslexia" based on different aspects of this disease.

Acquired dyslexia is fairly rare and it is caused by brain injuries; reading problems can arise both in children and in adults. It may also be a consequence of cerebral or vascular ageing or of sensorial deficits. People with acquired dyslexia need a re-education of reading skills that they had already developed before the trauma.

Developmental dyslexia is the most common form of dyslexia and its symptoms occur during childhood at the beginning of schooling when pupils learn to read. Nevertheless it is possible to make a prediction through the observation of two principal elements of risk: the presence of a language's backwardness or deficit and the familiarity. Children with developmental dyslexia don't need a re-education, but a personalized education in order to develop a skill that they had never acquired. The improvement of their reading abilities depends on early diagnosis and specific teaching strategies.

From a neuropsychological perspective we have a classification that does not consider the different types of performances in dyslexic individuals, but the neuropsychological process inhibited.
There are different subtypes of acquired dyslexia:

- PERIPHERAL DYSLEXIA: it involves visual analysis problems and the early stage of the reading process.

    - *Neglect dyslexia:* individuals with this form of dyslexia tend to ignore portions of words elaborated in the left side of the visual field. It is most closely related to damage to the parietal lobe.

E.g: Omissions: cage -> "age"
Substitutions: river -> "liver"; yellow -> "pillow"

    - *Visual dyslexia:* individuals with this type of peripheral dyslexia make reading errors throughout the word because the letter encoding is impaired:

E.g.: LEND ->"land"; ARRANGEMENT ->"argument";
CALM ->"claim"

- *Attentional dyslexia:* individuals affected by this form of dyslexia are able to read words, but they have problems in naming single letters. They are able to read words and letters if they are not part of a series. The most common mistake is the "migration" of the letters between words:

E.g.: RINE PATO -> pane rito; WIN FED -> "fin" and "fed";
POT BIG HUT -> "but, big hut"

- *Letter-by-letter reading (pure alexia):* this subtype of dyslexia reflects an inability to get from visual analysis to the orthographic input lexicon. These dyslexics can only read words aloud "l-e-t-t-e-r b-y l-e-t-t-e-r" and they usually make visual mistakes, confusing words which are visually similar.

- CENTRAL DYSLEXIAS: there is a deficit in the phonological and in the visual route which causes representation problems.

  - *Surface dyslexia (phonological reading):* it entails problems in the reading of irregular words with an unordinary pronunciation; therefore it is more easily diagnosed in individuals whose mother tongue has an irregular spelling, such as English. Non-words reading is normal, while there are miscomprehensions of homophones (his vs. he's, read vs. red). In written productions, instead, words are phonologically exact, but incorrect from an orthographical point of view (A dogni per ad ogni).
    This deficit has been attributed to an hyper use of the phonological route which allows the grapheme-phoneme conversion.

- *Phonological dyslexia (visual reading):* it is a deficit caused by a damage to the systems dedicated to control grapheme-phoneme conversion rules. Individuals with this type of dyslexia are able to read only familiar words because they exploit their representations in the orthographical lexicon, whereas the phonological analysis remains deficient. Consequently they cannot read non-words or unknown words. They are also unable to read function words, such as conjunctions, prepositions and adverbs because they do have little lexical meaning and, for this reason, they cannot be visually represented.

- *Deep dyslexia:* it is due to relatively large brain lesions that cause damage in the perisylvian region of the left hemisphere. Patients often present Broca's aphasia, dysgraphia and short term memory deficit as well.

  People with this form of dyslexia not only are unable to read non-words and new words, but they also make semantic errors (dog -> cat), visual errors (degree -> decree), morphological errors (courage -> courageous), paragrammatic errors (the substitution of function words is frequent, when ->where) in reading familiar words. They tend to have a better performance in the reading of words with concrete references ("table") than abstract nouns ("freedom").

  These symptoms lead us to hypothesize that deep dyslexia is the result of two possible disorders. It may be the consequence of multiple impairments to both the lexical and the nonlexical pathways in the reading system (Morton & Patterson, 1987). A second interpretation assumes that the two pathways are completely damaged and the reading process occurs via a secondary and intact right hemisphere

> reading system (Coltheart, 1987) that uses a holistic approach and allows to read merely content words but with numerous limitations because it lacks of the phonological process. (Marini, 2008)

There are different subtypes of developmental dyslexia as well:

- *Phonological type of developmental dyslexia:* it inhibits the "phonological route". It may be due to a stop in the process of learning to read, and precisely in the transition from the alphabetic stage to the orthographic stage. Children, therefore, are only able to develop the grapheme-phoneme conversion in single words, but they fail to apply the rules to syllables, morphemes and affixes. In particular, children find difficulties in reading non-words owing to the low degree of phonological awareness.

- *Surface type of developmental dyslexia:* it inhibits the "lexical-semantic route", namely the ability to connect the graphic form, the meaning and the phonological form of lexical items. It is characterized by the incapacity to read words containing pronunciation exceptions or that are irregularly stressed, while children can easily read a non-word. The cause of this deficit may be a developmental arrest in the orthographic stage. Consequently, these dyslexics do not have any difficulties in the grapheme-phoneme conversion, but they have not developed an inner lexicon indispensable to automate the reading process. In effect, the "lexical-semantic route" allows us to memorize words; therefore, individuals with a surface form of developmental dyslexia read slowly since they are able to activate only the "phonological route" and they make mistakes when there are irregularities in the grapheme-phoneme relation.

- *Deep type of developmental dyslexia:* it affects both "phonological route" and "lexical-semantic route" and it has a significant impact on many aspects that contribute to a fluent and accurate reading. It causes the typical

difficulties existing both in phonological and surface dyslexia, and also semantic errors (ill -> sick). (Daloiso, 2009, 3:25-43)

1.4. Assessment

Assessment of dyslexia can be a controversial question.
According to the World Health Organization (WHO) five criteria are necessary to identify developmental dyslexia:

1- Regular intelligence level (I.Q. $\geq$ 85);
2- Lower reading ability;
3- Absence of neurological and/or sensorial problems that can directly cause reading deficits;
4- The disease is enduring, in spite of adequate educational levels and specific didactic intervention;
5- The reading disability has direct consequences at school and in the activities requiring reading/writing skills. (Stella G., 2010:15)

An assessment should be able to identify the child's learning needs within the learning context and offer a complete representation of the learning situation and the learner as well. (Reid, 2009:30)

There is a rather heated debate on the use of IQ tests as a measure for recognizing dyslexia.
Actually, the main point to consider when assessing dyslexia is the *discrepancy criterion*: a child is unable to learn to read despite his or her intelligence (measured by means of IQ tests), the absence of hearing impairment and of neurological and/or sensorial problems, and an adequate education.
Joshi and Aaron (2008) argue that dyslexia has been traditionally diagnosed on the basis of a discrepancy between IQ scores and reading achievement scores. One of the problems of the discrepancy model-based diagnosis is that IQ is not a good predictor of reading scores. According to them decoding written words is a skill

that is independent of general intelligence, and this is the reason why there is a low correlation between IQ scores and reading ability. (Reid, 2009:30)

Despite this, the American Psychiatric Association, in its *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; APA, 1994, p. 74), defines reading disabilities as follows:

> *"Reading achievement, as measured by individually administered standardized tests of reading accuracy or comprehension, is substantially below what is expected, given the person's chronological age,* measured intelligence, *and age-appropriate education."*

Joshi and Aaron therefore propose an alternative model for diagnosing and treating reading disability based on the *Componential Model of Reading* which is no more based on IQ-reading scores discrepancy, but instead intends to identify a divergence between decoding and listening comprehension.

Decoding skills can be assessed by means of tests of spelling and of non-word reading, while there are several tests for the assessment of listening comprehension. These tests are very accessible by teachers and results can influence education.

Assessment involves not only a single test, but a battery of strategies that can be adapted to the school context. Furthermore it is important to look at the process of learning in addition to the skill level because assessment has also a dynamic dimension.

The diagnosis of dyslexia is extremely important since it facilitates the development of proper intervention that will help to prevent the child from any feelings of failure, anxiety and frustration.

Therefore, an early identification can be a key factor in an operational definition and general policy strategy.

As said by Knight et al. (2009), at about three years of age some children reveal a delay in the development of oral language, with the consequent risk for developing reading difficulties. Nevertheless, not every child with this type of language delay will be diagnosed with dyslexia.

Dyslexia cannot be prevented or cured. Early identification can reduce the negative consequences of the symptoms when it is accompanied by appropriate remediation,

sympathetic understanding and secondary emotional and behavioural problems can be avoided if proper intervention is made in early childhood. Early diagnosis should help to take away the feelings of failure and blame from the child, and let parents and teachers find solutions for the management.(Ott, 1997:25)

Another risk factor is the familiarity of the problem: new studies certify that dyslexia has a genetic origin and, therefore, children with dyslexic parents risk developing a reading disability. In the study by Hallgren (1950), 88 per cent of the 112 families evaluated contained at least one dyslexic member. This figure was almost replicated in the study by Finucci et al. (1976) which found that 81 per cent had at least one affected parent. Ott (1997) underlines the fact that is not just parents and their children who are affected; grandparents, uncles, aunts and cousins may also be. Research shows that children whose parents are dyslexic are significantly more likely to have reading problems themselves (Vogler, De Fries and Decker, 1985). They also found the risk to a son of having an affected father is 40 per cent and of having an affected mother is 35 per cent. For daughters the risk of dyslexia of having an affected parent of either sex was 17-18 per cent. The research of Finucci and Childs (1976) confirmed that the number of affected children increased when both parents were clearly affected.

In a child between two and six years of age there are several early warning signs that indicate that the child may experience learning difficulties later.

Most researchers maintain that in the identification of dyslexia language development is the most significant characteristic that has to be checked.

Speech and language: dyslexic children may present some or all of the following difficulties (Ott, 1997):

-Word-naming problems;

-Word mispronunciation;

-Jumbling words;

-Poor use of syntax

-Difficulties with rhyme and alliteration;

-Tendency to use circumlocutions;

-Hesitant speech;

-Needs frequent presentation of a word before being able to use it accurately and consistently.

Sequencing: many children may also have difficulties with some of the following tasks:

- *Visual difficulties*:

-The child may (or not) be poor at drawing;
-The child may have difficulty learning to dress himself and may put shoes on the wrong foot;
-The child may find doing puzzles or making models difficult.

- *Auditory sequential memory difficulties:*

-The child may not be able to learn or repeat nursery rhymes or to repeat messages;
-The child may have difficulties in following a series of instructions;
-The child may find it hard to string a few sentences together to describe a recent event;
-The child may find clapping or beating time to music difficult;
-The child may have difficulty with remembering common sequences, such as the alphabet, days of the week, months of the year.
-The child may find counting difficult;
-The child may show signs of poor auditory discrimination; he may hear the sound but be unable to identify what he hears.

Motor skills:

- *Fine motor skills* (associated with the fingers and hands):

-The child may find it difficult to use cutlery or a pair of scissors;
-The child may hold his pencil awkwardly;
-The child may find it difficult to tie shoe laces.

- *Gross motor skills* (associated with the arms and the legs):

-The child may find hopping difficult;
-The child may have difficulties catching, throwing or kicking a ball;
-The child may be constantly bumping into people and objects;
-Going up steps and learning to ride a bicycle can be a complex process;
-Setting the table may be difficult;

-Playground games may be hard, especially if they involve words such as left/right, up/down, etc…;
-The child may experience difficulties in dancing and in co-ordination in the gym.
Laterality: many children may have a lack of cerebral dominance; cross-laterality, however, is not in itself a diagnosis of a learning difficulty:
-Lack of consistent handedness or ambidexterity can lead to greater difficulties when the child begins to use pencils;
-Orton observes that there is a high frequency of left handedness in dyslexics and in their families.

According to Reid (2009:43), when the child begins to attend primary school the following factors can cause concern and may lead to an early identification of dyslexia:

- *School age*

-Signs of not enjoying school;
-Reluctance to read;
-Difficulty learning words and letters;
-Difficulty at phonics (sounds);
-Poor memory;
-Co-ordination difficulties;
-Difficulty forming letters;
-Difficulty copying;
-Difficulty colouring;
-Poor organization of materials.

- *After around two years at school*

-Hesitant at reading;
-Poor word-attack skills;
-Poor knowledge of the sounds and words continued;
-Difficulty recognizing where in words particular sounds come from;
-Spelling difficulty;
-Substitution of words when reading (e.g., bus for car).

- *Upper primary*

As above but also:

-behaviour difficulties;

-frustration;

-may show abilities in other subjects apart from reading.

- *Secondary*

-As above;

-Takes a long time over homework;

-Misreads words;

-Wants others to tell him or her information;

-Poor general knowledge;

-Takes longer than others in most written tasks.

Assessment for dyslexia should consider the difficulties related to the encoding or the encoding of print, the discrepancies between decoding and comprehension of a text, and the differences between individual learners.

A further component of a complete assessment of dyslexia is the analysis of *comorbidity,* namely the co-occurrence of other specific learning difficulties, such as dyspraxia or dyscalculia, or developmental diseases, for instance ADHD, behavioural problems and so forth.

Identifying dyslexia is a task better achieved by different personnel.

Parents are usually those who firstly may identify a delay in developing skills concerning language, even when the family doctor is not able to find anything wrong with their child. It is important, however, that health visitors should identify those weaknesses which suggest that a child may be at risk of successive learning difficulties. Subsequently they can refer the child to the speech therapist whose intervention can minimize or prevent later problems for many children. (Ott, 1997:21)

It is also important that the teacher adopts a leading role in the assessment. The nursery teacher can recognize the early signs of an irregular pattern of development in a child and, therefore, can use some form of remedial programme.

The class teacher may identify coordination difficulties, difficulties with pencil grip, immature use of language, sequencing or organizational difficulties prior to the teaching of reading skills. These difficulties can be highlighted through classroom observation, discussions with parents and diagnostic assessment. (Reid, 2009: 54).

Philomena Ott (1997:23) argues that children 'at risk' are best served if their teachers are made conscious of their problems as soon as possible, so that they can use the most suitable method of teaching the child, avoiding failure, frustration and refusal that can arise in the dyslexic learner.

According to Michael Thomson (2009:48) "the purpose of assessment is not only to give a diagnostic description of a child, whether in terms of 'dyslexia' or of a 'specific learning difficulty', but also partly to include a delineation of his or her particular strengths and weaknesses. The aim is to develop appropriate remedial teaching on the basis of this. Assessment is only the start because teaching also needs to be diagnostic. Observation, particularly in terms of the response that a child makes to the teaching, is an important element of the diagnostic and assessment process."

1.5. Neurobiological basis and theories of dyslexia

Neuroimaging technologies, such as PET and fMRI, consent to neuroscientists to observe the active processes within the brain as well as the brain structure. Thus it is possible now to examine the differences in the activation of brain areas of dyslexic people during reading skills.

Before the development of these technologies, Albert Galaburda, an American neurologist, found small alterations in those areas of the brain dedicated to language. He discovered minuscule exfoliations in the cortical tissue which seem to be the cause of functional deficits such as dyslexia.

By means of neuroimaging technologies, researchers and scientists determined that these exfoliations give rise to considerable alterations in the activity of several neurons and may influence complex functions such as language, reading and

writing skills. They also threw light on the nature of those minute variations of the neuronal substrate responsible for dyslexia: they are not originated by a lesion, but have to do with particular genetic characteristics. (Stella, 2010:37)

Yet, there is an ongoing debate on the nature of dyslexia and an explanation universally accepted is still required.

According to Thomson (2009:91), who considers dyslexia an individual difference in learning style, such a developmental disorder has a primary biological cause. It might have to do with brain functions or neurology from which a cognitive deficit and behavioural signs may result.

1.5.1. Brain function and anatomy

The nervous system can be divided into two parts: i) the *central nervous system (CNS)* that consists of the *brain* and *spinal cord,* and ii) the *peripheral nervous system (PNS)* that consists of sensory and motor nervous cells that run throughout the rest of the body.

The CNS is the processing centre for the nervous system; it receives information from and sends information to the PNS.

From a micro anatomic point of view, central nervous system (CNS) consists of *neurons,* which are the basic units and are responsible for sending, receiving, and interpreting information from all parts of the body, and *glial cells* that perform numerous functions in the nervous system, such as providing support for the brain, assisting in nervous system repair and maintenance, assisting in the development of the nervous system, and providing metabolic functions for neurons.

All cells of the nervous system are comprised of neurons. A neuron consists of two major parts:

- *Cell body or soma*: it is the largest part of a neuron and contains the neuron's nucleus, associated cytoplasm and other cell structures.
- *Nerve Processes*: they are "finger-like" projections from the cell body that are able to conduct and transmit signals.

They are of two types:

- -*Axons*: typically carry signals away from the cell body. They are long nerve processes that may diverge to convey signals to various

areas. Some axons are wrapped in an insulating coat of glial cells that form the myelin sheath which indirectly assists in the conduction of impulses. Axons end at junctions known as synapses.

- -*Dendrites*: typically carry signals toward the cell body. Dendrites are usually more numerous, shorter and more branched than axons. They have many synapses in order to receive signal messages from closer neurons.

Axons and dendrites are bundled together to form nerves that send signals between the brain, spinal cord, and other body organs via nerve impulses. Nerve impulses are received at neuronal dendrites and are carried along the axon to the terminal branches which end at a junction called *synapse*. At electrical synapses, ions and other molecules pass through gap junctions transmitting electrical signals from one cell to the other. At chemical synapses, chemical signals called *neurotransmitters* are released and cross the gap junction to stimulate the next neuron. Nerve impulses are transmitted from the brain and the spinal cord to the rest of the body by means of nerves, which are a bundle of axons that connect the CNS with the peripheral organs, such as eyes, ears, epidermis or muscles.

Brain consists of different areas formed by different types of neurons. In 1909 Korbinian Brodmann found 52 different brain areas: a *Brodmann area* is a region of the human cerebral cortex defined on the basis of its cytoarchitectonics, or structure and organization of cells.

From a macro anatomic point of view, CNS consists of the *brain* and the *spinal cord*. The brain processes and interprets sensory information sent from the spinal cord. Both organs are protected by three layers of connective tissue, the menninges.

- *The spinal cord*: it is a cylindrical shaped bundle of nerve fibers connected to the brain that travel in two pathways. Ascending nerve tracts carry sensory information from the body to the brain, while descending nerve tracts send information pertaining to motor functions from the brain to the rest of the body.
- *Brain*: it is the control centre of the body and it consists of two main components:

- -*the forebrain*: it is responsible for several functions including receiving and processing sensory information, thinking, perceiving, producing and understanding language, and controlling motor function. It contains the largest part of the brain, the cerebrum. The forebrain also contains structures such as the thalamus and hypothalamus, responsible for motor control, relay of sensory information and control of autonomic functions.
- -*the brainstem*, the portion of the brain, consisting of the medulla oblongata, pons Varolii, and mesencephalon, that connects the spinal cord to the forebrain and cerebrum;
- -*midbain*: it is the portion of the brainstem that connects the hindbrain and the forebrain and it is involved in auditory and visual responses as well as motor function;
- -*hindbrain*: it extends from the spinal cord and contains structures such as the pons and the cerebellum. These regions assist in maintaining balance and equilibrium, movement coordination and the conduction of sensory information. It also contains the medulla oblongata responsible for controlling autonomic functions, such as breathing, heart rate and digestion.

The brain contains various structures with several functions.

Thomson (2009:96) illustrates the parts of the brain and their associated language functions:

- *Cortex*: concerned with the receipt and recognition of others' speech, as well as the formulation, initiation and control of own. Cerebral cortex processes most of the information and it is divided into cerebral cortex lobes:
    - *Frontal lobes*: involved with decision-making, problem solving and planning;
    - *Occipital lobes*: involved with vision and color recognition;
    - *Parietal lobes*: involved in the reception and processing of sensory information;
    - *Temporal lobes*: involved with emotional responses, memory and speech.

Each lobe is important in the speech processes since any sensory impulse makes connection with the speech association areas.

The cerebral cortex is split into two halves: the *left cerebral hemisphere* is responsible for language functions and for serial order, sequencing and coding tasks; the *right hemisphere* is involved with three-dimensional, spatial or 'gestalt' tasks. The left hemisphere is the 'dominant' one because it is responsible for more sophisticated skills, that is language. Information passes from one side of the brain to the other via a structure called the *corpus callosum*.

- <u>*Subcortical structures*</u>: they are concerned with the organization and relay of sensory and motor impulses to and from the cortex.
    - *Basal ganglia*: they are involved in cognition and voluntary movement; they control the muscles of the face, larynx, tongue and pharynx. Damage in this area may provoke diseases such as Parkinson's and Huntington's.
    - *Thalamus*: it organizes and relays sensory data to and from the spinal cord and the cerebrum. Sensory concepts, which affect speech, may be organized here, as well as the emotional qualities of the voice.
    - *Midbrain*: on the sensory side, it contains relay stations concerned with sight and hearing. Similarly, on the motor side, it carries the pyramidal and extra pyramidal tracts.
    - *Medulla oblongata*: it contains motor nuclei for the control of basic body functions, such as breathing, together with motor and sensory tracts.
    - *Cerebellum*: it is the control centre for continuous muscular movements and coordination. If it is damaged speech consequently results erratic and confused.

Thomson later records the areas of the left cortical hemisphere involved in language and literacy (Thomson, 2009:97):

- *Auditory association areas* (first temporal convolution). This area is adjacent to the planum temporale and it has obvious implications in spoken and written language. *Wernike's area*, which is involved in

the understanding of written and spoken language, lies between this area and the angular gyrus.

- *Broca's area*: it is a region in the frontal lobe of the left hemisphere; it lies just anterior to the motor area that controls the movements of the face and mouth and the coordination of speech sounds. There is integration here between the production of speech sounds, important in early articulation difficulties, phonemic awareness and the relationship between phonological knowledge and later reading, writing and spelling.
- *Motor area*: it is important for writing.
- *Supramarginal gyrus*: here the sounds of the words are associated with their meaning.
- *Angular gyrus*: it is of particular interest because, within this area, written symbols are associated with their verbal corresponding item and with the concept they represent.

1.5.2. Genetic transmission of dyslexia

By learning to read, connections are created in the brain; the brain of dyslexic people fails to build these connections despite a proper teaching input. This is what happens in those specific parts of the brain involved in literacy (Thomson, 2009:93).

Researchers believe that such a developmental disorder must have a biological cause and a genetic transmission.

In a study of 2007, Snowling, Muter and Carroll found literacy difficulties in children whose relatives showed dyslexia problems to a lesser or greater degree.

Many of the gene studies indicate the presence of a possible site for 'dyslexic genes': many of these are found in Chromosome 6. They may be in the same region as the genes implicated in autoimmune diseases, highly associated with dyslexia. Smith at al. (1982), studying the transmission of dyslexia in a family, found a link between specific reading disabilities and Chromosome 15.

Another way of looking at genetics is to examine twins: if both twins are affected they are 'concordant'. There seems to be a greater concordance among

monozygotic twins than among dizygotic twins. Since monozygotic twins have identical genes, this greater concordance should be the confirmation of a genetic aetiology.

Thomson (2009: 110) reports the study of Pennington (1999) that hypothesized that reading ability is influenced by a number of genes, and that dyslexia is one variation of these genes.

Nevertheless, despite this genetic predisposition, educational and environmental input can prevent reading and spelling failure; therefore, dyslexics can learn to read and spell expertly if the written language is presented in a manner that meets their way of processing information.

1.5.3. Models and theories of neuropsychological aetiology

According to Milne (2005), the parts of the brain that are liable for reading tasks are 'auditory' modules, associated with phonemic awareness, and 'visual' modules, associated with grapheme awareness and word form.

Auditory/phonological deficit theory

There is general agreement that most dyslexics suffer from a phonological deficit. It seems evident that difficulties in acquiring phonological skills, particularly when related to phonological decoding, may cause dyslexia.

The lack of ability in children to distinguish sounds within verbally presented words would be a strong prediction of problems in learning the alphabetical principle that letters represent sounds: these children would be at risk of dyslexia according to *the phonological deficit hypothesis* (Hagtvet, 1997 and Lundberg, 2002). Following other researches speech rate could be the predictor of dyslexia (Muter et al. 1997, Hatcher and Snowling, 2002).

Phonological difficulties might derive from weaknesses in the basic auditory processing capacities.

According to Reid et al. (2008) speech and reading are probably mediated by the language regions in the left hemisphere and so they depend on properly analysed signals provided by the peripheral auditory system.

Accurate temporal processing is required to identify temporal changes in frequency and intensity in order to distinguish phonemes.

Several recent studies have demonstrated that there are strong correlations between basic auditory temporal processing and phonological skills.

The main consequence for the *temporal processing deficit* is the inability to perceive and process short acoustic events or quick variations of sounds, including acoustic features that are crucial so as to recognize words. According to Tallal and al. (1993) this inability may lead to further difficulties when there is a phonemic clash (ba vs. da).

Cerebellar theory

The *cerebellum* is responsible for coordinating the precise timing of muscle contractions and also for planning such movements.

It is largely thought that the cerebellum plays an important role in reading because cerebellar prediction is also used for planning movement related to cognitive operations such as silent reading and silent speech (Schmahmann, 2004).

Thus, the cerebellum probably plays a crucial role in the direction of eye movements during reading and visuomotor control for writing.

In addition, there is now substantial body of evidence that the right cerebellar hemisphere, which is linked to the left hemisphere of the cerebral cortex, plays a very important role in reading since lesions in this region often cause dyslexic type reading problems (Reid et al. 2008: 66).

According to Fawcett and Nicolson (2004) cerebellum has a very important responsibility in automating skills, including typing, driving and reading; when there is a cerebellar dysfunction and difficulties in those automatic skills arise, then the acquisition of grapheme-phoneme correspondences can be damaged.

Numerous studies suggest that the quality of individuals' cerebellar processing helps to determine their ability to develop the skills necessary for reading.

Visual temporal processing and magnocellular theory

According to Singleton (2009), *visual stress* can interfere with the ability to read and affect the development of fluent decoding of texts and good reading

comprehension. The most widely accepted theory of visual stress is that it is the result of a general over-excitation of the visual cortex due to the hypersensitivity to contrast (Reid 2009: 16).
Singleton and Henderson (2007) found that 41% of dyslexic children in their sample showed high susceptibility to visual stress, giving evidence to the connection between dyslexia and visual stress.

Singleton (2009) suggests that the research on the *magnocellular visual system* can also be related to visual stress.
There are two types of cell found in the neural tracts between the retina and the visual cortex: *magnocells* are large cells that code information about contrast and movement; *parvocells* are smaller and code information about detail and colour. Cooperation between these two systems enables us to perceive a stationary image when we move our eyes across a scene or a page of text.
Stein (2008) argues that the development of magnocellular system is impaired in children with dyslexia.
Dyslexia is explained as the effect of a lack in ocular control; consequently dyslexics' vision can often be vague or fuzzy and confusion in letters order occurs. For this reason dyslexics have a bad memory of words' visual shape and problems in the acquisition of orthographic abilities.
He argues that visual system provides the main input to both the lexical and the sublexical routes for reading; as a result vision is the most important sense for reading. He therefore suggests that the great variety of visual, phonological, kinesthetic, sequencing, memory and motor symptoms seen in different dyslexics may arise from diversities in the particular magnocellular systems of each individual dyslexic.
Stein's (2002) view on the role of magnocellular system seems to implicate aspects of various complementary theories such as cerebellar immaturity (Reid 2009: 16-17).

Both dyslexics and people who are not diagnosed as dyslexics may present signs of visual deficits, while not the entire population of dyslexics suffers from visual deficits.

Summarizing

Briefly, there are two main groups of causes of dyslexia: according to phonological theory dyslexia is due to a phonological deficit, while researchers who support magnocellular theory claim that reading difficulties are to be related to a general sensory deficit, such as visual, auditory and motor deficits.

Phonological and cerebellar theories are unable to explain motor and sensorial deficits found in dyslexic population.
Fawcett and Nicolson (2001) explain the differences of symptoms through the hypothesis of two subtypes of dyslexia: according to them some dyslexics suffer from a cerebellar deficit, while others have damage to magnocellular system.
Neurological studies, however, show that a general sensorial and motor deficit cannot be responsible for dyslexia: as a matter of fact, there is damage to visual, auditory and motor systems only in a group of dyslexics. Furthermore, a general sensorial deficit is unable to explain the phonological deficit that, on the contrary, is found in all dyslexic people.

1.6. *Models of memory and dyslexia*

Dyslexic learners have problems with aspects of memory, in particular with short-term memory, mainly in its relationship to aspects of written language learning. Obviously, a failure to internalize or remember grapheme-phoneme rules or sound-symbol correspondence is a key feature of learning to read and part of the memory system. (Thomson, 2009:165)

There are almost three types of memory: *long-term memory, short-term memory* and *the sensory register*. Originally, short-term memory has been considered an acoustic or visual storage system, whereas the long-term memory has seemed to be mainly semantic. Furthermore, tradition assumed that the short-term memory system was an electrical feedback system, that is, material was kept in it by

electrical activity or traces in the central nervous system, whereas the long-term memory was considered a more permanent store.

- *Long-term memory systems* are very generally divided into two areas: *implicit or procedural* and *explicit or declarative* memory. Implicit and explicit memories have been dissociated experimentally in numerous tasks. Implicit competence is acquired incidentally, it is stored implicitly (i.e., not available to conscious awareness) and it is used automatically (i.e., without conscious control). Explicit knowledge can be consciously learned and its contents can later be recalled into conscious awareness and verbalized. While implicit learning is invariant of IQ, explicit learning covaries with it (Paradis 2004: 8).

    - *Implicit or procedural memory:* it involves the acquisition of cognitive and motor procedures that are used in an automatic manner (for example, the ability to boil an egg or to play a musical instrument, or the set of computational procedures that permits the comprehension and production of utterances). It can consist of a string of small items or of just one overall procedure, depending on how one codes and memorizes.

    - *Explicit or declarative memory:* it memorizes and stores data that afterward can be consciously recovered and described. The hippocampus initially impresses information in the brain, then association areas store the information acquired that can be later recuperated by frontal lobes, thalamus and by the right cerebellar hemisphere.

      Declarative memory can be divided into two subtypes of memory.

      -*Episodic memory*, located in the medial lobe, deals essentially with the recollection of one's past experiences, the 'episodes' in one's life.

      -*Semantic memory*, located in the temporal lobe, involves the individual's general encyclopedic knowledge, including the

> meaning of words. It is related to what is sometimes known as the cognitive map, that is, our awareness of the world around us, our knowledge, and our internal dictionary, namely the lexicon. There are important components of accessing the lexicon in both reading and spelling and this is an area that has some impact on dyslexic difficulties (Thomson, 2009:169).

Implicit memory precedes both phylogenetically and ontogenetically the explicit memory and it is much more essential and pervasive. Implicit memory may in fact be considered the norm, while declarative memory is the specialized capacity of only the most evolved species. During the first 12 months of life, the child possesses only procedural memory and at three years of age children have an implicit memory that is still superior to the explicit memory, which continues to develop with age.
Whereas declarative memory is very flexible and integrates information from various modalities, procedural memory is available only for very specific tasks and it is inflexible, its contents remains opaque to introspection and it improves with practice (Cohen, 1991). Attention is an essential factor in the memorization and recall of explicit information, although it is not necessary for the acquisition of action programs or procedures (Paradis, 2004: 9-10).

- The *sensory register* is essentially a very brief store of uncoded visual and auditory information (and of other modalities). Basically, a sensory register decays rapidly (1-4 seconds) but has quite a large capacity. It is also known as *iconic memory.*
- *Short-term memory:* it stores information for a short period of time and it takes part in essential cognitive tasks, including reasoning, comprehension and consciousness.

  It is also known as *working memory system* and it involves recoding material and rehearsal. Its capacity is very limited. Acoustic or visual (and other) codes are used and this lasts about 6-12 seconds. One of its main functions is learning new phonological material. It keeps track of what we do moment by moment and organizes and directs our attention. It deals with immediately past experiences because it is a temporary system with a relatively limited capacity (Thomson, 2009:169).

The working memory system consists of:

- a *central executive*: it is an active central processor that directs information to other processors and also into the memory system. Material elaborated by the working memory must be combined, manipulated and interpreted by the central executive. It has a number of functions, including strategy, monitoring and planning, attentional control, initiation, inhibition, stopping. All these features have high resonance for dyslexia: many dyslexics find it difficult to keep engaged and to be attentive and concentrate, particularly to written language that is difficult for them.

-the *visuospatial scratch pad*: it is linked to visual information, and has different functions. One is concerned with visual appearance and location, for instance, it consents to describe a scene previously observed. It is also involved in the 'mental discovery', that is to say, imaging some shapes.

-the *phonological loop*: it has relationship with language, reading and dyslexia, in particular. It can be divided into: 1) *the articulatory control system*, a verbal rehearsal system linked to some vocal activity and described as the so-called 'inner voice'; it is a serial and temporal system since it keeps material in order and decays quickly, complex aspects for dyslexics; 2) *the phonological store,* a speech-based storage system linked to our speech-system, involved with articulatory rehearsal and described as the so-called 'inner-ear'; it decays quite quickly but it can be recycled through the articulatory control system (Thomson, 2009:172).

Working memory is the most relevant system for dyslexia and there is a long history of research into memory difficulties in reading problems.

Research has shown that it is easier remembering a sequence of shorter words than a sequence of longer words and this can be linked with the memory capacities involved in the articulatory control system. This study can be directly related to dyslexia: difficulties in remembering longer words are caused by short-term memory weaknesses and by segmentation problems that dyslexics have.

Dyslexia can be described as the failure to acquire phonological awareness and skills in alphabetic decoding. It may be due to poorly specified phonological representations because of weak phonological coding. There may also be other difficulties in memory: some children may have a memory deficit that prevents

them from storing phonological material in the working memory and this is an obstacle for the acquisition of long-term phonological memories. However, there has not been given a precise explanation of the exact nature of this impairment until now: it can be determined by a 'noisy system', or by a lower capacity in storing brief phonological representation, or, perhaps, the phonological trace decays more rapidly in people with dyslexia (Thomson, 2009: 198).

All of this is still the subject of ongoing research.

CHAPTER 2

2.1. *Language acquisition: an overview*

Acquiring a language is one of the most complicated tasks facing developing children: to learn a language, infants must discover the relevant sounds and auditory units (*phonology*), the sense of words (*semantics*), and the rules for combining words to express new meanings (*grammar*). Yet, in less than two years, infants naturally go from crying to talking.

According to George J. Hollich and Derek M. Houston (2007) infants move from being *universal perceivers,* capable of learning any of the world's languages, to being *specialists* in phonology, semantics and grammar of their own native tongue. Afterward, they become *language-learning sophisticates*, able to learn the meaning of words very quickly and to understand complicated sentences; at this stage they can produce utterances that they have never heard before.

- ***Neurobiological factors in Language Acquisition***

Recent studies have identified a number of neurobiological factors that allow a rapid and efficient acquisition of the first language (Fabbro, 2004):

- *Imitation*: an hour after their birth, infants are already able to imitate complex facial movements of adults. This behaviour is difficult to explain, because researches have demonstrated that babies begin to move intentionally their tongue and facial muscles only after the first year of age: this imitative behaviour, thus, is a human social instinct that in newborn babies is unconscious.

  This imitative behaviour also concerns the imitation of verbal expressions: babies of five months of age are already able to imitate the production of certain vowel sounds, such as 'a' and 'i'. This behaviour is also unconscious and is difficult to explain as well, because only at the age of one year babies can intentionally produce vowels.

In 1960s, a number of studies in experimental linguistics have discovered that motor imitation is very important in language comprehension. According to these findings, the hearer internally reproduces, at a motor level, what the speaker says. This assumption is known as the motor theory of language decoding.

In recent years, this theory has obtained scientific confirmations. A group of researchers of University of Parma, coordinated by professor Giacomo Rizzolatti, has shown that neurons of premotor cortical areas, responsible for the movement of hands, face and mouth, are activated not only when subjects move these organs, but also when they see someone else moving them. These neurons have been called *mirror neurons*.

These fundamental discoveries of neurosciences indicate that comprehension and perception processes are activated through an inner reproduction of what is observed or heard; the base of this inner representation consists of imitative mechanisms.

- *Echolalic behaviours*: it consists in the repetition of words or sentences, even if they are not always understood by infants. Echolalia is very frequent, above all, when babies are 2-3 years old, especially if the sentence uttered by adults is particularly complex. Three years old babies that show a frequent echolalic behaviour are better in comprehension, expression and naming tasks.

  Children show a decrease of echolalia, as well as of imitative behaviours, in conjunction with the development of the frontal lobe, which is the centre of complex cognitive functions, such as awareness and judgement.

- *Vocal accommodation*: it is a tendency that leads individuals to render his or her own verbal expression more similar to the vocal characteristics of the interlocutor, motivated by psychological reasons of social integration. This behaviour, furthermore, allows the increase of reciprocal communicative comprehension.

  A group of researchers have demonstrated that children continue to modify their production of sounds and their phonological repertoire following the adult model.

- ***Stages of Language Acquisition***

According to several studies, language has a *critical period* associated with its emergence: that is, the acquisition will fail if it is attempted either before or after the critical period.

The critical period of language acquisition extends from birth to the beginning of puberty. If the child is not exposed to language during this time, he or she will never acquire normal language skills.

Evidence from the critical period hypothesis comes from 'neglected children', who were mistreated by their caretakers, and from 'feral children', who grew up in the wild: they were exposed too little to language, or they were not exposed to language at all. When researchers attempted to help them acquire language, their success mostly depended on the age at which the children were discovered (Bergmann, 2007:313).

There are different stages in the process of first language acquisition (Matthews, 1996; Fabbro, 2004):

- *Prenatal development*

Language learning appears to begin before birth. Changes in fetal heart rate show that the fetus can already hear its mother's voice during the last trimester of prenatal development. This affects its preferences for language after birth in many ways (Karmiloff-Smith, 2001). As a result, within the first few days of life infants show a preference for the particular language their mother speaks.

- *Infant's Preverbal Communication*

Crying, that at first is a reflexive behavior, becomes the first manner of communication when babies understand that crying can be a signal that brings relief from hunger, discomfort, and loneliness. Research shows that parents can differentiate the intensity and severity of crying, but they are not able to identify the specific reason for the cry.

New born babies recognize and prefer their mother's voice and when adults speak to them, neonates will often open their eyes and gaze at the speaker.

Babies are able to discriminate speech from other sounds, such as music, from the moment of birth and in the first few days of life speech already elicits more activity in the left hemisphere than in the right.

By two days of age babies are able to discriminate between the vowel sounds of /a/ and /i/. Later infants are also able to distinguish between consonant sounds, i.e. /ba/ vs. /pa/. This ability to discriminate speech and non-speech sounds is probably innate.

Between two and four months of age babies begin to laugh and they are able to make *cooing sounds* in response to enjoyable interactions. Subsequently, babies learn how to use language even before they can speak.

At four-six months of age the baby enters the *babbling or echolalia stage*, which consists of the frequent repetition of syllabic sounds such as /dadada/ or /mamama/.

The following linguistic behaviour is often called the *Jargon period*: the baby produces strings of utterances which have the intonations of language, even though they do not contain meaningful sounds. By this stage it appears that the baby begins to understand utterances and to obey simple instructions.

- *The Holophrastic Period*

  It starts at about one year of age and, as the name suggests, the baby communicates through the use of single word sentences. These words have more than their basic meanings expressed by the use of intonation patterns and gestures, as well as volume: this is the reason why linguists call these words holo-phrases.

  At about 18 months of age the child's vocabulary grows rapidly: the words are accumulated at a rate of around 15 words per day.

  Pronunciation improves during the holophrastic stage and the vocabulary consists of a large proportion of person and object words. There are some relational words (such as, *up, no, more*) but they do not form a large part of the language of a child until the telegraphic period.

  It seems that the child's vocabulary must be of a certain size and consistency before the syntactic development of the telegraphic stage can commence.

  A child is able to understand very simple instructions and questions during this period.

From 18 to 21 months a child's vocabulary will expand from around 20 words to 200 words, and it will include action names, state names and the odd functional word which refer to kinds of events. Most of the vocabulary at this stage will consist of naming words (nouns) particularly of objects in the child's environment that the baby can manipulate, such as toys, clothes, food or people.

- *The Telegraphic Period*

  This stage of language acquisition occurs between the ages of 18 and 36 months and it is called telegraphic because in child's utterances there is the absence of function words such as tense endings, prepositions, conjunctions and articles. During this period of children's life they learn to add these function words to multiword sentences.

  The essence of telegraphic speech is linguistic economy: during this developmental period, children tend to use only those words that are necessary to convey the meaning and they also use gestures to disambiguate telegraphic sentences.

  From 18 months onwards the child is already beginning to produce two words sentences, even though single word sentences continue to be used for some time.

  From 21 to 24 months children begin to build a rudimentary syntactic/semantic system that allows them to adapt their form of communication if they are not understood.

  By two years of age, children are able to produce 3 or 4 word sentences obeying a few simple rules of grammar. At this stage they start to speak alone, to play with sounds and rhymes and to order events in a systematic way.

  Amazingly children from very different background produce similarly structured sentences even though they have been exposed to different languages during the first few years. Telegraphic speech thus represents a universal child language.

- *The Complex Period*

  During the early stages of this period the first examples of grammatical markers emerge.

  Between 30 months and 5 years of age the Mean Length of Utterance increases considerably and, consequently, sentences become more sophisticated. In this phase of language acquisition, it seems that children begin to learn suffixes of words and

to be conscious of the existence of linguistic regularities and exceptions. They also gradually acquire transformational rules.

By the age of 5 or 6 children's language becomes more complex since they are able to make use of the principles of grammar and they start to understand relational contrasts such as *big/little, I/you, before/after,* and so forth. At this stage their language is very similar to an adult's language.

- *The Intuitive Linguistic Period*

  Children learn most of language before the age of five; nevertheless when they are from six to fourteen years old there is an evident linguistic refinement. During this period, children learn many new linguistic skills, use larger words and produce more complex sentences.

  Children also exhibit more phonemic knowledge and develop a metalinguistic awareness: they start to draw inferences about the meaning of what they hear and to go beyond the information contained in sentences.

Recent researches have shown that there are individual differences in first language acquisition. For instance, children raised in a positive socio-cultural environment show a faster and easier language development. Furthermore, on average, baby girls acquire language before baby boys, particularly as far as phonological abilities are concerned.

Regardless of socio-cultural factors, there are two main individual strategies for first language acquisition:

-*Expressive* children: they show a rapid language development; they exhibit early preference for terms related to personal interactions that express greetings, feelings, wishes and social communication cliché. They display an echolalic behaviour and tend to produce complete sentences containing also morpho-syntactic elements.

-*Referential* children: their first language acquisition is slow; they exhibit an early preference for naming objects as their first words. They display an extremely reduced echolalic behaviour and produce sentences in which noun prevail.

First language acquisition and, possibly, foreign languages learning, is easier for 'expressive' than for 'referential' children.

- ***Two main approaches on Language Acquisition***

Tomasello (2006) describes two different theories about language development:
1) *Formal approach*: it emanates from Chomsky's generative grammar theory according to which natural languages are characterized in terms of: i) a set of abstract rules that are the core of linguistic competence, and ii) a lexicon containing meaningful linguistic elements that are the linguistic periphery and serve as variables in the rules. Along with Chomskian generative grammar children possess innately a universal grammar, while the "periphery" of linguistic competence must be learned: this is the so-called *dual process* approach.
2) *Usage-based approach*: it derives from the group of theories called *Cognitive-Functional Linguistics.* Its central principle is that language structure emerges from language use. According to this approach there is no such thing as universal grammar and children acquire the more regular and rule-based constructions of language in the same way they acquire the more arbitrary constructions: they learn them. They construct abstract categories deriving them from the concrete pieces of language they hear.

2.2. *Reading acquisition*

Learning to read is a process of matching distinctive visual symbols to units of sound (phonology). The first step for successful reading acquisition is therefore the process called *phonological recoding*, i.e. the ability to apply the system for an unambiguous mapping between the orthographic and the phonological domain (Ziegler and Goswami, 2005).

Written language is not naturally acquired because it is the product of cultural progress but it needs to be explicitly learned by children. One problem, particularly in western written language development, has been arbitrariness: for young children, the individual letters are arbitrary in the early stages, that is, they appear meaningless to them (Thomson, 2009:138-139).

2.2.1) Reading development

Daloiso (2012) illustrates and analyses the different stages of reading development:
-*Logographic phase*: even though the preschool child does not have explicit knowledge about phonological and orthographic structure of words, he is already able to identify a limited set of words because he visually recognizes them. It is the case of logos and brand-names items that are regarded as holistic symbols.
-*Semiphonetic phase*: this is the stage that allows the development of phonological awareness since the child begins to understand the relationships between the phonetic structure of a word and its graphic representation.
-*Alphabetic phase*: after explicit instruction, pupils begin to recognize letter-name-sound correspondence and to use the rules necessary for phoneme-grapheme associations, either for reading and for written production. Phonic knowledge becomes important.
-*Orthographic phase:* this stage is reached when the child is able to recognize words in an automatic manner and he uses context as support. Furthermore there is an augmentation of pupils' reading speed because, if at the beginning they read letter-by-letter, they now read by letter clusters.
There are two general models of the reading process. Alphabetic and orthographic phases are generally thought to be exclusively governed by *bottom-up* processes (data-driven): this model suggests that, first, the child look at the stimulus, i.e. the components of the letters, and then he moves to the meaning. Therefore, along with this model, children read letter-by-letter so fast that it becomes an automatic process. In actual fact, during reading and writing learning, also *top-down* strategies are activated. The top-down model is concept-driven: the reader attempts to absorb the meaning of a word from syntactic and semantic context and from the graphic information available.
-*Lexical phase*: at this developmental stage, children have memorized the graphic form of frequent words and, thank to their lexical knowledge, they are now able to read without using grapheme-phoneme conversion.

According to the *dual route model* (Coltheart, 1978), when this developmental process is completed, we can assume that the child has a specific module in his brain, dedicated to written decoding. The dual route model has been predominant

for many years in relation to reading development. It assumes that readers have two strategies at their disposal: *the direct/visual strategy (lexical route)* that exploits the memorized orthographic form of the words and is used for reading familiar words, and *the indirect/phonological route (sublexical route)* that involves the recognition of single phonological units and the use of grapheme-phoneme conversion; it is used for reading unfamiliar words.

There are a number of alternative approaches to the dual route model (Reid, 2009:109-110).

The *connectionist approaches or parallel distributed processing (PDP) models* offer a framework that can be relevant for different cognitive processes, such as language acquisition, reading and memory (McClelland, 1988).

As far as reading process is concerned, according to the connectionist model children learn to read through the association of their knowledge of letter string and phonemes and the development of letters-phonemes mapping. Ehri (1995) suggests that, in order to read, children develop a single orthographic system and not a dual route model. Along with this model regular words are more easily accessed than irregular words, because regular forms confirm the pattern to which children are repeatedly exposed. This model implies that the more associations that are made the stronger the connections will be, and these connections form a knowledge base that can be used when the child is faced with a new word (Snowling, 2000). The problem with this model is that it does not give information about the conscious reading strategies that can be adopted by readers.

The main exponents of *the balance model of reading* are Robertson and Bakker (2002) and they insist on the complexity of the reading process. According to this model reading development is *mediated:* during the first stage, children automate the perceptual features of letters and there is a mediation of the right cerebral hemisphere; during the second phase children become more familiar with words and with syntactical rules and this knowledge allows them to read in a more automatic manner: in this case reading is guided by syntactical rules and linguistic experience and it is predominantly mediated by the left cerebral hemisphere.

It seems evident that pre-reading activities can facilitate the development of the reading process. Children achieve an adequate evolutionary level for reading development at about five-seven years of age; according to a variety of psycholinguistic and neuropsychological studies, there is a number of general prerequisites that children of this age should possess in order to learn to read (Daloiso, 2012:14-19):

- *Cognitive skills:* the initial phases of reading development are not automatic and, consequently, a greater cognitive effort is necessary. Furthermore, in order to achieve a complete semantic comprehension of the text, children have to possess inferential strategies that they can only develop after an adequate expansion of oral language.

- *Attention skills*: in order to control the different simultaneous tasks activated during the reading process, different types of attention are to be developed. i) *Sustained attention*, that is the ability to remain concentrate for a quite long period of time; ii) *Selective attention*, that is the ability to select the most important inputs that need to be elaborated subsequently; iii) *Divided attention*, that is the ability to be careful to different inputs at the same time; in particular, in the case of reading process, children should be attentive both to the written form and to the meaning of texts.

- *Memory skills*: children need to internalize grapheme-phoneme conversion rules, memorize graphic forms of words and their associations to meanings, remember words, and so on. In order to increase their reading ability, each memory system must be developed.

Reid (2009: 102-103) mentions the problems related to long-term memory that affect dyslexic children's reading development: in particular, they show difficulties associated with storing and subsequently accessing new vocabulary.

-*Linguistic skills*: a six-year-old child is able to select adequate lexicon, use correct syntactic rules, utter and understand quite complex sentences in his mother tongue.

Two fundamental abilities can predict reading acquisition in children: lexical competence and phonological awareness.

Lexical competence is very important for literacy acquisition: actually, if the child possesses a large lexical knowledge and consequently knows the phonetic form and the meaning of a word, he merely has to associate them to its graphic form. Nevertheless, a child who at first has a poor lexical knowledge can still become a good reader because he starts to memorize new words when he learns to read and, consequently, his lexicon gets richer.

Phonological awareness, which comprises the ability to identify and manipulate phonological units within a word, is a strong predictor of long-term reading and spelling success and it can predict literacy performance more accurately than variables such as intelligence, vocabulary knowledge, and socioeconomic status (Gillon, 2004:47). Generally, preschoolers already demonstrate good phonological awareness of syllables, onsets and rimes in most languages. Phonological awareness involves the detection and manipulation of sounds at different levels of sound structure:

1) *Syllables*: capacity to divide words into syllables, to complete a word with a missing syllable, to eliminate a syllable within a word, to identify words which have the same syllable;

2) *Onsets and rimes*: spoken word recognition, spoken rhyme detection or rhyme oddity task, spoken rhyme generation;

3) *Syllabic structure*: ability to recognize words with the same syllabic structure and to distinguish vowels and consonants within a syllable;

4) *Phonemes*: capacity to detect, categorize and manipulate single sounds or phonemes, to identify words which start or end with the same phoneme, ability to isolate a single phoneme and pronounce it, to complete a word with a missing phoneme, to substitute a phoneme within a word, and so forth.

For most children, phonological awareness appears at four or five years of age and it develops in a natural and gradual manner progressing from larger to smaller units of sound (that is, from words to syllables to onsets and syllable rimes to phonemes). Nevertheless, there is a high individual variability and each child has his personal learning style: some children may be less sensitive to phonetic dimensions of language; in any case meta-phonological awareness skills should be stimulated from their earliest years. In fact, phonological awareness provides the basis for

phonics, that is the understanding that sounds and print letters are connected and this is the first step towards reading: for most children interventions to improve phonological awareness abilities lead to significantly improved reading abilities. The opposite is also true: literacy instruction improves phonological awareness.
Reading process is formed by two complementary practices: encoding involves the written representation of a word's oral sounds while decoding refers to the process of mapping words' written letters to their corresponding sounds in oral language. In both processes, phonological awareness is needed because the child must know the sounds of words in order to relate them to the letter sounds.

The ability to decode a written text is necessary but not sufficient to reading comprehension.
At the earliest phases of reading learning, children activate bottom-up strategies in order to analyze the text and decode it, and top-down strategies to reach the meaning. These approaches are not chronological, but they are often activated simultaneously and undergo a reciprocal influence.
Reading comprehension is a superior cognitive skill that involves a conscious activation of mental processes and of specific strategies; it requires an active contribution of readers who formulate hypothesis about the text that can be confuted or confirmed by the text itself.
According to Snow (2002:7) reading comprehension is:

> *...the process of simultaneously extracting and constructing meaning through interaction, and involvement with written language. It consists of three elements: the reader, the text and the activity or purpose for reading.*

Since preschool period children develop an oral *expectancy grammar*, a cognitive process that allows predicting how the text actually continues. Afterward children apply expectancy grammar also to written language and improve it with strategies based on background knowledge about the world, on their previous experience and on information they have about the text and the context.
According to Daloiso (2012:22-26), in order to reach a complete comprehension of texts, the reader should activate a strategic approach that consists of four different phases:

-*Planning*: since the beginning, the reader should stimulate expectancy grammar. He should collect preparatory information about the text and about the context with the aim of formulating hypothesis about the subject matter. This active interaction between the text and the reader becomes a sort of guide that facilitates comprehension. Language education theorists distinguish different methods of comprehension depending on the specific aim of the reading act:

a) Global method: the aim of the reader is to get a general sense of the text, avoiding details, examples and digressions.

b) Selective method: the reader intends to focus his or her attention on a particular section of the text so as to find specific information. We use this reading strategy, for instance, when we consult a dictionary or an encyclopaedia.

c) Analytical method: it involves a deep analysis of the text in order to discover specific and detailed information.

d) Exhaustive reading: the aim of the reader is to acquire both explicit and inferential information from the text. We use this strategy, for example, when we read a critical essay.

-*Monitoring*: in this phase of the reading act readers should verify their initial hypothesis and find the exact meaning of difficult or unknown expressions and of complex syntactical structures in order to disambiguate the text and reach a fully understanding. To achieve this aim, readers should activate compensatory strategies:

a) Textual compensatory strategies: readers may continue to read searching for further explanations within the text;

b) Lexical compensatory strategies: readers seek to grasp the meaning of a word analyzing its grammatical function, its internal structure and the context;

c) Morphosyntactic compensatory strategies: to facilitate reading comprehension readers may reduce the structure of complex or ambiguous sentences, adding at a later stage optional items.

-*Rehash*: readers may manipulate the contents of a text for a better comprehension. The most common strategies are:

a) Summary, that consents to eliminate those passages that are not functional for the purposes of the reader;

b) Expansion, which is the enrichment of a text integrating it with further, details, data and examples.

-*Valuation*: readers should take a critical attitude towards the text and they should evaluate both the text and their own reading strategies in order to modify or improve and strengthen them.

Even though the developmental sequence is respected in all languages, there are big variations in the global levels of phonological awareness attained, possibly because of the different characteristics of the spoken language. With regard to this, a study realized by Durgunoglu and Oney (2002) proves that languages with a limited vowel repertoire and a simple syllable structure ([CV], [VC], [V], [CVC]), such as Turkish, Greek and Italian, show high levels of syllable awareness prior to literacy. On the contrary, French and English have quite complex syllable structures with many consonant clusters and larger vowel repertoires, and children that speak these languages develop lower levels of syllable awareness prior to literacy.

In all languages, syllable awareness is much better than phoneme awareness prior to literacy teaching. This claim is not without controversy, however. Nevertheless, at least for the European languages tested until now, there seems to be a developmental progression in the phonological domain from larger to smaller units. Phonemes are represented once literacy is taught, irrespective of the age at which reading and writing is taught.

There are three main factors crucial for determining cross-language differences in reading acquisition (Ziegler and Goswami, 2005):

a) The consistency problem: some orthographic units have multiple pronunciations and some phonological units have multiple spellings. Both types of inconsistency are language specific. In some orthographies, one letter or letter cluster can have multiple pronunciations (in opaque languages, such as English or Danish), whereas in others it is always pronounced in the same manner (in transparent languages, such as Greek, Italian, Spanish). Similarly, in some orthographies, a phoneme can have multiple spellings (e.g., English, Hebrew, French), whereas in others it is almost spelled the same way (e.g., Italian). Both types of inconsistency slow reading development because it is difficult to learn about phonemes if a letter can be pronounced in multiple ways, or if phonemes can be spelled in multiple ways.

Consequently, reading acquisition should be more rapid in orthographies in which letter-sound relationships are highly consistent.

b) The granularity problem: the reduced reliability of small grain sizes in relatively inconsistent orthographies may lead children to develop different recoding strategies. Theoretically, children learning to read opaque, and therefore inconsistent, languages may supplement sublexical recoding strategies with lexical (whole-word) knowledge. If children reading a transparent orthography are required to read nonwords that sound like real words (pseudohomophones), grapheme-phoneme recoding strategies can be sufficient. Instead, in relatively inconsistent orthographies, the phonological familiarity of pseudohomophones at the whole-word level might give extra support to children's nonwords reading accuracy. In this case, vocabulary knowledge and a strong phonological awareness can become even more important for reading development.

c) The teaching method: in nonalphabetic orthographies, such as Chinese, the child usually learns the large numbers of characters by rote, while in alphabetic orthographies teachers begin to teach letter-sound correspondences, and hence the child learns about phonemes. However this method works less well in a language with less consistent letter-sound correspondence, such as English and English-speaking children show a slower average rate of learning to read.

- One approach to this teaching problem in English-speaking countries has been to begin the teaching of reading at younger ages with a phoneme-based strategy. The phonic method emphasizes the importance of phonology and the sounds of letters and letters combination by using a variety of strategies, such as colour-coding and marks to indicate short or long sounds. Phonic methods can be useful for children who hardly memorize sound blends and vowel digraphs and have difficulties in synthesizing them to make a word. Chall and Popp (1996) emphasise the need to teach phonics and suggest the systematic use of this approach from the pre-school. (Reid, 2009:111)
- A different method has been to begin instruction with correspondences for larger units of the phonological domain, such as rimes or syllables (beak-peak). Such a large unit approach to teaching seems to lead to an analogous advancement in reading English as small units approaches.

- A third approach has been the "look-and-say" method based on a whole-word teaching, according to which children learn to recognize words as holistic units. This approach highlights the importance of an exposure to meaningful units of language rather than to sounds of speech: in the initial stages it implies the use of flashcards and pictures and requires attractive books that can become progressively more demanding.

All these three approaches seem to contribute to efficient word recognition, but the first method seems to work better in languages with consistent letter-sound correspondences. Furthermore, the method based on a whole-word teaching may be difficult for dyslexic pupils because it assumes a good memory for shapes of letters and words and the ability to master the irregularities of sound-symbol correspondences: consequently, some elements of the phonic method should be added to look-and-say approaches.

It is important to know the reading process, but it is also important to relate this knowledge to classroom practice and to analyze children's reading behaviours.

2.2.2) Developmental dyslexia and reading

Given that phonological awareness is very important for reading acquisition, deficits in the representation and use of phonological information are critical in the aetiology of developmental dyslexia (Catts, 1993; Snowling, 2000; Stackhouse & Wells, 1997; Stanovich & Siegel, 1994).

Daloiso (2012:42-44) claims that from the early years of age, dyslexic children show a delay in the development of oral language.

They may have a poor lexical knowledge because of their memory difficulties associated with storing and accessing words.

With regards to phonological awareness, children with dyslexia show evident difficulties since the early stages of phonological development. Consequently, it is important to conduct researches to assess whether the development of phonological awareness in pre-reading children follows the typical sequence (syllable -> onset–rhyme -> phoneme). Such studies are rather rare because dyslexia is normally diagnosed after some years of reading instruction. Schneider, Roth, and Ennemoser

(2000) monitored a large group of 208 at-risk German children in kindergarten: their research showed that the at-risk children were significantly poorer at rhyme production, rhyme matching, and syllable segmentation than German control kindergartners, who were not thought to be at risk. Similar results have been obtained in a Dutch longitudinal study (De Jong & van der Leij, 2003). Children with dyslexia performed weakly on phoneme awareness tasks.

Philomena Ott (1997:54) indicates that it is important to assess whether the reading problem is specific, and consequently a child can be considered dyslexic, or if it is related to poor general intellectual abilities. IQ score is one of the most crucial factors in the diagnosis of dyslexia: the dyslexic child has an unexpected difficulty because there is a mismatch between his reading skill and general intellectual ability. However, this question is not without controversy.

So as to analyze a pupil's reading ability, it is necessary to consider his or her age, ability and reading methods. If possible, at least four different basic tests should be used (Ott, 1997:58-59):

-*A word recognition test*: the test involves reading words of increasing difficulty in isolation;

-*A reading accuracy test*: this test provides information about the pupil's reading strategies, since children are asked to read a story which has a picture beside it to give indications;

-*A reading comprehension test*: it involves questions addressed to the child about the contents of what he has read with the aim to establish how much the pupil assimilates and how good his retention of information is;

-*A sentence completion test*: the pupil is asked to choose the correct word from a list while reading a sentence silently; it reveals how quickly and well the pupil can cope when reading to himself.

Ott (1997:60) designates a series of typical errors made by children with reading difficulties:

Does the pupil

- Read word for word, with little expression and little understanding of what he is reading?

- Lose his place when reading?
- Need to use his finger to keep his place?
- Misread the simple, familiar words – ‘a’ for ‘and’?
- Omit endings from words – ‘play’ for ‘playing’?
- Confuse words of similar appearance – ‘house’ for ‘horse’, ‘of’ for ‘off’?
- Omit syllables from words – ‘rember’ for ‘remember’?
- Truncate the letters in a word – ‘dont’ for ‘downstairs’, ‘active’ for ‘attractive’?
- Add letters to words – ‘breast’ for ‘beast’?
- Tend to look at the initial letters of the word and guess the rest – ‘interrupted’ for ‘intercede’?
- Make bizarre guesses at words – ‘downest’ for ‘downstairs’?
- Read the word correctly on one line and then misread the same word on the next line?
- Reverse whole words – ‘on’ for ‘no’, ‘was’ for ‘saw’?
- Invert letters – ‘pig’ for ‘dig’?
- Reverse letters – ‘bud’ for ‘dub’, ‘brown’ for ‘drown’?
- Omit letters from words – ‘very’ for ‘every’?

Many pupils may initially make some of these errors, but dyslexic children continue to make them long after his peers and it is this that is significant for a diagnosis of dyslexia. Developmental dyslexia is qualitatively different from other forms of reading disability, since its immediate cause is poor grapheme-phoneme conversion skill (decoding) whereas the primary cause of general reading difficulties is poor comprehension ability.

Many researchers suppose that developmental dyslexia may manifest differently depending on the orthography that is being learned. Therefore, a more persistent phonemic deficit would be predicted for dyslexic children learning to read in irregular or “deep” orthographies, such as English, than for dyslexic children struggling to read regular orthographies (Everatt and Elbeheri, 2008).

Hatcher and Snowling (2002) suggest that in English the relationships between orthography and phonology represent an obstacle for children learning multi-letter (-ough, -igh), morphemic (-tion, -cian) and inconsistent (-ea) spelling-sound correspondences. Consequently, although dyslexic children can learn to read words they have been taught, they have difficulties generalizing this knowledge, and therefore one of the strongest signals of dyslexia is poor non-word reading.

Everatt and Elbeheri (2008) suggest that this variation in the orthographic features of different languages causes different manifestation of dyslexia across languages. They then indicate that English is a language with an opaque orthography: many words may be considered irregular or exceptions because there is not a direct relationship between graphemes and phonemes. German, on the contrary, is relatively transparent for both reading and spelling. These cross-linguistic differences have implications for assessment procedures for dyslexia, most of which are based on identifying difficulties in phonological awareness and phonological processing. (Reid, 2009:104).

Many studies suggest that although grapheme–phoneme recoding might become quite accurate for such individuals in languages with transparent orthographies, phonological recoding speed remains particularly slow and does not differ significantly from that of dyslexic individuals learning to read in languages with opaque orthographies (e.g., Breznitz, 1997; Paulesu et al., 2001; Wimmer, 1996; Ziegler, Perry, et al., 2003). Furthermore, these recoding difficulties do not seem to disappear in nonalphabetic orthographies, such as Korean, Hebrew, or Arabic. This suggests that the difficulties for all dyslexic readers depend on an ineffective processing at the phoneme level. Children with phonological difficulties may never attain automaticity at this level, regardless of the orthography being learned (Ziegler and Goswami, 2005:15).

Dyslexic children can elude decoding difficulties by relying on the syntactic and semantic context (Nation and Snowling, 1998), but at the early stages of reading development this is not a totally successful strategy because six-year-old children have not sufficient linguistic knowledge. Nevertheless, all children do not learn to read at the same way because they all have different learning styles and different cognitive skills: for instance, some may have severe phonological deficits but good

visual memory skills, while others may have weak phonological skills and slow speed of processing; in addition children may have experienced different teaching methods (Reid, 2009:104).

One of the most successful approaches is the 'multi-sensory' method of teaching: in order to cause a subsequent permanent and automatic response in readers, they learn to read through the simultaneous use of their visual, auditory, tactile, kinaesthetic and oral-kinaesthetic perceptual systems.
There is not only one single teaching method or approach that consents to activate the process of learning to read, but every teacher has a favourite theory about how to do so.

Reading is a traumatic practice for many dyslexics, but they must be encouraged to read day by day to a parent, teacher or classroom assistant. They can help develop phonological awareness with games which make it easier for the child to learn when he begins to read, despite his deficit in speech sound-words relationships. It is important to remember that reading improves with practice.

2.3. *Second language learning*

At the present time children begin to study a foreign language since the early years of age because learning at least a foreign language is considered very important in our globalized society, and it is important to have information about foreign cultures as well. In fact, at present, the term *communicative competence* is often used instead of *language proficiency* because knowing a language does not only mean knowing the rules governing the phonology, morphology, syntax and semantics of a particular language, but it also implies the knowledge of social convention of language use.

According to Klein (1986) several factors may influence the second language learning process (Ciliberti, 2012: 28-29):

- -*Purposes*: it is a concept strictly related to the concept of motivation. We can learn a language in order to achieve a social integration, or to pass our exams, for example.
- -*Linguistic abilities* of different learners.
- -*Linguistic input* and communicative circumstances presented to the learner.

These factors determine how the second language learning process will occur and particularly its development, the period of time necessary for it, the final outcome. Learning a foreign language, therefore, is a complex process and the interaction and application of several skills by the learner is required (Reid et al., 2008:440):

- *Analytic skills*, in order to understand the formal linguistic structures of the foreign language;
- *Meta-cognitive skills*, to enable self-correction and error analysis;
- *Memory*, so as to store and subsequently access new vocabulary;
- *Confidence*, to use the foreign language both productively and receptively.

2.3.1) Theories on Second Language Learning

Two main second language acquisition theories have greatly influenced second language teaching: *Nativist Theory*, which explores the linguistic aspects of language acquisition and provides an answer to the question of how people acquire a second language, and *Environmentalist Theory*, according to which social and psychological factors are equally important as linguistic factors in second language acquisition (Escamilla&Grassi, 2000).

- ***Nativist Theory***

With the advent of Chomskian theories several linguists began to conduct researches about the acquisition and, in particular, the grammatical development of children's mother tongue.

According to Noam Chomsky, people possess a Language Acquisition Device (LAD) that allows children to acquire a language in an innate, biological manner.

The first language is learned without any explicit instruction and LAD predisposes all people to the acquisition of a second language essentially in the same manner.

Stephen Krashen (1977, 1981, 1982, 1985) developed his *Monitor Theory* based on Chomsky's concept of LAD.

The Monitor Theory is composed of four hypotheses that provide a framework for teaching a second language, which are the foundation for the communication-based teaching strategies mostly used today:

- *Input hypothesis*: human beings may learn a language only if they receive comprehensible input, that is, messages they are able to understand.. An input becomes comprehensible when the teacher uses strategies such as the following ones:
  - Showing pictures, flashcards or visual to accompany new vocabulary words and communicative concepts.
  - Incorporating gestures, drama and music into the lesson that make a lesson more comprehensible and memorable.
  - Designing lessons with hands-on activities and manipulatives.
  - Repeating new vocabulary by means of different types of games or computer assisted lessons that incorporate the new vocabulary.
  - Translation: the teacher can translate the key concepts so as to make the lesson more comprehensible. However, it cannot be a common teaching tool in second language classrooms, as the students will direct their attention to the translation rather than the target language.

The learning process may progress when the second language learner receives a more complex input than the previous one and he or she demonstrates to be able to understand it. In fact, comprehensible input should be adjusted as the child acquires more and more language. Krashen refers to this concepts as i+1, where 'i' symbolizes the child's present stage of acquisition, and the '1' symbolizes the more advanced input the teacher will provide the child so that she may progress beyond the present stage.

Making a lesson comprehensible also involves assessing a student's level of academic vocabulary. Cummins (1979) discusses two forms of language developed in the acquisition process: Basic Interpersonal Communication Skills (BICS) and

Cognitive Academic Language Proficiency (CALP). BICS is the first typology of language acquired by students and it may also be called 'survival vocabulary': it is the language used in familiar and friendly contexts and a speaker need it to interact within society. It usually takes a student 2-5 years to acquire high proficiency in BICS: from then on, consequently, students are able to converse about several topics and show to be familiar with the target language slang and idiomatic expressions. However, unless specifically instructed in the academic vocabulary, students with advanced BICS skills may have great difficulty in academic areas, such as science, math or history, that require a different type of vocabulary, that is, CALP.

- *Natural Order Hypothesis*: according to this hypothesis every learner will acquire a foreign language in a predictable, and therefore natural and universal, order. The natural order of acquisition is not affected by instructional sequences: providing students with meaningful comprehensible input that contains grammar, but focuses on communication, will enable students to naturally acquire the necessary grammar.

Krashen expanded this 'Natural Order' hypothesis when developed with Tracy Terrell the four stages of BICS language acquisition:

- *Stage 1: Pre-Production*: during this stage, the second language learners actively listen to the language input and develop comprehension in the second language. Their receptive vocabulary may be of up to 500 words. At this level, students' first language pronunciation has a large influence on their reading and oral productions and they will find it difficult writing in the target language.

This 'silent period' may last around three or six months, but not all learners go through this stage: some students are able to produce language immediately miming the sounds of the target language group, while other students are more hesitant and need a longer period before they attempt to speak; however, being reluctant to speak does not mean absence or delay of acquisition of the second language.

- *Stage 2: Early Production*: at this level, students began producing one-word utterances, repeating words they have often heard. They may often use memorized well-formed phrases and formulae, but this does not indicate that they are able to manipulate and form original sentences in the target language; they rather have learned the function of these phrases as a whole, using them in the same manner they would use a single word. Students' native language pronunciation still influences their oral productions. Toward the end of this stage, students begin to incorporate different verb forms into speech but they show an over-generalization of grammar rules. Overgeneralizations, however, are not at all negative because they indicate a progress of the second language learning.

The length of this period varies deeply, even though most students spend from six months to one year in this stage.

In the majority of classrooms, students' opportunities to talk are limited and do not imitate the actual conversations used in real social interactions: rather, most of oral productions focus on decontextualized topics. This type of dialogue, however, facilitates the practice of new and different vocabulary.

- *Stage 3, Speech Emergence:* at this level, students begin to construct simple sentences and first language pronunciation begins to reduce its influence. Students at this stage begin to use various verb forms (past, present, future) and can engage more extended dialogues; grammar rule overgeneralizations are still present, but they indicate great progress in second language learning.

The typical amount of time spent at this stage is 1-2 years, but it may vary.

It is important for the second language student to have ample contact and interaction with the target language group at this stage

- *Stage 4, Intermediate fluency:* students are now able to manipulate the language and to produce original and complex conversations, although grammatical mistakes are still common.

This stage may last around 2-3 years because it involves more complex language skills and the possible acquisition of advanced academic vocabulary.

The teacher should persist to offer to the student new comprehensible input and instruction should accentuate the teaching of academic language.

- *Affective filter hypothesis*: in order to learn a language, the student should be "open" and well disposed. A low affective filter exists when the student feels comfortable in the learning environment, while a high affective filter exists when the student is anxious and worried about the learning process. To ensure second language acquisition, the teacher should maintain a relaxed, stress-free and pleasant learning environment.

- *Acquisition vs. Learning Hypothesis*: according to Krashen, there are two separate systems:

i) the *acquisition system*, which is more 'natural', unconscious, involuntary and global: the learner has a low affective filter and the heart of language lessons is on communication and meaningful use of language. The new language enters the learner's LAD and is unconsciously acquired into the mind, becoming part of the linguistic system of the learner. Thus, the second language can be spontaneously used in conversations and communication with the target culture group.

ii) the *learning system* is a conscious and systematic process during which the learner is focused on the form and the rules of language. Learning often occurs in a grammar-based and practice type instructional environment.

Along with Krashen, the second language student must first acquire the language before learning is introduced, so as to use the language for communicative purposes.

- ***Environmentalist Theory***

In accordance with Environmentalist theories, additional factors, such as social or psychological aspects, are highly important in the second language learning process.

The principal theory in this framework is *Schumann's 'Acculturation Model' (1978)*, according to which learners' social and psychological distance from the target language group prevents them from acquiring high proficiency in the second

language. In particular, Schumann makes a list of the social factors that may have positive or negative effects on the acquisition of a second language:

1) *Social Dominance*: it has positive effects if the second language learner's cultural group feels dominant or equal status to the target language group, while it is negative when the second language learner's group feels subordinate to the target language group.

2) *Integration Pattern*: it is positive if learners desire assimilation or acculturation into the target language group; on the contrary, it has a negative effect if they want to preserve their own cultural identity.

3) *Cohesiveness*: it has positive effects if the second language learner's cultural group encourages ample contact with the target language group; effects are negative if this situation this does not happen.

4) *Enclosure*: if the second language learner's group requires daily contact with the target language group, language learning process will be positively influenced; on the contrary, if the second language learners have their own churches, newspapers, leaders the second language is scarcely acquired.

5) *Size*: when the second language learner's group is small inter-group relations and, consequently, language acquisition are encouraged; if it is large, intra-group relations become an obstacle to second language acquisition.

6) *Cultural Congruence*: it is a positive factor if the target language group and the second language group are culturally similar, it is negative if they are culturally incongruent.

7) *Attitude*: the attitude of the two groups toward one another may be positive or negative.

8) *Length of Residence*: if the second language learner intends to reside within the target culture for an extended period of time, his or her language acquisition becomes easier.

According to Schumann, if these social factors are negative, the second language learner can face a number of social pressures that make it difficult to acquire high proficiency in the target language.

Schumann hypothesizes also the existence of a *psychological distance*, consisting of three main factors, which may influence an individual's ability to acquire a second language; these factors are:

1) Culture shock: after a first period of excitement in the new cultural environment, second language learners may temporarily refuse the target language and culture in a successive stage. However, if encouraged, they will acquire high proficiency in the target language.

2) Language shock: it occurs when the L2 is very different from the learners' mother tongue. For a period of time they may appear frustrated and discouraged and their language learning seems to stabilize at a set point and cannot progress. It is important for teachers to recognize this 'language shock' and to remove the negative psychological pressures, so that the second language learner may continue acquiring the L2.

3) Motivation: it plays a very important role in language acquisition, and it is psychological essential to acquire high proficiency in the target language. There are two subtypes of motivation: i) instrumental motivation, which is the desire to learn the second language for practical reasons, such as furthering a career, finding an employment, passing an exam; ii) integrative motivation, which is the second language learner's desire to be integrated in the target society.

In order to prevent both social and psychological distance, a teacher should aid students to become increasingly familiar with the target culture.

2.3.2) Second language learning errors and interlanguage theories

Chomskian theory changed researchers' view about linguistic errors: they are now considered universal, creative strategies in language learning process and are significant for three main reasons: 1) teachers may verify the learner's progress in language learning through errors' valuation; 2) errors enable language researchers to study how the language is learnt; 3) errors are important for second language learners, since they get involved in hypothesis testing.

Error analysis, a branch of Applied Linguistics, emerged in 1960s and was a reaction to Contrastive Analysis Theory according to which errors are mostly

caused by native language interferences, as behaviouristic theories suggested (Khansir, 2012).

From this idea it has been developed the concept of 'Interlanguage', which refers to a language that differs both from the learners' mother tongue and the target language.

- ***Error analysis***

Up to 1950s, the most followed theory was the Contrastive Analysis Approach, whose supporters, in particular Robert Lado, claimed that those aspects of the target language similar to learner's native language were easier to learn than the dissimilar elements.

Consequently, learners' errors were regarded as the product of the interference, or negative transfer, of their mother tongue: for this reason, the two languages were systematically compared in order to prepare materials and develop techniques apt to meet those difficulties and avoid linguistic errors (Ciliberti, 2012:42-43).

Contrastive Analysis was criticized by the exponents of Error Analysis who, instead, believed that not all errors are the result of interference, but they may also be caused by psychological, pedagogical and other extra-linguistic factors (Khansir, 2012:1028).

In recent years, studies on second language acquisition have focused their attention on learners' errors, since they allow for prediction of the difficulties that second language students generally meet. In 1975 Richard had already classified the developmental errors observed in the acquisition of a L2:

- Overgeneralization: learners create a deviant structure on the basis of the experience they have made of other target language's structure.
- Ignorance of rule restriction: it is due to failure to observe the restrictions or existing structures.
- Incomplete application of rules: it occurs when learners fail to fully develop a certain structure required to produce acceptable sentences.
- False concepts hypothesized: it is an error arising from faulty comprehension of distinctions in the target language.

Error is no more considered a negative element that should be avoided, but indicates a learning progress that is not necessary to be immediately corrected. Accordingly, the punitive attitude toward developmental errors has been replaced with a more tolerant position and with an additional attention for the causes and the effects of this deviant behaviour, which is a systematic stage of language acquisition (Ciliberti, 2012:55).

- ***Interlanguage Theory***

Since the late 1960s, new discoveries about foreign language learning led many linguists to analyse the language the learners themselves develop and use during the process of learning. This language is identified as the *Interlanguage*.

It is a language system used by the foreign language learner which is neither his or her first language, nor the foreign language. It is a third language, with its own grammar, its own lexicon and so on. One can define the interlanguage as an emerging linguistic system developed by a learner of a foreign language who has not yet become completely proficient but is only approximating the target language. An interlanguage is idiosyncratically based on the learners' experiences with the foreign language he or she is learning (Reid et al. 2008: 441).

The theory of the interlanguage was proposed by mainly three persons (Reid et al. 2008: 441): S. Pit Corder, who was the first to consider language errors positively; William Nemser, who was the first to regard the interlanguage as an independent language system; Lerry Selinker, who published the article 'Interlanguage' (1972) and after this publication the theory became generally accepted.

Selinker used the term *fossilization* to refer the tendency of many learners to stop developing their interlanguage grammar towards the target language; he identified five fossilization processes (Khansir, 2012:1030):

- Language Transfer: sometimes rules and subsystems of the interlanguage may be caused from transfer from the mother tongue;
- Transfer of Training: some elements of the interlanguage may derive from some peculiarities of the second language teaching method;

- Strategies of Second Language Learning: some elements of the interlanguage may originate from a specific approach to the material to be learned;
- Strategies of Second Language Communication: some elements of the interlanguage may derive from the specific way students learn to communicate with the target language group;
- Overgeneralization of the Target Language Linguistic Materials: overgeneralization and simplification of the rules and semantic characteristics of the target language may give origin to a development of some elements of the interlanguage.

In his article Selinker observes that the utterances produced by second language learner are different from those native speakers would produce in the same situation, even if both sentences attempt to convey the same meaning.

After the formulation of the interlanguage theory, linguists have tried to compare the process of foreign language learning to first language acquisition. There are many similarities, but also many differences. First of all, learners never fail to acquire their mother tongue and they do not need an explicit instruction, while some learners may find it difficult to learn a foreign language even if it is taught in a classroom environment. In addition, native language learners never ossify in any of the stages of learning the mother tongue, whereas many foreign language learners ossify while learning a second language and are not able to develop their linguistic abilities on the target language. Furthermore, the learner's linguistic abilities on the foreign language can even worsen. All this indicates that learning a foreign language is not a linear or automatic process (Reid et al, 2008:442).

2.3.3) Neuro-pedagogy and Second Language Acquisition

- ***Second Language Acquisition and Memory Systems***

Many studies have demonstrated that various elements of the first language, in particular phonological and morphosyntactic aspects, are stored in the implicit

memory system. On the contrary, words and their meanings are mainly stored in the explicit memory systems.

As far as foreign language acquisition is concerned, the more frequent and natural strategy is the automatic, implicit language acquisition: it allows the learners to be fluent because it is the same strategy used in the first language acquisition.

In order to learn a classical language, such as Latin or Greek, an explicit acquisition/teaching method based on the learning of grammatical rules is required. This method has been mistakenly adopted also for modern language teaching for a long period of time, preventing students from using the foreign language for communicative purposes (Fabbro, 2004, 67).

According to Paradis (2004:50-53) metalinguistic knowledge of surface forms has a very important role in L2 acquisition because it serves as a model for practice and as a monitor for checking the well-formedness of the automatic output of the implicit system. This process, which leads to further practice of the correct form, may facilitate the acquisition of implicit competence; however, it is not the knowledge that leads to competence, but the practicing of the relevant form, without conscious awareness of what is being internalized. Competence, actually, is implicit knowledge and it still remains unknown.

Consequently, formal instruction may have an indirect positive effect on L2 acquisition because attention could be focused on items that need to be practiced and, secondly, it allows learners to use their metalinguistic knowledge to examine the output of implicit linguistic competence.

Ellis (2002) claims that frequency of practice of a particular form will facilitate its incorporation into implicit linguistic competence. Thus, increased practice of the correct form should accelerate the acquisition of the underlying computational procedures that constitute competence, that is, the ability to automatically understand and produce the relevant correct forms.

Therefore, explicit, metalinguistic knowledge contribute only indirectly and secondarily to development of implicit linguistic competence, even though it is never converted into implicit linguistic competence, and is not automatized or proceduralized.

- ***Neurobiology and critical periods in Second Language Learning***

A number of studies have hypothesized the existence of 'critical periods' in second language acquisition, and according to many linguistics a complete acquisition of a foreign language can be achieved only before eight years of age. Researches on memory and brain physiology show that before this age, children's brain is very flexible, and this plasticity allows an optimal language acquisition. In contrast, after this stage, individuals activate procedural schemas of their mother tongue when they use the second language.

One of the main difficulties for second language learners are the acquisition of a 'perfect' pronunciation and the achievement of a complete grammatical competence.

The term *foreign accent* refers to the pronunciation of a language that shows deviation from native way of speaking. These deviations take place at the phonetic and phonemic level, and at the segmental and prosodic levels (intonation), and they characterize the use of a second language by a non-native speaker. The pronunciation of an L2 is deeply affected by the native language, but also by the age of the learner. Three critical periods in the acquisition of an L2 pronunciation may be identified (Fabbro, 2004:84):

1) before 8 years of age a learner is able to acquire a perfect pronunciation of the foreign language;

2) 8-22 years of age: a weak foreign accent can be perceived;

3) after 22 years of age the second language pronunciation is highly characterized by a strong foreign accent.

This partition, however, has only a statistical value because there are strong individual differences in the acquisition a second language pronunciation.

Grammatical knowledge of a second language acquired after the 'critical period' (eight years of age) may be influenced by the native language, while linguistic distance has not any consequence before the critical stage.

The most frequent grammatical difficulties concern the acquisition of function words; on the contrary, a learner may always acquire new content words, because there are no critical periods for their acquisition. In the first language grammatical

elements, or function words, are stored in the frontal lobe of the left hemisphere; semantic elements, or content words, are stored in the posterior portions of both cerebral hemispheres, mainly in the left one.

When the second language is acquired after the age of eight content words of both languages are stored in the same cerebral structures, while function words are not stored in the frontal lobe, but also in the posterior portions, as if they were content words. This means that the second language will have a minor representation in the procedural memory systems and phonological and grammatical competence will be less automatic.

According to these studies, consequently, it is recommended a precocious linguistic education (0-8 years of age) in order to achieve a complete competence in every aspect of the second language.

CHAPTER 3

Familiarity with foreign languages is highly required in our multilingual society and, thus, students have to learn a foreign language at schools and universities. Nevertheless, foreign language learning is a significant burden on students who have specific learning disabilities and special educational needs (Nijakowska, 2010:66).

Many explanations have been proposed and debated in order to explain these difficulties. Suggestions included lack of foreign language aptitude, low motivation, feelings of anxiety in having to communicate in a foreign language, failure to use appropriate learning strategies, and other personality variables (Nijakowska, 2010:66).

These correlations between affective variables and successful foreign language learning appear to be strong, but problems in foreign language learning are greatly related also to students' verbal and written language skills in the native language (Downey and Snyder, 2000).

Depending on the severity of the native language problems, dyslexic students exhibit various verbal and written difficulties in a foreign language. They may have problems distinguishing between words in the foreign language, storing new words and retrieving words from long-term memory; they may find it difficult to pronounce foreign words, to achieve a good phonological awareness in the foreign language, to learn the phoneme-to-grapheme correspondences, the syntactic structures, the word formation patterns, the vocabulary and the grammar of the foreign language. Furthermore, dyslexic students often suffer from a slow reading rate, poor comprehension of written materials and problems writing in the foreign language (Dal, in Reid et al., 2008:440).

Pimsleur observed that students that exhibit foreign language learning problems tend to demonstrate poor sound discrimination skills and hardness in sound-symbol learning, responsible for the foreign language learning differences that could not be explained by low motivation or intelligence (Nijakowska, 2010:66).

In 1989, Sparks and Ganschow tried to explain language problems encountered by poor foreign language learners through a model called *linguistic coding deficits hypothesis (LCDH)*. According to their researches, foreign language learning is built on native language skills and poor readers exhibit difficulties with phonological and syntactic aspects of their native language, and their phonological coding is especially weak.

Thus, the strength of the native language codes considerably determines the extent to which a learner can become proficient in a foreign language.

Moreover problems with one language skill are likely to have a negative effect on both the native and foreign language systems.

The name, linguistic coding deficit hypothesis, was changed to *the linguistic coding differences hypothesis (LCDH)* in 1994, firstly, in order to emphasize the individual differences in basic language propensities; secondly, to focus attention on the fact that language learning ability exists on a continuum, with foreign language learning difficulties ranging from mild to severe; and thirdly, to assert that there is no such phenomenon as a foreign language learning disability (FLLD).

On the proposed continuum, dyslexic students constitute the most severely affected cases. They, however, can, to some extent, become proficient in a foreign language and they do not necessarily have to impede successful foreign language acquisition (Mabbott, 1995). As a consequence, they should be encouraged to study foreign languages and should be provided with tutoring assistance (Nijakowska, 2010:68-73).

The challenge for the teachers of modern languages is to make the language as motivating as possible, reassuring the dyslexic student that success is possible.

The general development in language teaching has facilitated a more natural inclusion of dyslexic students in foreign language classes, and technological materials are of great help.

3.1. *Foreign language acquisition and the dyslexic students*

The dyslexic student who begins to study a foreign language may show an initial curiosity and excitement towards the new language, because it is considered a possibility for a new, successful restart. However, this early enthusiasm is doomed to weaken since dyslexic students have to face a number of learning difficulties.

Actually, foreign language learning causes various problems linked to typical limits that dyslexic students display, and it can be a very complex task from a cognitive point of view. Dyslexic students, in fact, not only find it difficult to learn grammar and write a foreign language, but often exhibit severe difficulties with phonological coding, that is grapheme-to-phoneme conversion, and vice versa, and construction of a representation in memory. Learning to read involves phonemic awareness and this is an immediate disadvantage for dyslexics. Furthermore, foreign language learning employs intensive memorization, both short-term memory and long-term memory: dyslexic students have difficulties both in storing words and in recalling them, and this is an obstacle for the development of the language learner's interlanguage.

Dyslexic students may also find it hard to understand the relationships between letters and sounds and to remember sounds clearly and long enough to repeat them correctly. Consequently, listening, speaking, reading and writing will all, directly or indirectly, be affected. It is therefore erroneous to believe that avoiding the reading and writing is a good solution for the dyslexic foreign learners. On the contrary, to develop the learner's interlanguage, all four language skills should be used, and this allows to avoid a complete failure (Dal in Reid et al., 2008:443-444).

As far as affective variables are concerned, dyslexic students exhibit a low level of motivation and a high level of anxiety because they often perceive themselves as deprived of the academic capacities to acquire adequate competence in a foreign language and less capable of developing both the oral and written skills.

This *linguistic anxiety* is generated by the language learning process and it emerges, mainly, when the dyslexic student is asked to perform particular anxiety-inducing tasks, such as (Daloiso, 2012:64):

-reading aloud, in particular in front of the classroom;
-reading aloud and, contextually, translating the text or answering comprehension questions;
-learning by heart a text and repeating it to an audience;
-memorizing lists of words without a context;
-giving a rapid answer to a question;
-improvising dialogues or dramatizations without any proper support to consult.

A number of studies clearly claim that foreign language learning difficulties are not provoked by the affective variables. On the contrary, the affective differences between good and poor foreign language learners seem to depend on the intensity of difficulties they have to face during foreign language learning.

Therefore, it is essential to let the student learn in a relaxed environment avoiding feelings of stress and apprehension.

Generally speaking, dyslexia is thought not to have any negative consequences on the socio-pragmatic use of the foreign language, provided that the learning process occurs in a stress-free and positive context.

In order to become aware of the development of the metalinguistic competence in dyslexic students, it is necessary to analyze the different components of the language (Daloiso, 2012:72-73):

1. phonetic grammar: it concerns the sounds combination rules, prosody and accent of a language. This is a fundamental ability, but it causes many problems to dyslexic students since they exhibit a poor phonological awareness;
2. lexical grammar: it concerns the vocabulary and the use of words; this area turns out to be difficult for dyslexics since it makes extensive use of memory systems;
3. orthographic grammar: it is a particular complex area for dyslexic students because it involves phoneme-to-grapheme conversion;
4. morpho-syntactic grammar: it involves the study of syntax, words' formation and declination rules, and so forth. This area do not directly affect dyslexia, even if dyslexic students may find it difficult to apply abstract rules in mechanical and decontextualized exercises;

5. textual grammar: it involves the use of coherence and cohesion rules that allow to relate the sentences of a text in a logical manner. This area may seem to be impaired in dyslexic, but, indeed, textual difficulties are a consequences of a scarce and inadequate development of the previous levels of grammar.

Communicative competence, nevertheless, should be considered complete only if the student integrates linguistic elements with non verbal codes and cultural aspects: these areas are very important for a successful communication and they are absolutely not affected by dyslexia.

- ***Differential dyslexia***

According to Smythe and Everatt (2002) the manifestations of dyslexia may be different depending on the type of language spoken or studied: they define this occurrence *differential dyslexia*.

This happens because certain languages allow the students to exploit the same strategies used in his or her mother tongue, while other languages make them learn new techniques that are more efficient for the foreign language.

Daloiso (2012:74-75) makes a list of the factors that may influence language learning, particularly when the student is dyslexic:

1. *Similarity between L1 and L2*: two languages may be similar for different aspects, such as:

-*phonology*: it involves the comparison between the phonological system of the mother tongue and the phonological system of the foreign language. One of the main aspect to consider is if a language is isosyllabic or isoaccentual, since this factor may influence syllable and, consequently, phoneme discrimination.

-*morphosyntax*: it involves the properties related to the nominal and verbal systems of a language that determine the morphosyntactic distance between two languages;

-*lexicon*: it concerns the formal and semantic similarity between the words of a foreign language and the words of the student's mother tongue.

2. *Orthographic transparency:* it is increasingly being recognised as a significant aspect in determining the manifestation of dyslexia in

individuals: in some languages with shallow orthographies, such as Italian, the orthographic mapping, that is the association between phonemes and alphabetic letters, is fairly simple. On the contrary, in languages with a deep orthography, such as English, the spelling system is more irregular and unpredictable: consequently, there is an additional difficulty for dyslexic students.

Different language systems seem to affect brain development: it is argued that different writing systems generate distinctive networks and differential use of areas of the brain involved in reading during the development of reading skills (Bolger et al, 2005). The complexity of a language influences the speed and efficiency with which literacy is acquired, the structure of the brain and the processes implicated in reading.

The processing involved in a more transparent language is quicker than English, which demands both the simple alphabetic mapping system and the logographic process with longer involvement of the areas connecting phonemes and meanings, consequently causing more difficulties for learners. Learning a regular orthography can encourage faster acquisition of phonological awareness and support the literacy in a less regular orthography (Everatt et al, 2010).

Consequently, manifestations of dyslexia would vary across languages reflecting the transparency existing between their orthography and phonology.

Therefore, research findings generally indicate that the level of transparency determines the stage at which phonological processing deficits begin to obstruct reading and spelling skills and there is proof that, in transparent languages, dyslexia is more expected to manifest in terms of speed and fluency difficulties (Everatt et al., 2012:24).

3.2. *Treatment and teaching*

To help dyslexic students overcome their problems and to develop their interlanguage, it seems essential to focus principally on questions regarding (Dal in Reid et al., 2008:444-445):

1) Phonological processing: that is poor grasp of sound, lack of awareness of individual sounds within words;

2) Memory: working memory might be limited and there may be inaccurate representations in the long-term memory;
3) Auditory discrimination: dyslexic learners may be uncertain of the sound which has been heard and may exhibit difficulty in discrimination between similar sounds or in knowing where a spoken word ends and a new word begins;
4) Sequencing: dyslexic students may find it difficult to get things in order, for example, letter order in words;
5) Speed of processing information: dyslexic students may show a tendency to be slower in responding to incoming information;
6) Visual discrimination/recognition: foreign language learners with dyslexia may show evidence of poor ability to differentiate between similar-looking words.

So as to reduce the literacy problems of individuals with dyslexia, it is crucial to improve automatisation of the reading and spelling skills through carefully planned, supervised and long-term reading teaching (Nicolson & Fawcett, 2001).

- ***Teaching Methods and Approaches***

The teacher has a central role in a foreign language classroom, since the learning process does not occur in a foreign environment, but in a formal context; therefore his or her methodological and educational choices may have a great influence on the language learning of a dyslexic student.

Teachers now recognize the necessity to adopt an assorted approach, which integrates elements from the variety of methods offered. Most language teaching methods nowadays give emphasis to oral communication, although many teaching programmes underline the importance of grammatical awareness and reading competence.

Teaching methods, as "approaches in action," are of course the practical application of theoretical findings and positions. It should come as no surprise to discover a wide variety of these applications over the last hundred years, some in total philosophical opposition to others (Brown 2001: 17-18).

A single, universal, optimum method for teaching and learning modern languages, then, does not exist. There are, instead, a variety of approaches described below:

A) *The Classical or Grammar-Translation Method*: it represents the tradition of language teaching employed in western society. It involves the study of grammatical rules and morphology, and it requires written exercises, translations and activities of vocabulary memorization. Lessons are conducted in the mother tongue, with little active use of the target language, the context of texts is not much taken into account, and much vocabulary is taught in the form of lists of isolated words; teachers show little or no interest for pronunciation. This method can be used for teaching the classical languages, such as Latin or Greek, but it has no efficacy for modern languages teaching.

B) *The Structural Approach*: this approach arises within the Neo-Behaviourist psychological and learning theories according to which the learning process is achieved through the sequence "Stimulus-Response-Reinforcement (rewards or punishments)". The learner is considered a *tabula rasa*, an empty vessel into which the teacher pours knowledge. According to this approach learning a language means acquiring habits. A new linguistic stimulus, based on specific grammatical structures, is first heard and analysed by the teacher who, afterward, gives explanation of the grammar rules. In a second moment, the student has to apply the rules in specific grammatical exercises, such as sentences to complete or modify. The conclusion of the learning process consists of a feedback stage, during which the teacher gives the tests solutions, confirming or correcting the students' hypothesis.

   This approach is particularly complex for the dyslexic student since:

   -the input exploits a single sense, predominantly the sense of hearing and the dyslexic student has a limited perception of acoustic signals;

   -there is no explicit teaching of phonetics, causing serious difficulties to dyslexic students that exhibit a poor phonological awareness;

   -the teaching process focuses on morphosyntactic rules that are to be memorized through mechanical exercises.

Students are not able to communicate in the foreign language and functional and intercultural competence are underestimated.

A positive aspect of this approach for the dyslexic is the explicit teaching of grammar.

C) *The Communicative Approach*: it emerged during the 1980s and 1990s under the influence of the theories of Krashen and it focuses on the communicative functions of language.

Brown (2001: 43) provide a useful overview:

1. Classroom goals are focused on all of the components (grammatical, discourse, functional, sociolinguistic, and strategic) of communicative competence.
2. Language techniques are intended to engage learners in the pragmatic, authentic, functional use of language for meaningful purposes.
3. Fluency and accuracy are seen as complementary principles underlying communicative techniques.
4. Students in a communicative class have to use the language, productively and receptively, in spontaneous contexts. Teachers must therefore provide the students with the skills required for communication in those contexts.
5. Students are given opportunities to focus on their own learning process through an understanding of their own styles of learning and through the development of appropriate strategies for autonomous learning.
6. Teacher have the function of facilitators and guides, and are not considered the only owners of knowledge. Students are therefore encouraged to construct meaning through genuine linguistic interaction with others.

This broad view of the language includes not only the linguistic skills, but also functional, meta-linguistic, intercultural competence, and this is a positive aspect for dyslexic students. Nevertheless, an approach excessively communicative, may also have negative effects, because it requires an active and autonomous use of the foreign language since the early stages of the learning process, creating linguistic anxiety. The study of phonology, moreover, still has a secondary importance and lesson's structure is not

transparent: this may create feelings of confusion and disorientation in the dyslexic students that cannot understand the purposes of the class.

D) *Formative-Communicative Approach*: Italian research has found a limit in the communicative approach, because it considers language only communicative vehicle, while, according to this new approach, a language is also a didactic instrument. Foreign language teaching is not only a mere "linguistic training" because it has high influence on the psychological, cognitive, social and cultural development of the student.

Therefore, this approach can be considered *communicative* because the learning process occurs in authentic communicative contexts and it involves the learning of communicative elements as well as formal rules; but it is also a *formative* approach because learning a language facilitates the development of social, cognitive and pragmatic abilities.

This approach has the same positive and negative consequences on the dyslexic students, but the importance given to extralinguistic elements is an advantage for their overall growth.

- ***Needs Analysis***

The analysis of students with special needs, dyslexic learners included, starts with a stage of observation: teachers should examine the students identifying their linguistic difficulties and their favourite learning modalities.

Given and Reid (1999) claim that there are several instruments for the identification of individual learning styles; these instruments usually focus on factors that seem to influence the learning process. These factors include (Reid et al., 2008:372-373):

-modality preference: the preference for visual, auditory, tactual or kinaesthetic input;

-personality types: such as intuitive, risk taking, cautious and reflective;

-social variables: including the need to work alone or in group;

-cognitive processes: such as memory, comprehension and methods of information processing;

-movement and laterality: such as active learning and left and right hemispheric activities.

Beyond these factors, all styles of learning are mediated by the learners culture, the classroom climate, teaching style and expectations.

This initial stage of observation is important both when the student already knows to be dyslexic and when the diagnosis still misses. If it is to be the latter, teacher's observations may lead to an official warning and to the discovery of dyslexia.

With reference to foreign languages, a dyslexic student may exhibit several anomalous behaviours that constitute significant warning signs to be attentively analysed:

-*oral skills*: in this area, dyslexic students have difficulties in understanding an oral text in the foreign language and also in repeating letters, numbers, or in improvising dialogues and role-play, and so on.

-*writing*: this area mostly concerns receptive tasks, that is reading, but also copying from the blackboard and identifying the graphic form of a word just pronounced.

-*lexicon*: dyslexic students often use a simple and vague vocabulary; furthermore they find it difficult to remember and repeat long words or to spell.

-*morphosyntax*: dyslexic students may find it difficult to reuse grammatical rules they have studied. The most difficult tasks concerning grammar are: dividing compound words, identifying suffixes and prefixes, recognizing the basic elements of a sentence (subject, object, verb), and so forth.

-*phonological awareness*: average students exhibit phonological difficulties with a foreign language; a dyslexic student also shows negative outcomes in meta-phonological tasks in his or her mother tongue.

Dyslexia is usually identified and assessed at primary school. Nevertheless, some dyslexic students may experience difficulties with higher order skills, which do not appear until secondary school. It may be due to a busier secondary school timetable that cause the elimination of many of the strategies that "hidden" dyslexic students developed at primary level to mask they were experiencing difficulties.

It may be difficult for teachers to detect dyslexia in secondary school. The first indication that dyslexia is present may be a divergence between a student's apparent ability and the quality and quantity of written work in some subjects. In addition,

many dyslexic students may often appear unable to concentrate, inattentive and uncooperative; consequently, they frequently have low self-esteem and poor motivation and become discouraged by their learning difficulties if mistaken for laziness or lack of interest by teachers and parents.
Teachers must be the first to recognize that students are experiencing difficulties and that an investigation should be started.

- ***The Individualized Education Plan (IEP)[1]***

The observation stage culminates with the elaboration of an Individualized Education Plan (IEP) that establishes aims, methodologies and criteria of valuation for students with special needs.
Each individual education plan is shaped for a particular student and it depends on his or her strengths, needs and aspirations and it needs to be monitored and reviewed, to judge if it is efficient. A really effective individual education plan should be shared with the student and with parents that play a crucial role in helping to develop significant objectives and in executing aspects of the agreed plan. The individual education plan gives the students specific goals, that are realistic and attainable and gives them motivation and direction. An IEP should consider the following points (Nugent, 2005):
• The nature and degree of the child's abilities, skills and talents;
• The nature and degree of the child's special educational needs and how these needs affect his/ her progress;
• The present level of educational performance of the child;
• The special education and related support services to be offered to the child.
The IEP, therefore, is the starting point for a didactic action and the goals to achieve are not to be considered in terms of contents, but of abilities to develop.

As far as foreign language teaching and learning for dyslexics are concerned, teachers have to focus on two groups of goals to achieve (Daloiso, 2012, 119-126):

[1] In italiano: Piano Glottodidattico Personalizzato (PGP)
Appendice 1: Modello PGP (Daloiso)

A) *Formative aims:*

1-*Personal domain:* it concerns an emotional dimension, that is the relationship between the student and the language that he should learn since the teacher should stimulate the learner's curiosity towards the foreign language and culture. Also a meta-cognitive dimension is involved, as the teacher should value which are the more adequate strategies that allow foreign language learning.

2-*Cultural domain:* dyslexic students do not have any difficulties to discover, observe and analyze foreign cultural models, but the teacher should introduce these cultural elements with multi-sensorial inputs.

In Secondary School, the study of foreign literature becomes part of the cultural domain as well. The study of literature should allow the students both to be acquainted with the history of literature and to broaden their vocabulary. This second aim is not fundamental for dyslexic students that, rather, should memorize high frequency words; teachers, then, are allowed to let them study literature in their mother tongue.

3-*Social domain:* the teacher should examine the progress and the participation of the dyslexic students in group works.

B) *Linguistic aims:* this area entails the development of the communicative competence that includes linguistic abilities, communicative functions and meta-linguistic competence.

Different school ranks require to achieve particular aims: during Primary School years oral production and comprehension are prioritized, while written skills have a secondary role; furthermore, communicative efficacy is considered more important than grammatical accuracy. In the Secondary School, teachers follow a path that should let students achieve at first a global comprehension of texts, both oral and written, then to selective comprehension and finally to an analytic comprehension. As far as linguistic productions, both in the oral form and in the written form, are concerned, teacher aspire to the progressive achievement of adequacy to the context, lexical exactness, cohesion and coherence. Furthermore, students should develop a meta-linguistic competence learning to reflect on linguistic properties of the language, in comparison with their mother tongue as well.

As far as this linguistic area is concerned, a IEP should include the following steps:
1-*Linguistic prerequisites:* the IEP should predict the recovery of phonological and orthographic abilities that are insufficiently developed in dyslexic learners and that are not adequately studied in typical classes.
2-*Comprehension:* for dyslexic students is sufficient to achieve a good level of global comprehension, both in the oral and in the written form.
3-*Interaction:* adaptation in this area is not required, but the IEP should make explicit the specific aims of the teaching program. The student should become able to communicate with efficacy, and utter clear messages even if not completely correct from a grammatical point of view, with the help of non-linguistic tools if needed. He should learn to use linguistic structures and vocabulary as precisely as possible, and to be adequate to the communicative context, using the proper linguistic register.
4-*Production:* also in this domain the teaching program should aim to the development of communicative efficacy, adequacy to the context, linguistic pertinence, cohesion and textual coherence.
5-*Meta-linguistic competence*: it seems important trying to develop meta-linguistic competence since the early stages of linguistic learning by means of an explicit linguistic teaching, as dyslexic students need to be guided to build up specific strategies for reflecting upon the various aspects of the language.

Once the didactic objectives have been decided, the teacher has to formalize in the IEP the compensatory and dispensatory measures that will be granted to the student with special needs.
The compensatory measures are teaching tools and technology, such as computer and concept maps, that facilitate the task in which the student has difficulties. For example, the teacher can decide to elaborate specific activities with the aim to develop phonological and orthographic skills that are poor in dyslexic learners.
The dispensatory measures are interventions that permit the dyslexic student to not perform certain tasks which are particularly difficult and that do not improve learning.
The didactic choices depend on the gravity of the disturb:

-in case of serious dyslexia, with comorbidity with dysgraphia and dysorthography, the teacher can decide to exempt the dyslexic student from written work, converting them into oral activities. As far as comprehension is concerned, the dyslexic student can benefit from audio-books, digital readers or from an official reader during the lessons. These dispensatory measures are to be used also during texts and examinations.
-in case of tolerable dyslexia the teacher can privilege the oral dimension of language, but can pursue basic aims in relation to reading and writing activities.
-in both cases the teacher should avoid the situations that can cause linguistic anxiety, such as asking the dyslexic student to read aloud in front of the rest of the class, to translate instantaneously, to answer rapidly to comprehension questions, to memorize texts and repeat them aloud, to improvise dialogues without any support. An important compensatory support, actually, is the 'prompt', that is a driving scheme that the student can consult to call to mind words and linguistic structures, since dyslexic students have memory difficulties.

IEP is an important instrument to make aware the dyslexic student and his or her parents of the difficulties generated by dyslexia in foreign language learning, becoming conscious of the goals they can achieve. Furthermore, they can partially negotiate the compensatory and dispensatory measures with the teacher.
The IEP is also a manner to let the class know what dyslexia is and why dyslexic students are offered special instruments.

The Individualized Education Plan permit the teacher to define the didactic techniques and the evaluation criteria that will be used.

- ***Teaching Techniques***

The didactic unit, or the lesson, should have clear structure and explicit aims because dyslexic students may show feelings of frustration and confusion if they do not understand what the teacher is explaining and why. The teacher could give to the dyslexic learner a plan of the lesson that can be frequently consulted. The contrary may also be done: at the end of the didactic unit the teacher could ask the

student to do a metacognitive reflection, resuming what has already be done and hypothesizing which the following goals could be.

Reid (1998) stresses the need for the application of a structured approach, so that learning can appear in a linear developmental manner, which enables learners to grasp a particular skill before advancing to a subsequent one (Nijakowska, 2010:123).

Furthermore, since dyslexic students have memory problems, the teacher should frequently recap the topics studied and the competences developed in the previous lessons and intensive rehearsal encourages more complete mastery of the subjects before the new information is introduced. Dyslexic students, moreover, should perform certain tasks autonomously using supplementary educational material. Self-dependence is achieved gradually, starting with guided practice, through supported practice to independent practice.

Therefore, children with dyslexia require plenty of reinforcement, repetition and overlearning, which are meant to eventually lead to automaticity (Deponio et al., 2000; Reid, 1998; Thomson &Watkins; 1990).

In general, identification of measures and methods is particularly important due to considerable differentiation as to the type, range and intensity of developmental disorders and learning difficulties.

The direct *multisensory structured approach* is promoted for teaching reading and spelling in the native language to children with dyslexia.

Originally, the programme became known as the Orton-Gillingham (OG) instructional approach (Gillingham & Stillman, 1997) and has been successfully used to teach reading and spelling to students with native language learning problems (Crombie & McColl, 2000; Jameson, 2000; Miller & Bussman Gillis, 2000).

The simultaneous activation of the auditory, tactile, visual and kinaesthetic pathways makes up a basic component of the multisensory approach: the simultaneous presentation of linguistic material with the use of many sensory channels benefit individuals with dyslexia, as the more modalities involved in the learning process, the more effective it appears to be. In fact, if a stimulus is

complex, it activates several receptors and perception of information is realised simultaneously through several sensory channels (Nijakowska, 2010: 125).

Sparks et al. (Ganschow & Sparks, 2000) transferred the multisensory approach into the field of foreign language teaching, since they assumed that early and frequent presentation of print in a foreign language, combined with listening and speaking activities, could be advantageous for at-risk foreign language learners because it provides a multisensory input. It has been demonstrated that dyslexic students who receive direct multisensory instruction in the phonology/orthography of a foreign language significantly improve their development of the phonological/orthographic competence (Nijakowska, 2010: 128). Direct multisensory instruction in a foreign language not only substantially improves foreign language learning, but may also increase native language phonology (Ganschow & Sparks, 1995; Sparks et al., 1992b).

According to Daloiso (2012:140-142), the most efficient strategies to realize this multisensory approach are:

-chromatic encoding, which may help dyslexic students to overcome certain ambiguities of the written codes;

-sensorial supports, such as pictures or concrete objects that can be used, touched and manipulated, a technique particularly useful for younger learners;

-psychomotor activities, which involve associations between language and coordinated movements;

-holistic experiences, such as sport, theatre and, for children, playful activities conducted in the foreign language.

Dal (in Reid et al., 2008: 447-453) claims that the development of the learner's interlanguage is crucial for learning a foreign language, but this becomes difficult for dyslexic students because of problems linked to phonological processing, inaccurate representation in long term memory, sequencing, poor ability to differentiate between similar looking words and difficulty to discriminate between similar sounds. Dal, later gives examples of a 'dyslexic friendly language instruction':

1) *Support to develop phonological awareness*

An important goal of foreign language teaching to dyslexics is to help dyslexic students become aware of the sound system of the target language, so as to increase their word reading and spelling skills in the foreign language as well as their pronunciation of new vocabulary.

At the beginner's level of foreign language learning phonological awareness is typically exercised through games of rhyming. However, it might be necessary to prepare special exercises for dyslexic students.

If the target language is English, phonological awareness programs may make use of an every-day vocabulary and include, for example, visual prompts, such as picture representation of words: a typical task would be to order a row of pictures according to which words rhymed or to order the words according to the first sound of the words.

Dyslexic students can find it extremely difficult to develop a sufficient phonological awareness. Rather, it seems to be easier to manipulate larger sounds segments, such as syllable segments; exercises could become even easier when the syllable to manipulate is also a meaningful unit, that is a word or a morpheme as it eases the load on the student's working memory.

Therefore, teachers should initially work with meaningful syllables (i.e., *what is left if you take away* car *in* carpet*?*); then, they can move on to syllables that are nonsense segments (i.e., *what's left if you take away* /tic/ *from the word* tic-ket = ket). Later on teacher can work with onsets and rimes in one-syllable words (i.e., *what's left if you take away* /m/ *in the word* mice*? Can you get another word if you change the first sound of* mice *for example shift it with a* /d/ = dice). Finally it is possible to move on to awareness of phonemes in words (i.e., *what is the first sound in the word* mice = /m/).

It is particularly difficult for dyslexic students to manipulate the individual sounds of words. However, awareness of the individual phonemes of words is the main prerequisite of word identification, or decoding, and spelling; for this reason, the phonological awareness teaching should include a large number of exercises at the phoneme level.

At present, one of the most followed theories claims that the phonology identities in lexicon of dyslexics are more indistinct than those of normal readers, and this indistinct phonological identities would cause a poor ability to discriminate between words or sounds that share many common traits (i.e., /p/ and /b/) and consequently poor word learning and listening comprehension. Thus, helping the dyslexic student to get a higher degree of phonological awareness also will make it easier for the same person to develop a useable interlanguage.

The aim of teaching phonics is predominantly to gain the knowledge that written words are built of letters or clusters of letters that represent the sounds of spoken words and to acquire those systematic relations between letters and sounds. Not until sounding out letters and spelling patterns is automatic can readers naturally concentrate on meaning rather than on decoding while reading (Nijakowska, 2010: 154).

2) *Support to listening comprehension*

Phonological awareness is not only important for the development of reading and written skills, but also for listening comprehension.

The teacher should prepare the students before each listening comprehension exercise, by means of pictures related to the topic or providing information about the main characters or events in the text.

Dyslexic students need to listen to the information several times before reporting the information or answering questions about the text. It could be useful let them listen to the text at home and also work in smaller groups. Under certain circumstances the dyslexic student might also hear a 'slowed down' version of the text in order to have longer time to comprehend the information. However, it is fundamental that the speech sounds are not distorted in the process.

3) *Support to word learning*

Word learning can be considered a prerequisite for the development of the learner's interlanguage. Nevertheless, the dyslexic students' phonological processing problems impede the inductive word learning practice through exercises of the communicative language classes.

Dyslexic students should have extra time and should participate in special word learning tasks to learn and improve new vocabulary. They must learn the pronunciation of the word and use it in spoken language exercises in order to reinforce both the meaning and the sound of the word, and they must also learn the spelling and use the word in their own writing as well as be able to read it.

The multisensory approach is very useful for the development of dyslexic learners' vocabulary, especially when touch and movement are used. This will give the child's brain tactile and kinetic memories to hang on to, as well as the visual and auditory ones.

- ***Evaluation Criteria***

Special accommodations can be made available to students with dyslexia during scholastic examinations in order to limit the impact of the candidate's disability on the exam performance, while not giving the candidate any unfair advantage.

Formal tests and examinations can present challenges for dyslexic candidates: speed of processing, organising information, sequencing, short term and working memory, reading accuracy and automaticity and fluency in writing can all be particular issues preventing the dyslexic candidate from achieving their potential. Dyslexic students may have difficulty with legible handwriting and, in addition, they can be prone to stress, and this may increase their difficulties (British Dyslexia Association).

If the student suffer from a severe form of dyslexia the IEP imposes to avoid written tests that should be converted in oral examinations.

If written tests are admitted it is important that the teacher proposes types of exercises that the student already knows, written in a clear format. In general, accommodations can include**:**

-extra time (30% is usual): it is an effective compensatory measure;

-a reader;

-using a computer instead of handwriting;

-using assistive software (screen reader/voice recognition);

-exam papers to be on a coloured paper in dyslexia friendly font;

-shorter tests: if a test is too long and consists of more that one parts, it can become cognitively difficult for dyslexic students.

Also during oral examination, the dyslexic students can benefit from certain compensatory or dispensatory measures, since they have memory difficulties and may show signs of linguistic anxiety: they should be previously informed about the test and they are allowed to have extra time of preparation and the possibility to consult a prompt or maps.

As far as the evaluation is concerned, teachers should evaluate dyslexic students considering their performance in connection with their learning path: their concrete results may actually be below the class average, despite their progress.

It is then important that evaluation parameters agree with the choices previously clarified in the IEP.

A) Linguistic Parameters

-*Comprehension*: depending on the school ranking the student will be evaluated for his or her ability to understand a text in a global, selective or analytical manner respectively.

-*Interaction*: in this field evaluation parameters are communicative efficacy, adequacy to the context and linguistic appropriateness.

-*Production*: also in this field evaluation parameters are communicative efficacy, adequacy to the context and linguistic appropriateness and, in addition, cohesion and textual coherence. As far as linguistic appropriateness is concerned, dyslexic students should be evaluated as their classmates for the correct use of lexicon and grammar structures, but not for the orthographic correctness, even if they have not been dispensed with written examination.

-*Metalinguistic competence*: it cannot be verified only on the base of written grammatical exercises, but it is important to consider the students' ability to reflect upon the language itself; therefore, evaluation parameters could be the ability to advance hypothesis about the working principles of language, the ability to compare the foreign language and their mother tongue, the ability of conceptual elaboration of linguistic rules.

B) Student-oriented Parameters

Scholastic evaluation does not simply verify students' performances, but also their learning progress. Therefore, two significant parameters have the same importance: the teacher should consider both the personal progress of a student and the formative dimension. Consequently, the results obtained in the written and oral tests should be integrated with the personal, relational and cultural spheres in order to reach a global judgement of the student.

3.3. *"Dyslexic Friendly" Materials*

- ***New Technologies***

New computer technologies are very useful for dyslexic students in the process of learning a foreign language, especially when reading a text in a digital format: today it is, in fact, possible to benefit from various screen readers that analyse texts on screen and output is a synthetic speech. Research clearly shows that synthetic speech helps dyslexic students better to understand written language. Furthermore, certain software programs allow the student to listen to his or her own reading of the text, permitting them to check their errors and to improve their pronunciation.

Another technical and efficient tool is the 'talking pen', a handheld scanner which can scan texts from books to the inner memory of the pen and shows it on a display. It is also able to transfer the scanned paper text to a computer. More advanced examples of 'talking pen' can read the scanned text line aloud with a synthetic voice.

At present there is a large number of computer programs that can help the dyslexic student to learn a foreign language: the teacher, therefore, should secure that the dyslexic student has access to tools such as a screen reader, or 'talking pen', and the necessary language programs both in school and at home (Dal, in Reid et al., 2008: 451-453).

Melero (in Daloiso, 2012) makes a summary of the technological compensatory supports for foreign language learning for dyslexic students. According to his

analysis, there are several parameters to consider when choosing hardware and software:

-they should be easily employed by students;

-since they are used for a complete integration of the dyslexic student, they might also be used by the rest of the class, becoming, in this way, a valid didactic instrument;

-hardware should be multifunctional and multimedia and software multimedial and multidisciplinary.

At school it is up to the teacher to decide the proper technological supports for dyslexic learners, while at university dyslexic students themselves choose hardware and software. Melero lists the technologies available:

A) *Hardware*: at present, teachers and students may decide to use computers and notebook, that are very effective even if expensive and bulky. An alternative are new technologies, such as tablet and smartphones that have the advantage of being extremely handy and the Apps to install are not expensive; the screen of smartphones, however, are too small and this is a negative factor for a practical didactic use.

B) *Software*: there are several software to help dyslexic students, both for free and with fee.

As far as reading is concerned, besides the digital books, the most known software are:

-*Balabolka*, a free screen reader that reads Window files and DOC, RTF, PDF, HTML documents and reproduces them with a synthetic voice. It is possible to regulate intonation and speed of reproduction;

-*DSpeech,* it is a free program able to read aloud written texts. It is possible to save the output in the form of Wav or Mp3 files and to select different voices, in order to create dialogues;

-*ALFa READER*, it is a compensatory vocal reader produced by Erickson on 8 Gb USB keys that allows to listen to Word and pdf texts. It underlines words while reading them, and allows to record the text read. It costs about 150 euros;

-*Vocal Reader*, it is a vocal reader of files and documents, ad is able to read any file with legible texts and WEB pages (.pdf, .opf texts, or web pages, .doc, .xls, ppt, .wri, .rtf, etc…). It allows to record the vocal reading as audio file (.wav, .mp3), and it may be used with any version of Windows. It is possible to download 30 voices of 11 different languages. It costs around 35 euros;

There are also Apps for tablet and smartphones, such as *Cool Reader, Go Read, Vocal Builder and Words Words Words* for Android, and *Speak it!, vBookz* for Apple devices.

As far as writing is concerned, available software are:

- *Carlo II*, that is a texts editor provided with vocal synthesis. It facilitates writing processes and text processing. It costs approximately 240 euros;

-*CARLO Mobile*: it is a set of apps grouped together in a single interface. It costs around 300 euros with a vocal synthesis Loquendo in Italian, and around 400 euros with vocal synthesis Loquendo in Italian plus a foreign language;

There are also numerous free software with spellchecker to write documents, spreadsheets, slides and so on. For example *Open Office* is a packet that contains different programs: word processor, table maker, drawing, database, and so forth. It is available for Windows, Linux and Mac as well. It is a freeware and freely downloadable. It is very useful for dyslexics, since it highlights the orthographic errors.

Various software are also available for creating conceptual maps:

-*CMAP* is a free program that allows the elaboration of conceptual maps available for Windows, Mac OSX, Linus and Solaris systems. It has been developed in Java by the Institute for Human and Machine Cognition of Cornell University of West Florida, and it is downloadable from the producer website[2].

-*Freemind*, an editor for mental maps that is lightweight and rapid and that does not need a large quantity of ram. It is Open source and it is for free.

-*Knowledge Manager*: it is a software based on the principles of cognitive psychology and it is able to imitate certain thought, memory and automation processes. It costs around 90 euros.

[2] http://cmap.ihmc.us/download/.

- ***'Dyslexic friendly' books***

Instructions for make print documents easier to read have been given.

-*Font Style*: There should be space between letters, fonts should be rounded and should reflect ordinary cursive writing. It is suitable to select fonts such as Arial or Comic Sans. Other suggestions include Verdana, Helvetica, Tahoma, Trebuchet and Sassoon. It should be used a minimum of 12pt or 14pt font size and lower case letters are to be preferred since capital letters for emphasis can make text harder to read.

-*Paper*: it is better to avoid light text on a dark background and to use coloured paper instead of white, for example cream or off-white could be a good option. Furthermore, matt paper is preferable to glossy paper because this diminishes glare.

-*Presentation Style*: presentation can make a big difference, both to readability and initial visual impact. It is important to use wide margins and headings, line spacing between paragraphs to divide the text and it is suitable to avoid long paragraphs. It is possible to use boxes for emphasis or bold rather than Italics, or underlining to highlight titles and instructions. It is important to keep lines left justified with a space between lines of 1.5 to 2. In the section of exercises it is important to write in bold the instructions and to give concrete examples.

-*Writing Style*: long and complicated sentences can be difficult for the reader to comprehend. Therefore it is important to write in short simple sentences, to use short words and to be clear and concise.

A project concerning the foreign language learning to dyslexic students has been developed by a group of researchers of the University Ca' Foscari of Venezia. It is known as DEAL (Dislessia Evolutiva e Apprendimento delle Lingue) and it is a group of research guided by Professor Michele Daloiso that shoots for the study of the learning process in students with special needs and for the development of new specific didactic methodologies.

A large number of professors and researchers are involved in the development of DEAL[3] and it takes also advantage of the collaboration of important partners, such as the Associazione Italiana Dislessia and the Oxford University Press.

DEAL conducts different lines of research:

-the foreign language learning in children, teenagers and adults;

-the role of phonological awareness in foreign language learning;

-specific problems caused by dyslexia during the foreign language learning process;

-didactic technologies and compensatory measures.

The results obtained are subsequently related in scientific publications.

In cooperation with the Oxford University Press, researchers of group DEAL have conducted the project and the realization of 'dyslexic friendly' books for the English as Foreign Language learning that are easier for dyslexic students to read[4].

[3] Staff:
Didattica dell'inglese: Dott.ssa Verusca Costenaro, Dott.ssa Luciana Favaro, Dott.ssa Antonella Pesce
Didattica dello spagnolo: Dott. Carlos Melero,
Didattica del francese: Dott.ssa Paola Celentin, Dott.ssa Barbara D'Annunzio
Didattica del tedesco: Dott.ssa Melania Spinello
Didattica dell'italiano a stranieri: Dott.ssa Paola Celentin, Dott.ssa Barbara D'Annunzio, Dott.ssa Anna Toscano

[4] For an example of 'dyslexic friendly' English books, see Appendix 2 (Jon Hird, *The Complete English Grammar* for Italian students) and Appendix 3 (Student's Book of *Headway Fourth Edition Elementary*)

CHAPTER 4

L'obiettivo di questo capitolo è quello di analizzare le iniziative portate avanti dalle Università italiane per garantire un'adeguata formazione agli studenti con dislessia. Una particolare attenzione sarà rivolta all'Università di Pisa all'interno della quale è stato istituito l'Usid[5] che, grazie all'attività dello Sportello Dislessia, garantisce l'integrazione degli studenti dislessici e fornisce loro il necessario supporto.

Anche il Ministero della Pubblica Istruzione riconosce la dislessia come una differenza individuale specifica e diagnosticabile sul piano clinico. Pertanto, si è giunti all' emanazione di una normativa specifica, la legge 170/2010, e di linee-guida ministeriali che consentono ai docenti delle scuole di ogni ordine e grado di avere un riferimento omogeneo per l'adozione di pratiche educative adeguate per gli allievi con bisogni speciali.

Commenterò brevemente la legislazione italiana in materia di dislessia mettendola a confronto con le leggi di altri paesi europei ed extraeuropei.

Infine, presenterò le interviste svolte con alcuni studenti dislessici dell'Università di Pisa che frequentano diversi corsi di Laurea dell'ateneo.

4.1 Legislazione italiana e internazionale in materia di dislessia: uno sguardo di insieme.

Daloiso (2012, 188-211) approfondisce gli aspetti fondamentali della legge italiana in materia di dislessia.

La prima circolare ministeriale che facesse esplicito riferimento alla dislessia risale al 2004 e promuoveva l'adozione di strumenti *compensativi* e *dispensativi*. Tra gli strumenti compensativi è possibile citare ausili quali tabelle dei mesi e alfabeto per lo studio delle lingue straniere, tabelle delle formule e delle misure per la matematica e, inoltre, strumenti tecnologici come il calcolatore elettronico, il registratore, i programmi di video-scrittura con correttore automatico e sintesi vocale. Questi strumenti hanno lo scopo di permettere allo studente dislessico di

[5] Unità di Servizi per l'Integrazione degli studenti Disabili

ottenere gli stessi obiettivi didattici stabiliti per i compagni di classe. Le misure dispensative da attuare dipendono dal grado di gravità della dislessia: tra le attività dispensabili rientrano, ad esempio, la lettura ad alta voce, il dettato, lo studio mnemonico delle tabelline. Inoltre, la circolare prevedeva adattamenti organizzativi, come interrogazioni programmate o tempi aggiuntivi durante le verifiche, per supportare gli allievi con dislessia.

Questa circolare ministeriale del 2004 rappresenta un decisivo passo in avanti rispetto alla situazione precedente di un sistema scolastico in cui vigeva una totale autonomia e discrezionalità. Tuttavia, anche questa circolare era in molti punti ambigua in quanto non precisava in quali casi specifici andassero applicate le misure dispensative descritte. Inoltre, l'introduzione delle misure dispensative e compensative sollevò la questione circa il loro utilizzo in sede di valutazione ed esame.

A questo proposito, le circolari del 2007 sottolineano che le misure dispensative e compensative non vanno intese come una riduzione dei contenuti di apprendimento, bensì come supporti che mirano a garantire pari opportunità di apprendimento a studenti con disturbi e bisogni specifici. Ciò ha delle dirette conseguenze anche sul piano della verifica e della valutazione: lo studente dislessico non è dispensato dallo svolgimento delle prove di valutazione, ma ha il diritto di usufruire di alcuni strumenti che lo supportino durante lo svolgimento delle prove.

Nel 2009 un'importante nota MIUR e il *Regolamento per la valutazione degli alunni* (DPR 122/2009, Art. 10) stabiliscono che in sede di esame non è prevista alcuna dispensa dalle prove scritte per gli allievi dislessici, ma possono essere utilizzati gli strumenti compensativi adottati durante l'anno scolastico. Gli insegnanti dovranno valutare gli studenti con dislessia prestando più attenzione al contenuto che alla forma e a considerare maggiormente le prove orali per la formulazione del giudizio complessivo, specialmente nel caso in cui le prove scritte non offrono un quadro oggettivo ed esaustivo delle reali competenze dello studente:

Art. 10.

Valutazione degli alunni con difficoltà specifica di apprendimento (DSA)

1. Per gli alunni con difficoltà specifiche di apprendimento (DSA) adeguatamente certificate, la valutazione e la verifica degli apprendimenti, comprese quelle effettuate in sede di esame conclusivo dei cicli, devono tenere conto delle specifiche situazioni soggettive di tali alunni; a tali fini, nello svolgimento dell'attività didattica e delle prove di esame, sono adottati, nell'ambito delle risorse finanziarie disponibili a legislazione vigente, gli strumenti metodologico-didattici compensativi e dispensativi ritenuti più idonei.

2. Nel diploma finale rilasciato al termine degli esami non viene fatta menzione delle modalità di svolgimento e della differenziazione delle prove.

La legge 170/2010[6] ha permesso di regolamentare in modo univoco le pratiche didattiche da adottare con allievi con disturbi specifici di apprendimento: si tratta di una legge-quadro, composta da nove articoli che offre uno sfondo unitario che si era ormai reso necessario e che si inserisce in un quadro legislativo più ampio relativo al diritto allo studio e al successo formativo.

Nel primo articolo si ha il riconoscimento legislativo ufficiale dell'esistenza dei disturbi specifici dell'apprendimento, ovvero dislessia, disgrafia, disortografia, disgrafia e discalculia. Nel secondo articolo vengono indicate le finalità: interventi precoci, sensibilizzazione delle famiglie, diritto all'inclusione scolastica e sociale. Nel terzo articolo viene sancito il compito attivo delle scuole nella diagnosi dei disturbi specifici dell'apprendimento e il ruolo delle ASL nel rilascio delle certificazioni necessarie. Negli altri articoli viene stabilito che gli alunni con DSA debbano poter usufruire di strumenti compensativi e misure dispensative per poter godere di pari opportunità di studio.

Questa legge è corredata dalle *Linee-guida per il diritto allo studio degli alunni e degli studenti con disturbi specifici di apprendimento* pubblicate nel Luglio del 2011 dal Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR). Questo documento è un allegato esplicativo della Legge 170/2010 che ne chiarisce alcuni aspetti e offre un orientamento di carattere metodologico ed organizzativo.

[6] Appendice 4

Alcune parti delle linee-guida ministeriali riguardano da vicino l'insegnamento delle lingue straniere. Dal punto di vista glottodidattico gli aspetti maggiormente salienti sono i seguenti:

-*Analisi dei bisogni*: i docenti, specialmente nella scuola dell'infanzia e primaria, dovrebbero individuare l'emergere di alcune difficoltà che possano indurre al sospetto della presenza di dislessia: ad esempio, difficoltà nella discriminazione fonetica, problemi di memorizzazione, scrittura lenta e poco decodificabile, errori ortografici, scrittura speculare. La scuola dovrebbe in seguito comunicare con la famiglia suggerendo una eventuale diagnosi specialistica.

-*Elaborazione di un piano (glotto)didattico personalizzato*: si tratta di un documento da redigere in maniera collegiale una volta accertata e certificata la dislessia, e si concentra soprattutto sull'individuazione e la formalizzazione degli strumenti compensativi e delle misure dispensative da mettere a disposizione dell'allievo dislessico.

-*La documentazione*: occorre documentare il percorso di apprendimento dell'allievo dislessico in quanto solo il passaggio di informazioni nei vari gradi scolastici permette di realizzare una continuità glottodidattico in termini di obiettivi, metodologie, procedure valutative e così via.

Nelle linee-guide ministeriali c'è un paragrafo dedicato in modo specifico alla didattica delle lingue straniere (*Linee-guida per il diritto allo studio degli alunni e degli studenti con DSA,* 2011: 19-20):

> Poiché la trasparenza linguistica, ossia la corrispondenza fra come una lingua si scrive e come si legge, 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. Analogamente, i docenti di lingue straniere terranno conto, nelle prestazioni attese e nelle modalità di insegnamento, del principio In sede di programmazione didattica si dovrà generalmente assegnare maggiore importanza allo sviluppo delle abilità orali rispetto a quelle scritte. Poiché i tempi di lettura dell'alunno con DSA sono più lunghi, è altresì possibile consegnare il testo scritto qualche giorno prima della lezione, in modo che l'allievo possa concentrarsi a casa

sulla decodifica superficiale, lavorando invece in classe insieme ai compagni sulla comprensione dei contenuti.

In merito agli strumenti compensativi, con riguardo alla lettura, gli alunni e gli studenti con DSA possono usufruire di audio-libri e di sintesi vocale con i programmi associati. La sintesi vocale può essere utilizzata sia in corso d'anno che in sede di esame di Stato. Relativamente alla scrittura, è possibile l'impiego di strumenti compensativi come il computer con correttore automatico e con dizionario digitale. Anche tali strumenti compensativi possono essere impiegati in corso d'anno e in sede di esame di Stato.

Per quanto concerne le misure dispensative, gli alunni e gli studenti con DSA possono usufruire:

· di tempi aggiuntivi;

· di una adeguata riduzione del carico di lavoro;

· in caso di disturbo grave e previa verifica della presenza delle condizioni previste all'Art. 6, comma 5 del D.M. 12 luglio 2011, è possibile in corso d'anno dispensare l'alunno dalla valutazione nelle prove scritte e, in sede di esame di Stato, prevedere una prova orale sostitutiva di quella scritta, i cui contenuti e le cui modalità sono stabiliti dalla Commissione d'esame sulla base della documentazione fornita dai Consigli di Classe. Resta fermo che in presenza della dispensa dalla valutazione delle prove scritte, gli studenti con DSA utilizzeranno comunque il supporto scritto in quanto utile all'apprendimento anche orale delle lingue straniere, soprattutto in età adolescenziale.

In relazione alle forme di valutazione, per quanto riguarda la comprensione (orale o scritta), sarà valorizzata la capacità di cogliere il senso generale del messaggio; in fase di produzione sarà dato più rilievo all'efficacia comunicativa, ossia alla capacità di farsi comprendere in modo chiaro, anche se non del tutto corretto grammaticalmente.

Lo studio delle lingue straniere implica anche l'approfondimento dei caratteri culturali e sociali del popolo che parla la lingua studiata e, con l'avanzare del percorso scolastico, anche degli aspetti letterari. Poiché l'insegnamento di tali aspetti è condotto in lingua materna, saranno in questa sede applicati gli strumenti compensativi e dispensativi impiegati per le altre materie.

Sulla base della gravità del disturbo, nella scuola secondaria i testi letterari in lingua straniera assumono importanza minore per l'alunno con DSA: considerate le sue possibili difficoltà di memorizzazione, risulta conveniente insistere sul

potenziamento del lessico ad alta frequenza piuttosto che focalizzarsi su parole più rare, o di registro colto, come quelle presenti nei testi letterari.
Ai fini della corretta interpretazione delle disposizioni contenute nel decreto attuativo, pare opportuno precisare che l' "esonero" riguarda l'insegnamento della lingua straniera nel suo complesso, mentre la "dispensa" concerne unicamente le prestazioni in forma scritta sopra indicato.

È importante sottolineare che l'esonero è una possibilità estrema e controversa in quanto incide pesantemente sulla carriera scolastica ed extra-scolastica dell'allievo: chi sceglie l'esonero non otterrà un diploma alla fine del percorso di studi, ma una semplice attestazione di frequenza. Ciò, di conseguenza, preclude l'accesso alla formazione universitaria.
Per queste ragioni, l'esonero andrebbe evitato e limitato ai casi di dislessia estremamente severa, con l'accordo consapevole della scuola, della famiglia e dello studente.

La legge italiana si inserisce perfettamente nel più ampio quadro legislativo promosso dall'Unione Europea. Dal 1996 la *European Agency for Development in Special Needs Education* invita gli Stati Membri a promuovere politiche educative di inclusione che favoriscano il successo didattico degli allievi con bisogni speciali, anche nella prospettiva di un adeguato inserimento nella società, da un punto di vista sia personale sia lavorativo. La nozione di *'inclusione'* si fonda sulla valorizzazione delle differenze come diritto civile promossa dall' UNESCO. Dal punto di vista della glottodidattica, le politiche di inclusione devono esplicitarsi in un'integrazione dello studente, la cui partecipazione alle attività didattiche deve essere supportata e favorita sia dagli insegnanti sia dalle metodologie, in quanto l'adattamento glottodidattico sulla base del profilo e dei bisogni degli allievi rappresenta il compito di ogni insegnante di lingue.
La legge, tuttavia, non è sufficiente: serve una maggiore consapevolezza e conoscenza dei disturbi specifici dell'apprendimento per poter rendere efficaci le norme emanate.

A livello internazionale, non sono molti i paesi in cui esistono norme specifiche riguardanti la didattica ad allievi con DSA: molto spesso, infatti, i disturbi specifici dell'apprendimento vengono inseriti nelle disposizioni che riguardano le disabilità psichiche e motorie.

I Paesi più avanzati dal punto di vista delle leggi in materia di DSA sono gli USA e il Regno Unito, forse anche per via della maggiore incidenza della dislessia in paesi anglofoni.

Nel Regno Unito la dislessia è regolata dal *Disability Discrimination Act 1995*, integrato con lo *Special Educational Needs and Disability Act, 2001*. I DSA sono specificamente trattati all'interno delle leggi in questione e agli studenti e agli adulti affetti da DSA viene garantito un supporto adeguato pari a quello previsto per le persone disabili.

In Gran-Bretagna, le risposte educative iniziali alla dislessia sono avvenute in un contesto medico; Nel 1964, il neurologo Critchley ha scritto un libro denominato `Developmental Dyslexia' in cui venivano riassunte le conoscenze in materia di dislessia. Grazie al suo impegno nel 1963 fu fondato a Londra il Word Blind Centre, la cui attività continuò per circa un decennio. Gli anni 60, inoltre, hanno visto il fondamento delle prime scuole britanniche pensate specificamente per i bambini dislessici.

È del 1968 la definizione di dislessia pubblicata dalla federazione mondiale della neurologia e citata ancora oggi.

Nel 1972 viene fondata l'Associazione Britannica della Dislessia (BDA) che favorisce la formazione degli insegnanti e promuove la diffusione di centri specializzati per studenti dislessici.

L'anno 1970 ha visto il primo riferimento alla dislessia nella legislazione britannica: il Chronically Sick and Disabled Persons Act impone ai Local Education Authority di fornire "il trattamento educativo speciale per i bambini che soffrono dalla dislessia acuta". Questa disposizione interpreta, dunque, la dislessia come una questione medica.

Sempre agli anni ’70 risale la formulazione del concetto di ‘bisogni educativi speciali’ (special educational needs) che enfatizza la differenza esistente tra disturbi specifici dell’apprendimento e le disabilità.
Questo progressivo percorso di inclusione ha portato all’istituzione di scuole ‘dyslexic-friendly’ e ad una maggiore conoscenza dei problemi di apprendimento, e soprattutto delle numerose potenzialità degli allievi con dislessia.

I DSA negli USA sono regolati dall'*Individual with Disabilities Education Act* (IDEA), emendato nel 2004 in seguito alla promulgazione nel 2001 del *No Child Left Behind Act*, e dall'*American with Disabilities Act* (ADA) emendato nel 2008. Negli Stati Uniti, tuttavia, le tutele garantite dalla legge del 2004 si scontrano con un sistema scolastico abbastanza frammentato tra i diversi stati e dall'elevato numero di ricorsi da parte di genitori o istituzioni scolastiche a causa delle ambiguità della legge che lascia ampi margini di interpretazione.
Un aspetto fondamentale della legge del 2004 la promozione di un piano didattico personalizzato, lo IEP (Individualized Education Program), ponendo così l’attenzione sui bisogni di ogni singolo studente.

La dislessia non è una malattia, è una differenza individuale. La disabilità della dislessia si manifesta quando l'ambiente (la scuola, l'università, il posto di lavoro) non è accessibile. Le leggi mirano proprio a creare ambienti favorevoli che consentano agli allievi dislessici di avere pari opportunità di apprendimento e di conseguire gli stessi obiettivi previsti per i compagni.

4.2 Lo studente dislessico all’Università. Uno sguardo all’Università di Pisa

Come abbiamo visto, la legge 170/2010 stabilisce che gli allievi con disturbi specifici dell’apprendimento hanno diritto a misure compensative e dispensative che garantiscano il successo a tutti i livelli di istruzione, compresa la formazione universitaria.

Le *Linee guida* ministeriali (pp. 26-27) esplicitano il ruolo degli atenei nella didattica a studenti con disturbi specifici dell'apprendimento:

> Nonostante nel corso dell'età evolutiva si verifichino processi di compensazione funzionale che migliorano notevolmente le prestazioni dei ragazzi con DSA, il substrato biologico non scompare e può condizionare in maniera significativa le attività accademiche, richiedendo un impegno personale supplementare e strategie adeguate per aggirare le difficoltà. Con il miglioramento dei supporti didattici durante la scolarizzazione, sempre più studenti con DSA ora possono proseguire con successo gli studi universitari. Studenti con DSA, sono presenti in tutti i corsi universitari: se adeguatamente supportati, possono raggiungere con ottimi risultati il traguardo dei titoli accademici, realizzando le proprie potenzialità cognitive. In questo processo di crescita, anche l'Università, in accordo con le finalità della legge, dovrà svolgere un ruolo importante, trovando soluzioni all'interno delle metodologie didattiche e di valutazione e favorendo l'uso di strategie e risorse, in particolare attraverso le nuove tecnologie.
>
> L'art. 5, comma 4, della Legge 170/2010 prevede che "agli studenti con DSA sono garantite, durante il percorso di istruzione e di formazione scolastica e universitaria, adeguate forme di verifica e di valutazione, anche per quanto concerne gli esami di Stato e di ammissione all'università nonché gli esami universitari".
>
> Il successo formativo può assicurare alla nostra società l'apporto creativo e professionale di persone dotate di normale intelligenza e a volte anche di talenti spiccati.
>
> Preliminare all'applicazione del disposto sopra citato è l'acquisizione, da parte dell'Ateneo, della diagnosi di cui all'art 3 della legge 170/2010.
>
> E' importante rilevare che molti studenti con DSA - probabilmente più della metà dei casi - arrivano all'università senza aver ricevuto una diagnosi in precedenza.
>
> Si pone, pertanto, anche nell'ambito universitario, la necessità di *interventi idonei ad individuare i casi sospetti di DSA negli studenti* (art. 3.3) come per tutti gli altri gradi di scuola. Al riguardo vi sono già state, presso vari Atenei, delle esperienze di utilizzo di strumenti di screening sotto forma di questionari specifici, il cui esito non è comunque una diagnosi ma solo l'evidenziazione di una difficoltà. La diagnosi deve essere effettuata dal Servizio Sanitario Nazionale, da specialisti o strutture accreditate, se previste dalle Regioni.

Le diagnosi risalenti all'età evolutiva possono essere ritenute valide, sempreché non superino i tre anni dalla data di rilascio, considerato che i DSA sono condizioni che tendono a permanere per l'intero arco di vita.

La presentazione della certificazione diagnostica, al momento dell'iscrizione, permette di accedere anche ai *test di ammissione* con le seguenti modalità:

· la concessione di tempi aggiuntivi, rispetto a quelli stabiliti per la generalità degli studenti, ritenuti congrui dall'Ateneo in relazione alla tipologia di prova e comunque non superiori al 30% in più;

· la concessione di un tempo aggiuntivo fino a un massimo del 30% in più rispetto a quello definito per le prove di ammissione ai corsi di laurea e di laurea magistrale programmati a livello nazionale o dalle università ai sensi dell'art. 4 della legge 2 agosto 1999 n. 264;

· in caso di particolare gravità certificata del DSA, gli Atenei – nella loro autonomia - possono valutare ulteriori misure atte a garantire pari opportunità nell'espletamento delle prove stesse.

Le diagnosi presentate successivamente all'iscrizione permettono di poter fruire degli *appositi provvedimenti dispensativi e compensativi di flessibilità didattica*, secondo quanto stabilito dall'art. 5, comma 1.

In particolare, per quanto attiene alle *misure dispensative*, ci si riferisce a:

· privilegiare verifiche orali piuttosto che scritte, tenendo conto anche del profilo individuale di abilità;

· prevedere nelle prove scritte l'eventuale riduzione quantitativa, ma non qualitativa, nel caso non si riesca a concedere tempo supplementare;

· considerare nella valutazione i contenuti piuttosto che la forma e l'ortografia.

Per quanto attiene agli *strumenti compensativi*, si ritiene altresì che gli Atenei debbano consentire agli studenti con diagnosi di DSA di poter utilizzare le facilitazioni e gli strumenti eventualmente già in uso durante il percorso scolastico, quali, per esempio:

· registrazione delle lezioni;

· utilizzo di testi in formato digitale;

· programmi di sintesi vocale;

· altri strumenti tecnologici di facilitazione nella fase di studio e di esame.

Per quanto attiene alle forme di verifica e di valutazione, con riferimento agli *esami universitari*, si applicano le misure dispensative e gli strumenti compensativi già sopra descritti (prove orali invece che scritte; uso di personal computer con correttore

ortografico e sintesi vocale; tempo supplementare fino a un massimo del 30% in più oppure riduzione quantitativa; valutazione dei contenuti più che della forma).

Peraltro, gli Atenei debbono prevedere servizi specifici per i DSA, di nuova attivazione o nell'ambito di quelli già preesistenti di tutorato e/o disabilità, che pongano in essere tutte le azioni necessarie a garantire l'accoglienza, il tutorato, la mediazione con l'organizzazione didattica e il monitoraggio dell'efficacia delle prassi adottate.

Nell'ambito di tali servizi potranno essere previsti:

· utilizzo di tutor specializzati;

· consulenza per l'organizzazione delle attività di studio;

· forme di studio alternative come, per es., la costituzione di gruppi di studio fra studenti dislessici e non;

· lezioni ed esercizi on line sul sito dell'università.

Solo recentemente le Università italiane stanno avviando iniziative volte a garantire e a favorire la formazione universitaria ad allievi dislessici o con altri disturbi specifici dell'apprendimento, anche se manca una normativa specifica che regolamenti in modo univoco la gestione di questi servizi a livello nazionale. Molto, dunque, è lasciato all'autonoma gestione dei singoli Atenei che cominciano ad avvalersi di uffici specifici come il Servizio Disabilità.

Presso l'Università di Pisa è attivo dall' A.A. 2011-2012 lo Sportello Dislessia presso il quale possono recarsi gli studenti dislessici dell'Ateneo pisano per capire di quali supporti possono usufruire[7]. Possono avvalersi di questo servizio anche gli studenti che non possiedono una certificazione in modo da avviare un percorso di screening e valutazione che può portare alla certificazione presso l'Irccs Fondazione Stella Maris di Calambrone (PI), ente abilitato e convenzionato con l'Università di Pisa.

Il numero di studenti certificati è cresciuto molto dalla nascita dello Sportello: il primo anno vi erano solamente 7 studenti certificati, nel 2012 sono passati a 17 e in quest'ultimo anno accademico ci sono circa 40 studenti dislessici certificati. Questi studenti hanno, in genere, una forma di dislessia *compensata*: hanno, cioè, trovato

[7] Ringrazio il Dott. Landucci per le informazioni fornite riguardo ai servizi forniti dallo Sportello Dislessia.

il modo per superare le loro difficoltà attraverso metodi di studio personali o anche attraverso percorsi specifici offerti loro dalle scuole. In generale, presentano forme lievi di dislessia e qualcuno anche discalculia e disgrafia. Gli studenti che si rivolgono allo Sportello Dislessia chiedono di poter usufruire dei tempi aggiuntivi e delle misure dispensative previste dalla normativa, solo in pochi casi viene richiesto l'affiancamento di un tutor. È richiesta anche la mediazione con i docenti, che vien fatta inizialmente soltanto dall' Ufficio e, successivamente dall'Ufficio insieme ai ragazzi stessi.

L'ufficio dispone di fondi ministeriali e offre strumenti per facilitare la didattica e lo studio. Vengono proposte alcune applicazioni, in particolare l'Alfa Reader.

Una specifica attenzione è rivolta anche allo studio della lingua Inglese, materia presente nella totalità dei Corsi di Laurea e particolarmente ostica per gli studenti con dislessia: lo Sportello Dislessia sta impostando con il CLI un progetto che porterà all'ideazione di un corso specifico per studenti dislessici.

Lo Sportello Dislessia, inoltre, interagisce con l'Associazione Italiana Dislessia con la quale vengono organizzati convegni ed eventi nel territorio.

Il Professor Giacomo Stella, in videoconferenza al convegno *Dislessia e Università*, organizzato dall'Università degli Studi dell'Insubria Varese-Como il 15 Novembre 2006, ha fornito una serie di dati sugli studenti dislessici che frequentano l'Università in Italia.

I dislessici adulti presentano, in circa il 45% dei casi, forme di dislessia *compensata*; il 20% dei soggetti pare aver *recuperato* completamente l'abilità di lettura, mentre il 35% presenta forme di dislessia *persistente* con lettura inaccurata, molto stentata e lenta, il che porta ad un conseguente rifiuto della scolarizzazione e a disturbi della socializzazione.

Gli studenti universitari, il più delle volte, hanno forme di dislessia compensata: vale a dire che hanno trovato un metodo di studio che consente loro di ottenere dei risultati soddisfacenti nell'apprendimento. Da un punto di vista neuropsicologico questi studenti sono in grado di leggere con una certa fluenza (>3 sillabe/secondo) e, grazie ad un compenso lessicale, commettono pochi errori di lettura. Gli errori compaiono, invece, nella lettura di stimoli a bassa frequenza come non parole o termini appartenenti ad un lessico tecnico e specialistico.

Kirk e Reid (2003) hanno individuato le difficoltà principali associate alla dislessia che incontrano gli studenti universitari:

- Problemi di accuratezza e/o di velocità nella lettura;
- Difficoltà con le strutture grammaticali;
- Difficoltà nell'ordine delle parole e delle idee;
- Necessità di rileggere i testi;
- Difficoltà nel pianificare e organizzare i compiti scritti;
- Problemi di memorizzazione (fatti, formule, etc…);
- Difficoltà a prendere appunti durante le lezioni;
- Difficoltà nell'identificare i punti salienti di un testo o di notare le inferenze;
- Difficoltà con i tecnicismi;
- Problemi di attenzione e concentrazione;
- Affaticabilità;
- Difficoltà nelle prove a tempo;
- Problemi nella lettura e nello studio delle lingue straniere;
- Bassa autostima.

Durante il processo di lettura il dislessico adulto utilizza prevalentemente la via lessicale, mentre ricorre alla via fonologica per la lettura di termini appartenenti a lessici speciali, per le parole nuove e quando nota delle incongruenze nella ricostruzione del significato.

Lo studio disciplinare avviene quasi sempre attraverso la lettura e richiede continui processi di controllo per giungere ad una piena comprensione del testo. Questi processi di revisione richiedono, evidentemente, una ri-lettura la quale si realizza attraverso la via fonologica. Lo studente dislessico, invece, ha la tendenza a leggere una sola volta il testo usando la via lessicale e a 'riparare' le incongruenze senza ricorrere ad alcuna verifica attraverso la ri-lettura.

Gli studenti dislessici hanno a disposizione dei mezzi compensativi, come la sintesi vocale, che danno loro un aiuto importante nello studio; tuttavia, si mostrano spesso riluttanti nei confronti di questi strumenti di supporto perché vengono visti come dei 'marcatori di diversità'.

4.2.1 Il questionario

Ho voluto fare un'indagine per ottenere dei dati sulle esperienze di alcuni studenti che frequentano diversi Corsi di Laurea dell'Università di Pisa. Ho rivolto la mia attenzione principalmente all'apprendimento delle lingue straniere, nello specifico dell'Inglese, per scoprire quali difficoltà incontrano gli studenti dislessici nell'affrontare lo studio di questa materia, per loro particolarmente ostica.

Ho raccolto 5 testimonianze di studenti universitari che mi sono stati segnalati dallo Sportello Dislessia dell'Usid: dopo aver chiesto l'età e il corso di Laurea frequentato, ho chiesto loro quali mezzi di supporto hanno messo a loro disposizione le scuole e l'Università, se e quali mezzi informatici utilizzano e, infine, quali sono state le specifiche difficoltà legate allo studio della lingua inglese.

Dalle risposte fornite dagli studenti è emerso che per tutti lo studio dell'Inglese risulta particolarmente difficile, specialmente quando non ricevono alcun supporto: le aree che creano maggiori difficoltà sono la produzione sia scritta che orale, la comprensione del testo, la pronuncia e l'applicazione delle regole grammaticali. Quasi tutti, inoltre, affermano di avere enormi problemi a memorizzare il lessico e le regole.

Riporto qui di seguito le interviste.

QUESTIONARIO

DISLESSIA E APPRENDIMENTO DELLE LINGUE STRANIERE

1) Età

A: 21

B: 19

C: 19

D: 21

E: 24

2) Corso di Laurea frequentato

A: Scienze del Servizio Sociale

B: Viticoltura ed Enologia

C: Ingegneria Informatica

D: Ingegneria Edile-Architettura

E: Lettere Moderne

3) *Quando e come ha scoperto di essere dislessico?*

A: In quarta elementare

B: A otto anni grazie alla madre

C: A diciotto anni

D: Alle elementari, a sei anni circa. Presentava evidenti difficoltà, soprattutto nell'ortografia

E: In quarta elementare. Presentava già da tempo difficoltà tipiche della dislessia, ma queste venivano erroneamente attribuite a una mancanza di interesse per lo studio. Dopo aver letto della dislessia su un giornale scientifico, è stato il padre a consultare uno psicologo che ha confermato la diagnosi di dislessia. Anche il fratello maggiore aveva mostrato le stesse difficoltà dell'intervistato, ma non aveva mai ricevuto una diagnosi di dislessia.

4) *Quali sono stati gli aiuti messi a disposizione dalle scuole?*

A: Interrogazioni programmate, compiti in classe fatti in modalità diverse soprattutto per le lingue (inglese e latino) e per la matematica (riduzione degli esercizi.

B: Mappe concettuali, formulari, calcolatrici e strumenti informatici.

C: Nessuno

D: Alle elementari e alle medie ha avuto il supporto di una psicologa e di una logopedista. Alle scuole superiori, invece, non ha avuto alcun supporto perché, secondo il parere della psicologa e della logopedista, il suo 'ciclo di recupero' era terminato. Al quinto anno delle superiori, però, grazie al suggerimento della docente di lettere, si è nuovamente rivolto ad uno specialista ricevendo, finalmente, una diagnosi di dislessia nel 2010. Durante gli Esami di Stato ha avuto la possibilità di usufruire di tempi aggiuntivi per lo svolgimento delle prove scritte, ma non ha ricevuto altri aiuti in quanto la certificazione, a suo parere, non è stata presa in considerazione.

E: Nessuno. I docenti, benché fossero stati avvertiti, non hanno preso alcun provvedimento, forse perché poco informati delle problematiche legate alla dislessia.

5) *Quali sono stati gli aiuti messi a disposizione dall'Università?*

A: Tutor (soprattutto per impostare lo studio prima degli esami attraverso mappe e ascolto), mediazione con i docenti in vista degli esami scritti e orali, ausilio per la lettura facilitata Alfa Reader.

B: Tempi più lunghi durante lo svolgimento degli esami, questionari.

C: Tutor e mezzi informatici, come Alfa Reader e il pc.

D: Supplemento di tempo per i test di ingresso e il concorso a numero chiuso. Durante le lezioni e gli esami nessun aiuto, solo l'umanità dei singoli docenti.

E: Avendo trovato un suo metodo di studio non ha avuto alcun problema nel superare gli esami. Si è rivolta all'Usid solo per il superamento dell'esame di inglese che le creava particolari difficoltà per la non corrispondenza grafema-fonema. Ha ottenuto così la possibilità di svolgere un esame a scelta multipla e non a domande aperte, pur seguendo lo stesso programma degli altri studenti.

6) *A casa quali mezzi informatici usi per studiare le lingue straniere?*

-computer: **A, B, D**

-tablet: **B**

-cellulare

-altro

-nessuno: **C, E**

Quale utilità credi abbiano questi mezzi informatici per aiutare i ragazzi con dislessia?

A: Sono utili soprattutto per l'ascolto della pronuncia, per la lettura e per la traduzione.

B: Velocizzano lo studio, permettono di non dover cercare le parole sul dizionario cartaceo, correggono gli errori di ortografia e rendono più chiara la scrittura.

C: /

D: /

E: Ha sempre studiato con mezzi tradizionali (libro degli esercizi, dizionari); l'uso del computer e del tablet permetterebbe di evidenziare gli errori ortografici grazie all'ausilio del correttore automatico.

7) *Conosci software o app che possono aiutare nello studio della lingua straniera?*

A: Carlo Mobile e Alfa Reader

B: Vocal Reader (sintesi vocale), Babylo (dizionario multimediale)

C: No

D: No

E: No

8) *In quali ambiti la sua forma di dislessia si manifesta maggiormente (lettura, scrittura, calcolo…)*

A: Soprattutto calcolo e a volte nella comprensione

B: Sia nella lettura che nel calcolo e nella scrittura

C: Nella lettura

D: Prevalentemente nella lettura e nella scrittura; nel calcolo ha qualche rallentamento, difficoltà superabile con un maggiore ragionamento.

E: Soprattutto nella lettura: era più lenta rispetto ai compagni. Oggi, grazie ad un costante allenamento riesce a leggere anche quattro libri a settimana. Risulta ancora un po' problematica la lettura ad alta voce.

9) *Quali sono le difficoltà specifiche nell'apprendimento della lingua inglese, anche rispetto alle altre lingue straniere studiate?*

-Lessico: **B, D**(tantissimo)

-regole grammaticali: **A, C, D**(la studia in italiano, ma ha enormi difficoltà nell'applicazione delle regole)

-Comprensione: **A, C, D**

-traduzione orale: **A, C, D**

-traduzione scritta: **A, B, D**

-comprensione del testo: **A, B, C, D**

-esposizione orale: **A, B, C, D**

-altro: **D**(Pronuncia), **E** (Esposizione scritta)

10) *Le difficoltà incontrate hanno avuto ripercussioni sul processo di apprendimento della lingua straniera, in particolare dell'inglese?*
Se si, in quali forme (difficoltà di memorizzazione, difficoltà di segmentazione del parlato…)?

A: Difficoltà di memorizzazione e nel parlato

B: Dimentica tutto

C: Difficoltà di memorizzazione

D: Problemi nella pronuncia e nell'applicazione delle regole

E: Le difficoltà dovute alla non corrispondenza grafema-fonema hanno suscitato uno scarso interesse nei confronti dello studio della lingua inglese. Tuttavia, avendo una forma di dislessia lieve, ha trovato un metodo (appunti schematici) che le hanno permesso di raggiungere gli obiettivi previsti dai corsi.

11) *Quali attività trovi più difficili? E perché?*

-dialoghi da ascoltare o leggere: **A**(per l'ascolto), **B, D**

-brani da leggere e capire: **A**(per la comprensione), **B, C, D**

-esercizi sul lessico: **B, D**

-grammatica: **A, B, C**(difficoltà a ricordare le regole), **D**(in italiano, però, riesce a ripetere le regole)

-esercizi di pronuncia: **B, D**(non riesce ad associare alle parole la giusta pronuncia), **E**(prova imbarazzo a parlare in inglese; all'estero, tuttavia, riesce ad avere una buona pronuncia)

-esercizi di produzione (scrivere, parlare): **A, B, D, E**(produzione scritta)

-il glossario con le liste di parole da memorizzare: **B, D**

CONCLUSIONS

In this thesis, I focused my attention on the problems connected with English language learning by dyslexic students, concentrating on the university system and, in particular, on the present situation and on future perspectives at Pisa University. I further described the difficulties caused by the study of a foreign language, in particular English, through the answers given by five students of the University of Pisa to a questionnaire that I gave them to complete.

As the answers to my questionnaire prove, English language learning is an extremely challenging task for a dyslexic student. They find it hard to apply the grammar rules, to write and comprehend written texts and to speak in English and exhibit problems in the memorization of lexicon and in the correct pronunciation of foreign words.

This is principally due to a difficulty in the achievement of a good phonological awareness in the foreign language, especially in opaque languages such as English, where the grapheme-phoneme correspondence is particularly weak.

According to the Italian law, dyslexic students have at their disposal compensatory and dispensatory measures as a didactic support.

At University of Pisa, dyslexic students have the assistance of a dedicated office, the Sportello Dislessia, which gives them support during the academic years: it provides students with specific didactic materials and allows them to use dispensatory measures, such as extra-time, during examinations and it mediates with professors.

The Sportello Dislessia, in collaboration with the University language Centre, is engaged in the preparation of an English course specifically ideated for dyslexic students.

I believe that this is an extremely important project: dyslexic students have specific difficulties in English learning related to their low phonological awareness and their problems in the memory systems.

For this reason, there is the necessity of qualified tutors, specialized in the English language teaching, and concentrated on the particular difficulties encountered by dyslexic students. The tutors should develop a specific didactic program that

attempts to improve the phonological awareness, insisting on the phoneme-grapheme correspondences and on the correct pronunciation, in order to make the students able to discriminate the different sounds of English and, consequently, to better understand the oral productions. Particular attention should also be given to the memorization of vocabulary and to the application of grammar rules.

Furthermore, it is important that the tutors are aware of the specific methods and of the recent software for the study of foreign languages realized specifically for dyslexic students.

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