**People's Democratic Republic of Algeria**

**Ministry of Higher Education and Scientific Research**

**University of Mostaganem**

**Faculty of Foreign Languages**

**Department of English**


**MASTER DEGREE IN**

**English Language and Linguistics**

# **Phonological Processing Deficit in Dyslexia and its Impact on Language Performance: A** Case study of Dyslexic Children in the Mental Disabilities Center Ouad Rhioue, Relizane, Algeria

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**Academic Year 2016/2017**

# Dedication

Dedicated with love and gratitude to my beloved parents who supported me throughout my cherished childhood.

To my family as whole who supported and encouraged me in my life

To my relative and close friends who contributed in one way or another in successful accomplishment of this project “Nouria”,“Halima”,“ Ladouyia”, “Asmaa”

To my best friend “Djamel”

## Acknowledgments

First and for most, I have to express my greatest gratitude to the most Merciful and most Gracious**, ALLAH**, for being my guiding light and giving me the effort to exceed all the obstacles to prepare this work

This work would not have been possible without the assistance and encouragement of many people. I am very grateful to my advisor and supervisor Miss Benyoucef for her guidance. As always, I wish to express my sincere gratitude to my teacher Mr Moulai Hacene for his advice as well to Mrs. Haireche for her support. To all members those work in Psycho-pedagogical Center for Children with Mental Disabilities of Ouad Rhioue. special thanks to the educational psychologist Mr Hafsaoui. To all teachers and colleagues who help and support me to fulfill my work.

## Abstract

The aim of this study is to examine the phonological processing in dyslexia and its impact on language performance. It also provides an overview about the nature of dyslexia. Special focus is on the children (pupils) with reading difficulties. The method of this investigation consists of two main parts in order to find out answers to the research questions and test our hypothesis through which this research has been constructed. Part one: group of eighteen (18) child with reading difficulties were recorded by given them set of words to read. This sample consisted both of males and females from the age of 4 to 15 years old from both Remas Pre-school and the psycho-pedagogical centre for children with mental disabilities, in Oued Rhiou, Relizane, Algeria. The second part, an interview in which six questions had been asked to an educational psychologist concerning the underlying causes, symptoms and treatments of dyslexia. The record result showed that there is a deficiency of phonological processing in those children with reading difficulties (dyslexic children). Hence, there is a significant impact on the language performance (deficiency of phonological processing, affects mainly all the levels of language; morpho-syntax and semantics). The second part, revealed that dyslexia can be studied at various levels: at a biological, neurological and an environmental level.



**Keywords**: phonological Processing, Phonological Processing Deficit, Dyslexia and Reading Difficulties

## List of Abbreviation

**BCA** British Colombia Association

**ICTs** Information Communication and Technologies

**IDA** International Dyslexia Association

**DD** Developmental Dyslexia

**NEPS** National Educational Psychological Services

**SLI** Specific Language Impairment

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## General Introduction

Reading proficiency has become more and more important for people in their daily life, and it is hard to imagine them unable to read in this modern society. Reading process is measured as one of the fundamental ways to get and exchange information. It is a complex operation that needs numerous skills to be successful in this academic area. Unfortunately, some people have struggled with difficulties to achieve reading abilities from their youth. Those people are considered as dyslexic. In order to be good language users, we need to learn it starting from the basic level of language which is phonology (sounds), then move to morphology (word), syntax (the structure of the sentence) and the level of semantics (meaning).

For those who have problems to learn how to read, write and spell when they start to attend school are dyslexic children (pupil). The ability to recognize and separate words into the smallest units (phoneme) is widely lost for dyslexic children. Several studies have pointed out that dyslexia or language disorder is associated with the language system and more specifically, with a particular subcomponent of that system which is the phonological processing. Many studies claim that reading difficulties lead to language deficit which refers to deficiency in phonological processing. Deficit in the phonological processing of language relates to weaknesses in manipulating single-word, decoding ability, reading fluency and spelling.

This subject took all my interest to make a research about it to discover:

- ✓ What is the relationship between phonological processing, dyslexia and reading difficulties?
- ✓ What are the main causes and effects of dyslexia on child language performance?
- ✓ Is dyslexia innate or acquired?
- ✓ Do the dyslexic children share the same characteristics?

# General Introduction

The nature of reading disabilities and the main features of dyslexia are graded among scholars and scientist. It may be a biological heritage, or affected by the environmental problems means being unable to perform in a normal way. The second one, poor phonological awareness is the main cause that creates reading disabilities in which there is a deficiency in phonological processing

Many reasons that arise my attention to know about the nature of dyslexia:

- ✓ It is related to the brain mechanism, means it is purely scientific.
- ✓ Generally, parents do not pay attention to their children's language, especially at the level of childhood (the beginning of attending school).
- ✓ the need to know about dyslexia may bring some changes to improve the dyslexic capacities

This study aims to examine the nature of dyslexia and its effects on language performance. It is also conducted to assess the main theories of developmental dyslexia and more generally, to investigate phonological processing skills in dyslexic children.

This research is divided into three main chapters. Chapter one is a theoretical part concerning the main studies related to phonological dyslexia. The second one is a practical part of the research, we will study the spoken language(record) of dyslexic children and conducting an interview with an educational psychologist to look for the underlying causes and symptoms of dyslexia and its effects on language performance. Also, the interview will provide us with the main method and strategies that parents and educators need to follow to enhance dyslexia children' capacities . The last will be a recommendation and suggestion.

## 1.1. Introduction

Language is a means of communication. People need language to understand each other, to share their vision, to plan for their future even for their daily life. In order to be good language user, we need to learn it. To learn a language, we start from the basic element of language which is the phoneme (phonology) then move to the word at the level of morphology, syntax to study the words combination to structure a sentence and at the level of semantics to study meaning and finally the pragmatics level (language in use). Many theorists and linguists accept the universal definition of learning as process of getting knowledge or skill acquired by instruction or study (Merriam-Webster Dictionary).

Some people are unlucky to gain this opportunity to have a normal learning, they struggle with some problems and difficulties to learn how to learn, how to write even how to read. What is important for this research are the difficulties in reading skill or reading disabilities. This chapter attempts to give an idea about reading disabilities "dyslexia" for children, the main causes and consequences and also give a brief definition about some key concept related to this topic.

## 1.2. Key Concepts

### 1.2.1. Phonology and phonological processes

**Phonology** is a branch of linguistics. It is a science that studies the speech sounds, the study of the structure and the function of the sounds of a language. In Prague School, they view that differences in sounds are related to difference in meaning in a given language. This view means that one sound can make different word which refers to minimal pair.

As it is known, the basic element of grammar is morpheme, for written language is grapheme and the fundamental unit of sounds is phoneme as it is noticed by Crystal (2001, p3) that the phoneme is the smallest unit: "the smallest contrastive unit" and it is highly useful to you in explaining things" means that one phoneme can make different words.

**Phonological Processes** during the development of the child, the language is also developed. At the age of 1 to 3 years, the child uses some patterns and changes in the speech sound in order to perform like an adult by simplifying and facilitating these processes. Linguistically, this act is called phonological processes. The main identified phonological processes are; assimilation, insertion and deletion. Assimilation, in which a sound in speech changes so that it becomes identical with or similar to a neighboring sound. For example: instead to say "bag", /bæg/ the child pronounces the word as "back", /bæk/. Omission refers to delete or omit a sound or syllable as it is in saying "water", he deletes the /t/ sound saying "wa-wa", /top/ for /stop/. Insertion means add or create new sound such as /law and order/ pronounced as /lɔ:rndɔ:də/ the /r/ sound is inserted, (Miss Benyoucef lectures). Substitution refers to Sound changes where one sound class is replaced for another class of sounds and syllable structure refers to sound changes where sounds or syllables become reduced, omitted, or repeated,(Hanks.H,2013).

## 1.2.2. Phonological Awareness and Phonological Representation

**Phonological Awareness** is the ability to realize, analyze and pay attention to a word in which the smallest units (phonemes) are combined and divided. It is considered as cognitive condition responsible for reading acquisition by mapping between the graphemes and phonemes. Phonological awareness is defining by Abu-Rabia, Share & Mansour (2003) as: "the more widely known factor, which refers to the individual's implicit and explicit sensitivity to

the sub-lexical structure of oral language and the ability to decode and manipulate the alphabet as it is viewed by Stanovich, (1986).

**Phonological Representation** or phonological coding. A. Clark, (2013, p651) states that there are widely accepted views on the nature of phonological representation. Depending on the linguistic view, phonological representations are:

> what are assumed to underlie speakers' understanding about meaningful differences in the phonological patterns of linguistic structures. For instance, the contrast between /p/ and /b/ in English distinguishes the lexical items *pin* and *bin*. Regardless of exactly how this knowledge is or is not mentally represented, it remains the case that although this type of knowledge is essential for successful communication.

### 1.2.3. Learning Disability

Learning disability has various definitions. Merriam-Webster Dictionary defines it as:

> any of various conditions (as dyslexia) that interfere with an individual's ability to learn and so result in impaired functioning in language, reasoning, or academic skills and that are thought to be caused by difficulties in processing and integrating information and it is also called learning differences.

This means that it has an impact on the individual performance mainly caused by a damage in the system which is responsible for language. Many psychologists from British Colombia Association of school (2011) point out that: "learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering, or learning. These include, but are not limit to language processing, phonological processing, visual spatial processing, processing speed, memory and attention and executive function".

The brain dysfunction is one of the main reasons that lead a child to be unable to learn and face many difficulties in learning process in addition to the environmental and emotional

factors that can create these disabilities to learn. These difficulties can affect the acquisition process in oral language, reading skills, written performance and also mathematic abilities. The child could not identify his/her disabilities till s/he starts to attend school. Learning disabilities are characterized by some properties which determine that a child has this kind of problems. According to BCA, children with learning disorder have less engagement in learning tasks. They are poorly organized in both thoughts and work habits. Also, they frustrated with difficult work task. Being less confident in their ability to learn and being unable to cope with multiple instructions are considered as other characteristics that differentiate them from normal children. They are fear to success, they feel that there is no hope to achieve their academic goal. These difficulties are different from one child to another, these differences identify the types of learning incapacities. The most known types are as follow:

**Arithmetic Disorder:** or "Dyscalculia" refers to difficulties to understand and calculate numbers. It is related to mathematic calculation for example turning the number 42 into 24.

**Writing Disorder:** "Dysgraphia" refers to the problems to recognize and decode sounds and words structure. Child with dysgraphia is unable to write a coherent word as a result of damage in the brain, stroke or progressive illness.

**Reading Disorder:** "Dyslexia" is characterized by difficulties to recognize, decode, spell and comprehend the phoneme.

**Spelling Disorder**: "Dysorthographia" generally refers to spelling and difficulties and weak memory for the structure of letters in word.

**Visual Disorder:** describes the difficulties to make a sense for what they see.

**Auditory Disorder**: deals with the various problems that affect the way the brain works. This type associates with difficulties to interpret and understand what is said and heard.

**Processing Disorder:** "sensory integration" is referred to the difficulties to connect the information of senses (visual and auditory) to the brain in which it will not be interpreted in the way it should be.

For learning disabilities, there are several strategies and techniques that parents and educators should follow to improve skills and capacities for children who suffer from these problems.

## 1.3. Brief Historical Background of "Dyslexia"

Previously, the concept of dyslexia has been considered as medical problems. Before 1900, the medicine has the dominant role to identify learning disabilities. The first appearance of reading difficulties in 1878, is pointed out with the Adolph Kussmaul, a German neurologist. He noticed that many of his patients have problems in reading skills in with they use regular words in the wrong order. He created the notion of word blindness to describe their difficulties. In 1887, the German ophthalmologist, Rudolf Berlin, was the first to use the word 'dyslexia' in place of word blindness. Years after, the term dyslexia have been described as a result of brain injuring which is produced by Dr Dejerne. So, new medical hypothesis is emerged to proof the underlying causes of dyslexia that the brain injuring explains this phenomenon. Moreover, by the beginning of twentieth century, Dr James Hinshelwood declare that the main cause leading to dyslexia is malfunction of eyesight as a result of a brain defect. In 1955, the American neurologist Dr Orton introduced the term strephosymbolia in which dyslexic children reverse letters. The term dyslexia are considered as medical issue till the mid of thirties, dyslexia have become under the consideration of literature. It is commonly associated with the letters,

difficulties to recognize, spell, and decode words. The notion of dyslexia is mixture of two morphemes, dys which refers to impaired or difficult and lexis which is Greek in origin, means language or speech. It is primarily used in 1896 as result from a visual deficit by William Pringle-Morgan. In the last decades, the idea that the visual impairment is rejected and new evidence has emerged to explain the phenomenon of dyslexia which is related to problems in verbal language. A person with dyslexia has a language disorder associated with language system at the level of brain and it is more related to phonological processing. The wide acceptable definition of dyslexia is identified by the International Dyslexia Association (2002, p582) as:

> Dyslexia is a specific learning disability that is neurological 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.

What is remarkable among many studies that dyslexia affect around 7% to 17 % of population and what is observed that males suffer more from this issue. Crichley (1973, p2) indicates that:

> It is a difficulty in learning to read despite adequate intelligence and appropriate educational opportunities. Children, most commonly boys, may be bright and articulate and even excel in other areas of achievement, but they show severe delays in learning how to read

Dyslexic children may struggle with many problems to, read a separated word, difficult to read a word quickly and fluently, to spell and decode unfamiliar words, to develop their phonological awareness and difficult to memorize sounds and words. It is also hard for them to

name the familiar objects and colors. Recently, new branch has emerged which is the educational psychology in order to enhance learning disabilities rather than medical control. New methods and techniques are followed in determining and improving reading disabilities.

## 1.4. The Main Causes of Dyslexia

Many years ago, dyslexia had been much debated among scientists, neurologist and psychologist as it has been mentioned previously. Some of them view dyslexia as a result of a brain dysfunction and others believe in psychological and environment problems.

### 1.4.1. Psychological and Environmental Factors as Bases for Dyslexia

Several views indicate that dyslexia have a neurobiological origin. However, there are other factors that contribute at birth of this specific learning disabilities in which environmental and psychological aspects have an important role. Sammuel,T and Orton,M.D (2010) are the first researchers attempt to describe the social and emotional aspect which may influence the child' schooling outcomes negatively. Poor socio-economic status within a family may have a great impact on the child performance in his/her learning process by which the children have no control from their parents, so many psychological problems will be presented and one of them is dyslexia. Moreover, families' educational level has a great role in the growth or reducing the learning process. A child will be well ready to read and write when he has the desire to understand what his family read or talk about it. The absence of this motivation among family with poor educational level may decrease the desire to read and write. Also, what is more remarkable among the lower classes, that their children are suffering to grasp the basis linguistic knowledge caused mainly by poor nutrition (Ahmed Awed, 1997).

Being angry and frustrated are the most psychological problems that the dyslexics face, resulted by the bad influence of the environment. Dr. Michael Ryan (2004, p2-4) reports in his article that social scientists have frequently observed that frustration produces anger, anxiety, and depression in which the child considered as invisible handicap. S/he is less likely to enjoy the positive experiences in life, has great trouble imagining anything positive about the future. They have problems with social relationships in which their social childishness may make them awkward in social situations. They easily give up to their challenges and being feared to make any effort to improve their skills.

### 1.4.2. Brain Dysfunction Explains Dyslexia

Reading disabilities are one of the most problems that scientists and psychologists faced to notice the brain area which is responsible for normal reading. They were not able to examine the brain system when we read. Recently, and due to the globalization and the development of science, new evidences of technology have been emerged to explain the function of the brain during language production and especially in reading process, using brain functional brain imaging technique. The neurological studies suggest two main distinct areas of the brain. The right and the left hemisphere. It seems to be similar in the structure but, both sides have different functions. The right side is concerned with the intuitive, creative, non-verbal part of our brain and it deals in three-dimensional forms, images and music. The right hemisphere sees the whole. It is capable of understanding complex configurations and structures. It is working stronger at pattern and face recognition, spatial stimuli, nonverbal ideation, intonation of language and the parallel processing of diverse information (Eva Gyarmathy, (2007, para 18) causes of dyslexia). The left side is more related to abstractness. It is responsible for speech, reading, writing,

counting, logic, analysis and relations parts. The following table gives a simple description of the main parts of brain related to language, how does the it works.

Table 1.4.2. the Main Parts of the Brain where Language Occurs. Michael Guerin and Patricia Henley, (2001; p20)

| **Parts of the Brain** | **Definition** | **Function** |
|---|---|---|
| Arcuate Fascicules. | A white matter tract linking in the temporal lobe. | Involve in interpreting speech with area in the frontal lobe, it plays a role in language evolution. |
| Broca's Area | Area from the brain locates in the triangular and opercula section of the inferior frontal. | It is responsible for speech production, language processing and comprehension and grammatical structure |
| Cerebral Cortex | It is the thin layer of the brain that covers the outer portion of cerebrum | Contains neurons that promote higher intellectual function and memory, and interprets sensory impulse |
| Frontal Lobe | Is one of the four lobes in the cerebral hemisphere | This lobe controls a several elements such thought and facilitates speech |
| Left Hemisphere | Deals with language and verbal abilities | Process language in most people; writing, reading, math, verbal thought and memory, sequential language, linguistic consciousness |
| Parietal Lobe | Locate in the cerebral hemisphere | Focus on comprehension, reading and language |
| Right Hemisphere | The right side of the brain | Interprets emotional content; tone of voice, facial expression, melodic speech |

| | | |
|---|---|---|
| Temporal Lobe | It locates in the cerebral hemisphere | Include areas that help to manage some speech and language |
| Thalamus | It is small structure within the brain, located above the brain steam between cerebral cortex and midbrain | Regulate emotional life and physical safety; processes incoming sensory information, tells us what is going on outside body |
| Werenck's Area | Portion of the temporal lobe is formed around he auditory cortex | Links language and thought, word comprehension |

Leisman & Ashkenazi, 1980 state that there are different cerebral hemispheres at the level of the brain are responsible for reading process. The reading process is involved in the left hemisphere in which three regions are connected. Broca's area which is responsible for articulation and word analysis, Parieto-temporal to analyses words and Occipto-temporal which is responsible for word form as it is exemplified in the figure (1)

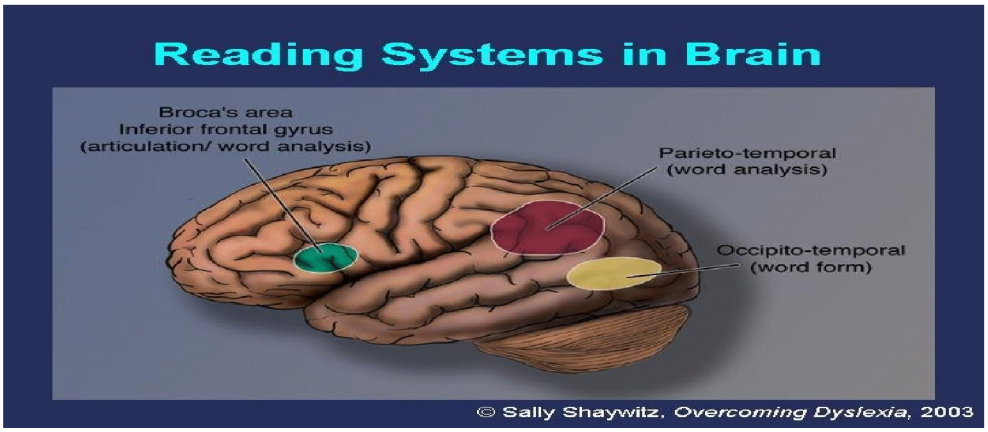



*Figure 1.4.2.1. The Main Part in the Brain Responsible for Reading Process SallyE. Shaywits (2003,p279)*

Scientists and neurologists use different and sophisticated tools to study the structural and functional differences of dyslexic brain. These studies have showed different views about dyslexic brain function. The first one, is related to Cerebral Cortex dysfunction, by which high-level processing, including sensory and motor analyses, working memory, attention and language is controlled. The second, is concerning the Thalamus dysfunction in with there is problems to transmit the information from the sensory organs (eyes and ears) to the high-level processing (structural brain different in kids with dyslexia, Great School (2016)

In other side, Tasha Cullingham explains the children' brain with dyslexia that the brain does not work correctly. As it is mentioned before, there are three major areas responsible for reading processing, for normal reading these regions are well connected and functioned but, for dyslexic there is no activation for the two back regions (Parieto- temporal and Occipito-temporal areas) which are responsible for phonological system with an over activation of the Broca's area as it is exemplified in the following figure 2.

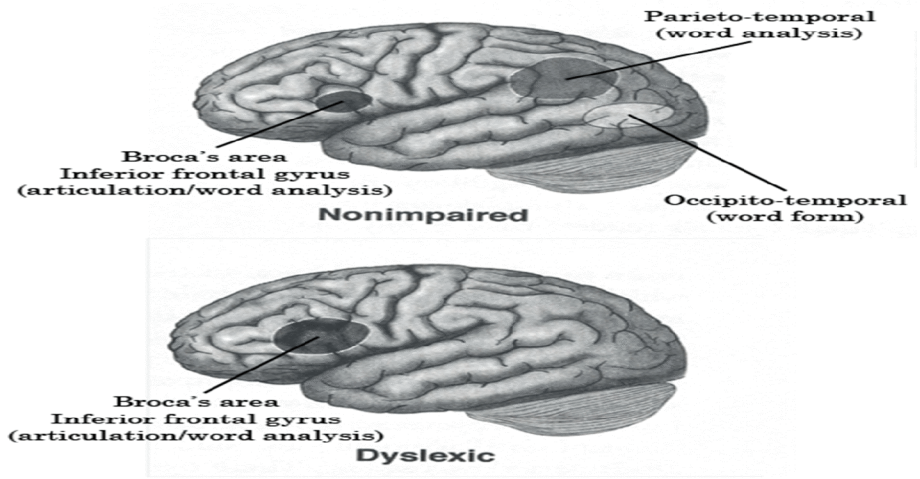



*Figure 1.4.2.2. .Normal and Dyslexic Brain SallyE. Shaywits (2006, p6)*

It is also shown that there is no connection to the right hemisphere in which the word form memory is included to establish graphemes and phonemes principle. This view is more accepted by Pugh et al, (2001, p6) stating that:

> Develop a structured temporo-parietal system that can decode effectively, resulting in a failure to establish adequate linkages between phonology, orthography, and meaning. Because the temporo-parietal system does not develop normally, the RD reader subsequently fails to develop a highly-integrated word form system in the ventral LH occipito-temporal area.

## 1.5. Phonological Processing Deficit in Dyslexia

It is widely known that developmental dyslexia are mainly caused by a deficit at the level of phonological component of language. For Eden et al (1993, p9), it means that during the reading or writing process, the child face weaknesses to make phonological information. Phonological deficit refers to deficiency in phonological awareness. which is considered as primary problem in developmental dyslexia. Vary theories believe that dyslexia as difficult to represent, store and retrieve the sound, led to poor understanding of the grapheme-phoneme in a particular language (Snowling, 2001). The neurobiological studies have argued that phonological deficit refers to a weak performance in manipulating (h+a+v+e=have) and segmenting speech sounds (have= h+a+v+e). Others believe that the child with dyslexia can naturally segment the word into syllables but cannot manipulate single phoneme, he fails to create the basic mental phonological representation. Three major problems are correlated to phonological deficit. First, speed of information processing in which children make more mistakes in auditory perception tasks that require quick stimulus discrimination as Javier Gayan (2001, p29) mentions in his article that: “dyslexics have difficulties trying to perceive and

process rapid information. This deficit might cause the phonological deficits that dyslexics exhibit while reading". The second one is related to memory deficit in which dyslexics have small storage memory of the phoneme and grapheme structure, this theory is well supported by Mann et al (1980). Thirdly, language and phonological deficit, which refers to poor phonological awareness. phonological awareness is a very important precursor of reading, and supports the hypothesis that early phonological deficits could cause later reading disability. This theory has a large number of followers.

## 1.6. Dyslexia and Specific Language Impairment

Both developmental dyslexia (DD) and specific language impairment (SLI) or developmentally language impairment is considered as a communication disorder. Bethesda, M.D defines SLI as a language disorder that a child face difficulties to mastery the language skills. It is also called dysphasia. The child with SLI have problems with the acquisition of phonology, morphology, grammar and other aspects of language. Currently, some researchers have shown that that dyslexia and SLI are two distinct language disorders. However, others suggest that there is closer association between both of them. Both DD and SLI have an influence on the educational and psychological outcome of the child.

Recent discoveries report that the underlying causes of SLI is related to family geneses, means that the main cause of SLI is a biological factor. However, others report that the brain injuring particularly the in left hemisphere is the main cause for SLI. The major symptoms that represent in children with SLI are having problems to learn new words and make conversation. They may speak but, may not understood. They have problems in acquiring the tense as well as the phonological processes.

The relationship between dyslexia and specific language impairment is that both of them are considered as a result of cognitive deficit at the level of deficit phonological processes which is responsible for both disorders. In this case, Bishop and Snowling (2004) proposes that dyslexia and dysphasia have great connection. What differentiates them is that a phonological processing deficit is the core deficit in dyslexia and is responsible for the word reading problems of children with this condition. Children with SLI, on the other hand, have a different deficit(s) at the core of their disability that causes problems in the development of oral language. The oral language problems observed in SLI include problems in semantics, syntax, and discourse (Paul, 2001), particular attention has been given to deficits in morpho-syntax in which the /s/ of present tense is dropped. They also may ask question without using the auxiliaries (to be, to do,.), instead of saying why does she give it to me? they say why she dive it to me?

## 1.7. Conclusion

To conclude, dyslexia is one specifics learning disabilities that associate to poor phonological awareness which leads to deficiency in phonological processing. Reading disabilities has a historical development in which the clinical domain takes control over these problems until the recent few years it becomes a psychological issue. it is also caused by the negative influence of the environment factors and the most theories agree with the neurobiological origins. This phenomenon is considered as one aspect of language disorder. The deficiency of phonological processes in dyslexia will be investigated in the following chapter

## 2.1. Introduction

Reading process is considered as one of the fundamental ways to get and exchange information. It is a complex operation that needs numerous skills to be successful in this academic area. Number of students fail in their academic achievements. Those students are considered as dyslexic. They have problems to recognize words and most researcher believe that this problem is related to deficient language skills, especially phonological awareness. Bender, (2001, p2) states that: "Reading difficulties are observed among students with learning disabilities more than any other problem area of academic performance. It is the most prevalent type of academic difficulty for students with learning disabilities", and the most common reading problems relies on the word rather than the text. This chapter is devoted to present and analyze the ability of dyslexic children to decode and recognize words. The analysis concerns the data obtained from an interview with an educational psychologist Table recording of pupils suffer from reading difficulties, then a discussion of the findings is to follow.

## 2.2. Research Design

Business Dictionary defines a research design as "an outline of how an investigation will take place. In regard to this, both quantitative and qualitative approach are required in this research. The quantitative approach is used to collect and analyze numerical data, then transferred into graphs and the qualitative approach refers to the analysis and the comments on these graphs and figures.

## 2.3. The Population

The participants in this study are pupils with reading difficulties at Rimas Pre-chool and in the Psycho-pedagogical Center for Children with Mental Disabilities in Oued Rehou, Relizane, Algeria. Their age is between 7 to 16 years old. The sample consists of 16 dyslexic children. eight of them are attending Adda Tiress Primary School as a special class (integrated class) and the rest are followed by special teachers and psychologists in this center. Also, two dyslexic children from Rimas pre-school in the same city with the age of 4 and 4,5 years old. Those informants were recorded when they were reading a set of words, moving from the familiar words to unfamiliar one. Most of them are males with only 3 girls. This type of individuals is selected by the teachers and the educational psychologists in both locations, depending on the children's abilities to speak and response. Another participant gets place in our study. Hafsaoui Ismail is an educational psychologist and the head of Afkar institution for training, consulting and teaching foreign languages. Also, he is the responsible for Rimas pre-school. He provided us with an important poinst about the main practices of Afkar institution to improve the dyslexic children's skills during our interview with him.

## 2.4. Data Collection

Margert Rose (2016) states that data collection helps a person or a researcher to reply on a relevant question, evaluate outcomes and make prediction about what probably come later. Concerning this investigation, two main tools are used to solve the research problem. Group of dyslexic pupils were recorded when they were reading some words to examine their pronunciation, and set of questions were asked to an educational psychologist about the main symptoms and ways to treat dyslexia.

### 2.4.1. Record and Interview

A record and an interview are tools used to collect data about a particular subject of research. By using a voice recorder, eighteen children with dyslexia were recorded. An interview is a conversation between persons in which they exchange their information. In the procedure of this study, the interview was face-to face meeting iconsisted some questions in which the psychologist I. Hafsaoui presented the main ideas related to the topic and shed the light on some advices for parents and teachers concerning our purposes.

### 2.4.2. The Dyslexic Children Record

The dyslexic children record includes a set of words. These words are divided into three main groups and each group contain seven or eight words. The first group deals with a simple and familiar words, each one is formed by three letters, like /ʃems /the sun, /qʌmʌr/ the moon /, /leɪl / the night. The second group consists also of the same number of words but, each two words have the same letters in different combination or have the same rhyme such as: /ʃa:rɪʔ/ the street, /ʃa:ʔɪr / poet, /fara:ʃa/ butterfly and / fɪra:ʃ/ bedding. The last group covers complicated words combined by more than four letters and some of them contain figures of sounds as a sheet / ʃarʃef/, bats /χafefi:ʃ /, the pearl / lu?lu?/. These groups have been selected on purpose. The first group is selected to examine if there is problem to pronounce the familiar word. Then, the second has been chosen to observe the errors that the dyslexic children make when they read word with the same letters and different orders. The third is about how they are going to read and articulate a sophisticated word and the main phonological processes they will produce.

### 2.4.3. The Interview

There are some points and questions have been discussed during the interview with an educational psychologist, concerning dyslexia, the main causes and characteristics of children with dyslexia. Moreover, he has talked about how can a dyslexic child improve his/her abilities and about the main practices and methods that are followed in this foundation. At the end, the psychologist suggests tips for parents, what they should know and how they are going to deal with their children with handicapped reading. He emphasises on the necessity to the role of teachers and they need to be experienced to teach dyslexic children.

## 2.5. The Data Analysis

The data would be analysed and interpreted in terms of figures and tables to highlight the quantity and the quality of the finding as it is mentioned below

### 2.5.1. The Dyslexic Children Record

- Firstly, we have got the background information about the sample like the sex and the age

**Table 2.5.1. Dyslexic Children's Sex**

| | Male | Female | Total |
|---|---|---|---|
| Number of Children | 15 | 03 | 18 |
| Percentage% | 83% | 17% | 100% |

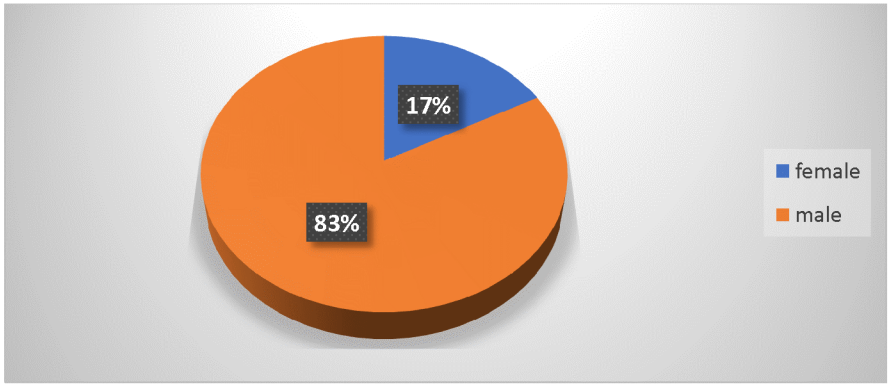



**Figure 2.5.1. Children 's Background Information**

The above graph represents the sex of the participants. Most of them are male, they were 83% whereas females were only 17% represents the female number. On the other hand, they were asked about their age. The girls were between 7-13 years old and boys from 4 to 16 years old. This information is included to examine which sex group is more affected by dyslexia.

- Secondly, the children are asked to read some familiar words and the aim behind this action is to discover to what extent they are familiar with these words.

**Table 2.5.2. The Result of Reading Familiar Words**

| Words | /ʃems/-sun | | /ɖʌmʌr/-moon | | /leɪl/- night | |
|---|---|---|---|---|---|---|
| Correct pronunciation | Male | Female | Male | Female | Male | Female |
| | 20% | 100% | 87% | 100% | 53% | 100% |
| Incorrect pronunciation | 80% | | 13% | | 47% | |

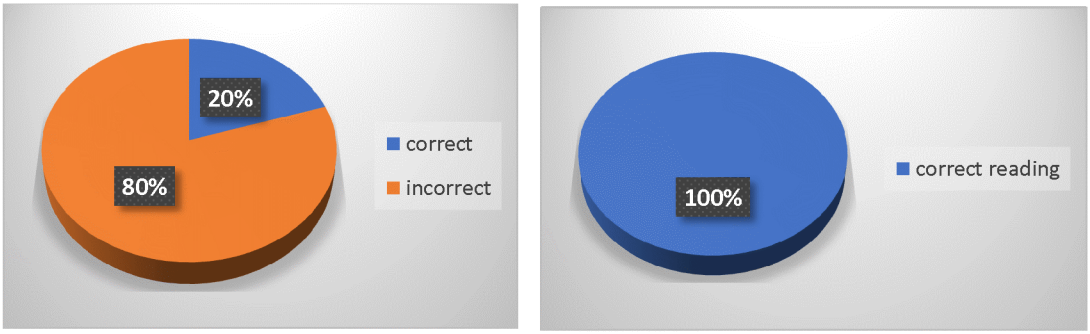
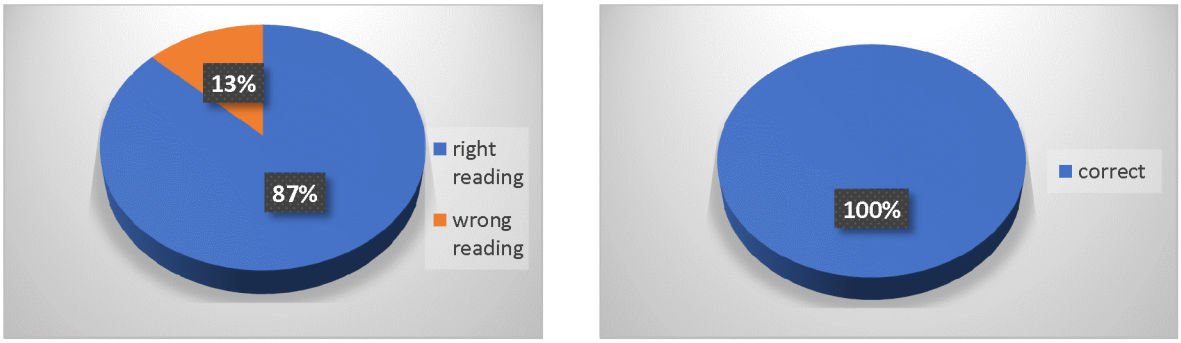


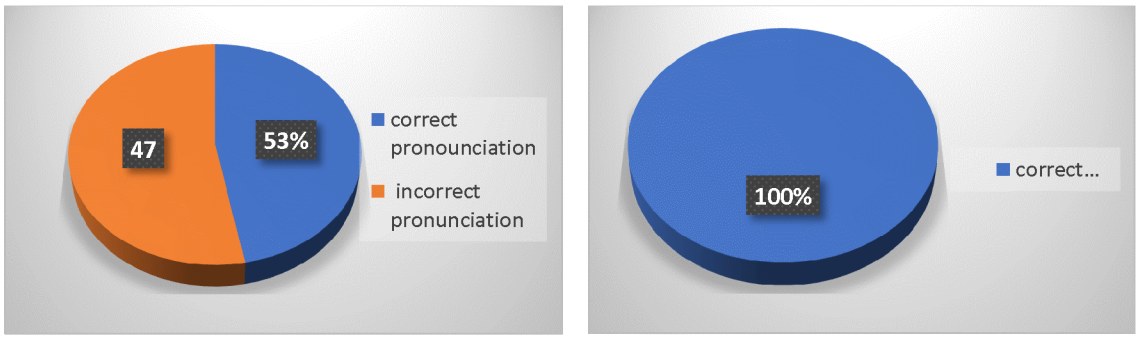

**Figure 2.5.2.1. Reading the Word /ʃems/ by males and Females**

The word /ʃems/ is considered as a familiar word but, most of them have read it incorrectly (80%). Among these participants especially, for males there are different ways to pronounce this word. They used to say /ʃemʃ/, /temʃ/, /sems/ and /ʃem/, And the rest of them say read the word correctly, while all females pronounced the word correctly.




**Figures 2.5.2.2. Reading the Word /ɖʌmʌr/ by Male and Females**

The second word /ɖʌmʌr/ "moon" has been read in the right way by 87% of the informant. For the rest, instead to say /ɖʌmʌr/, they change the order of letters and say /mʌɖʌr/



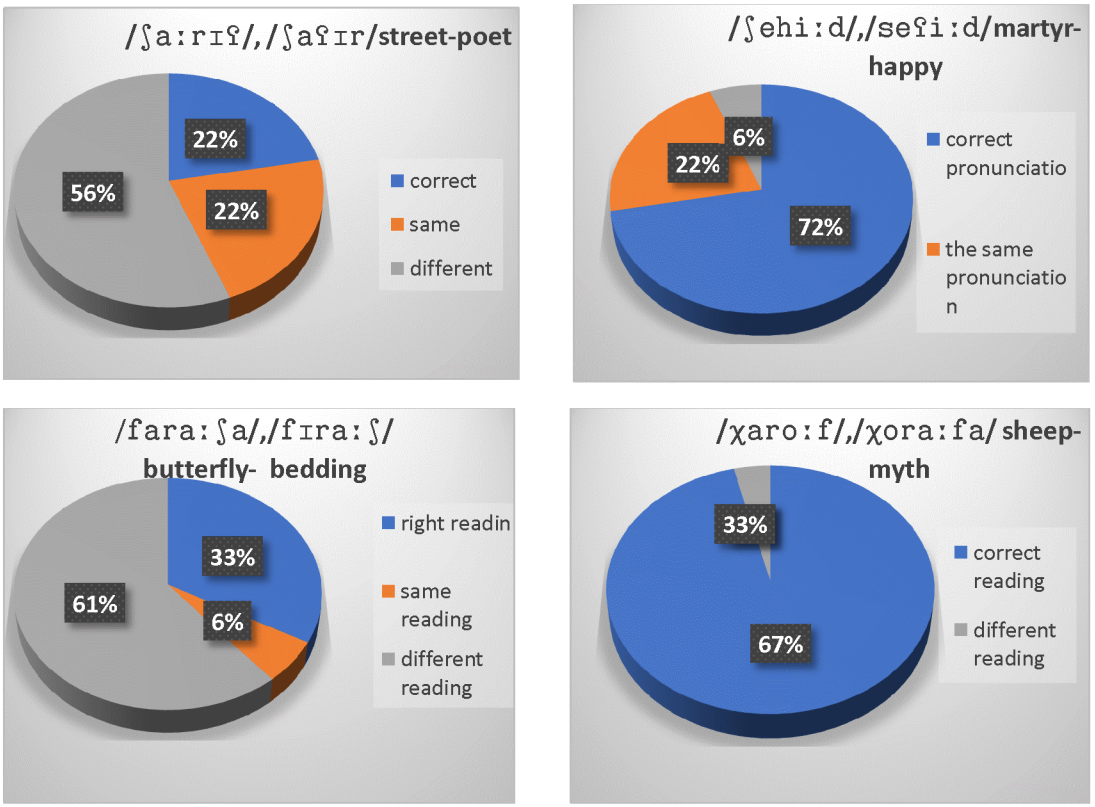

**Figures 2.5.2.3 Reading the Word /leɪl/ by Males and Females**

For the word /leɪl/ (47%) of them have wrong reading. They change the first letter in the word, the "n" takes the place of "l" /neɪl/ for /leɪl/. All words above have been pronounced correctly by all females.

- Another set of words have been recorded when the selected population read. These words are considered as simple words but, what characterized them is that each two words have the same sounds however, they have different order such as /ʃa:rɪʕ/ street and /ʃa:ʕɪr/ a poet, /fɪra:ʃ /bedding and /fara:ʃa/ butterfly. These words are selected to be recorded in order to examine how the dyslexic children can pronounce them. Means if they pay attention to the structure of the word.

**Table 2.5.3. Reading Couple Words with the Same Letters and Different Order**

| Words | Correct Reading | | Same Pronunciation | | Different pronunciation | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| /ʃa:rɪʕ/, /ʃa:ʕɪr/ street-poet | 22% | 67% | 22% | | 56% | 33% |
| /ʃehi:d/, /seʕi:d/martyr-happy | 72% | 100% | 22% | | 6% | |
| /χaro:f/, /χora:fa/ sheep-myth | 33% | 100% | 6% | | 61% | |
| /fɪra:ʃ /, /fara:ʃa/ butterfly-bedding | 45% | 100% | 22% | | 33% | |




**Figures 2.5.3.1. Dyslexic Pronunciation of Words with Same Sound and Different Order or with the Same Rhyme by Males**

Each graph above shows the different pronunciation of the second group which includes couple words. "boys' pronunciation" The first pair words are /ʃa:rɪʔ/ and /ʃa:ʔɪr/ (street and poet). Most of children read those words incorrectly (56%). (22%) were pupils who didn't make different in pronouncing of both words in which they say /ʃa:hɪl/, and /ʃa:ʔɪr/ for the two terms and the rest read them in the right way. They say /ʃahir/ and /ʃa:lɪʔ/ for the word /ʃa:rɪʔ/ and /sa:mɪʔ/ for /ʃa:ʔɪr/. For the words /fara:ʃa/ and /fɪra:ʃ/ (butterfly and bedding), 61% read them differently. They said /fa:sa/, /farʃa/ and /ʃa/ instead to say /fara:ʃa/. /sɪra:ʃ/ and /fɪʃa:r/ are words replaced the correct

pronunciation of /fɪra:ʃ/. The right reading of these two words was presented by 33% of participants. Then, 6% pronounced the words in same way. Both /fara:ʃa/ and /fɪra:ʃ/ were pronounced as /sa:s/ and /fa:ʃ/.

Moreover, the terms /χarʔo:f/ and /χora:fa/ (sheep and myth) had been read correctly by (67%) and 33% read them mistakenly such as /χaju:f/, /χaro:θ/, /χari:f/ and /χafu:n/. /χro:f/, /χofafa/, /χorfa/ and /χawfa/ for /χora:fa/. The words with the same rhyme as /ʃehi:d/, /seʔi:d/ (martyr-happy), were saying truly by the majority of the children (72%). About 22% said the two words equally, /ʃehi:d/ for both. Few of them (6%) read these pair words as /sad/ for /seʔi:d/ and /ʃad/ for /seʔi:d/. On the other hand, the majority of girls pronounced these paired words correctly, only the first couple words had been pronounced as /ʃa:hɪl/ for /ʃaʔɪr/, presented by 33% as it is mentioned in the following graphs and the others read it fluently.

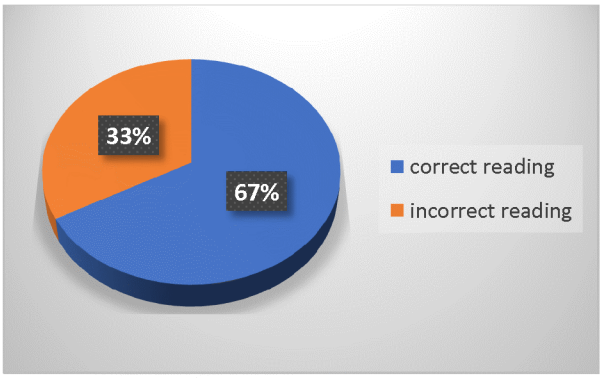


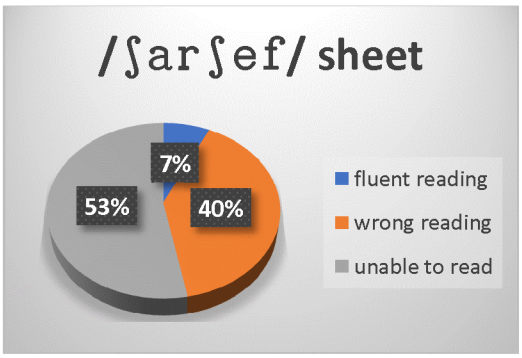

**Figure 2.5.3.2. Females Reading the Couple Words /ʃa:rɪʔ/, /ʃa:ʔɪr/**

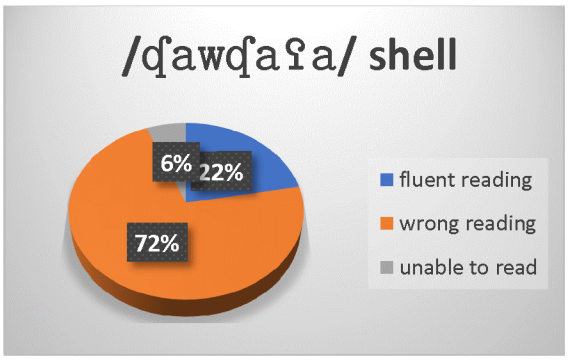
- The last group is related to a complicated word in which the informants were asked to pronounce them. Choosing words comprising a kind of figures of sound has been done

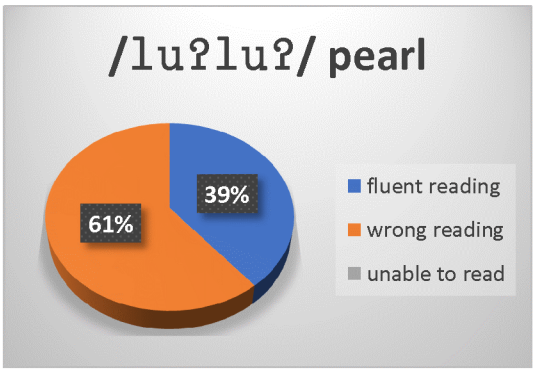
for a purpose by which we are going to check their abilities to repeat the same sound in the same word with different position.

Table.2.5.4. Different reading of the complicated words

| Words | Fluent Reading | | Wrong Reading | | Unable to Read | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| /ʃarʃaf/ sheet | 7% | 33% | 40% | 67% | 53% | |
| /ɖawɖaʔa/ shell | 22% | 100% | 72% | | 6% | |
| /dʒumdʒuma/ scull | 20% | 67% | 22% | 33% | 58% | |
| /luʔluʔ/ pearl | 27% | 100% | 61% | | 12% | |
| /χafefi:ʃ/ bats | 20% | 100% | 67% | | 13% | |
| /feseti:n/ dresses | 53% | 100% | 39% | | 8% | |
| /ɖajlu:la/ nap | 20% | 100% | 30% | | 50% | |



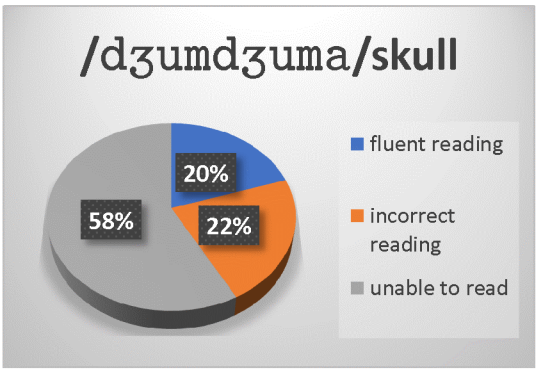




**Figure2.5.4. Reading the complicated words by Males**

From the figures above, we notice that most of dyslexic children faced difficulties to read and pronounce words with such kind of figures of sound. Sometimes they omit a sound or change it and others change the word totally. Moreover, there were group of them refused to read. Between 17% to 39% had fluent reading. The word /ʃarʃef/ had been read wrongly by 39%. They said /ʃaraʃ/, /ʃarfaʃ/, ʃarʃ and /dʒrdʒal/ as a new word. About 44% refused to read this word. Around 72% had misread the word /ɖawɖaʔa/. The most errors that they have made is reading this word as: /ɖawʔa/, / ɖawtˤaʔa/, / ɖawɖatˤa/ and /tˤawɖaʔa/, while 6% abstained to read. The word /dʒumdʒuma/ is also considered as a difficult word for dyslexic children to read. Most of them refused to read. As well as to the word /luʔluʔ/. The majority of the sample had incorrect reading, for example: instead to say

/lu?lu?/, 61% said /lu?lu?lula/, /lu?lu?lu/, /nu?lu?/ /lulu/. Both words /χafefi:ʃ/ and /feseti:n/ had approximately the same effects of reading. From 33% to 39% presented the children with incorrect reading in which they said /fesesi:n/ and /seti:n/ for the word /feseti:n/. Besides, they pronounce the word /χafefi:ʃ/ as /χafeti:ʃ/, /χabeti:ʃ/ and. /χafeti:s/ whereas the others had a fluent and correct reading. /ɖajlu:la/ (a nap) is another word that the dyslexic children were required to read it. 33% had a right reading, 17% rejected to read and 50% had different way to say the word like: /tˤwi:la/, /ɖajla/, /wawu:la/ and /ɖalu:la/.

Another issue was remarkable during this investigation, that females are less influenced by dyslexia in comparing to males as it is presented in the previously (see the **Table 2.2.5.4 Different reading of the complicated words).** Only for the word /ʃarfaʃ/, 67% faced difficulties to pronounce it. Additionally, the word /dʒumdʒuma/ is also pronounced in wrong way by 33% and the rest had read it correctly.

Likewise, the main phonological processes which were observed during this investigation are:

**Omission /ʃam/for /ʃems/and /fa:ʃ/).**

**Insertion as** /lu?lu?lu/ for /lu?lu?/, /dʒumdʒumdʒa/ for /dʒumdʒuma/,

**Substitution in:** /ɖawtˤa?a/, for /ɖawɖa?a/, / and /sɪraʃ/ for /fɪraʃ/

**Syllabic structure like:** /ɖaw?a/ for /ɖawɖa?a /dʒuma/ for /dʒumdʒuma/

**Reduplication** such as /wawu:la/ for /maqu:la/

## 2.5.2. Interview Analysis

- ✓ **The first question**

It basically contained two parts, pointing to identify both the educational psychologist and Afkar foundation. The response was as follow:

*"The educational psychologist is an advisor who works under the supervision of the office of educational and professional guidance and instruction. He follows his activities in different educational institutions. He is commissioned with everything which has a relation with pupils' guidance and information about their learning. He is also responsible for the different studies concerning the psychological part of pupils"*

About the second part, he has identified Afkar Institution as a foundation offers kinds of help, consulting and training in different disciplines associated to the educational, psychological and family issues.

- ✓ **The second question**

Answering the second question identifies two main educational branches in Afkar institution. The first branch is about teaching foreign languages (English, French, Spanish Germany and Italy) in a modern way in which they use training bags depending on the curricula followed by the countries of these languages. On the other hand, there is the Kindergarten Rimas, for children from 3 to 5 years old. Additionally, to a special section of learning difficulties as dyslexia, dysgraphia and dyscalculia includes different stages of children with an academic or developmental difficulties in learning.

- ✓ **The third question**

Mentioning the case of dyslexia had arose the question about the classification of dyslexia, whether biological or psychological issue. The reply on this question was that the special psychologist always demands a medical diagnosis. It is possible the that child has a problem in the nerves or brain disorder as the case of epilepsy, autism, mental retardation and make sure that the auditory devise does not have problems. Then the medical psychologist has to examine the psychological problems as shock psychic or phobia and fears. This means that the psychological diagnosis depends on whether dyslexia associated with the developmental or academic difficulties.

- ✓ **The fourth question**

This question has been asked to point out the main degrees of dyslexia. Depending on the psychologist's answer, there are vary grades and the most known cases are those suffer from Autism or so called echo, all what they can say is to return what you have said to him. Also, cases with mute are considered as the main difficult one. Ann there are special technique followed for example learning by playing. There is also a special room containing sand, glue, scraps which contributes significantly to read, write and calculate by which the educator or the teacher writes letters and words on the ground and account to the number three, in this process the child follows the acoustic rhythm which helps him to memorize and facilitate pronouncing words each time until they be better.

- ✓ **The fifth question**

Technology has invaded mainly all the domains in the real life, so how can technology enhance the dyslexic child's capacities. Concerning this question there is a coordination with

the university of Telemcen to develop an educational project through the use of piano. There are also number of techniques such as games consisting Quranic verses, words and speeches audio and video. Currently, the emergence of specific application (Android application) on mobile phone and electronic boards is another space that offers more opportunity to those children to improve their skills easily and speedily. Recording these children during their reading process using special devices, through this process they recognize their shortcoming suffered by and they can therefore improve by training and repetition until the intended. Furthermore, for those who are suffered from difficulties in breathing as it is known to articulate or produce sounds or words we need the air, there are different ways to ameliorate the breathing process. Firstly, the child blows to extinguish a candle which is about 50cm away from him and whenever it is difficult, the candle being rounded to him. The same operation for the use of balloon**.** Each time the quantity of Oxygen is determined by writing a number till the fully blown where the balance of the breath is realized. Another method is used when the child has problems in his jaws by means of massage as it is done by chewing gum or chopped meat. Reading words in the form of melody or rhythm has more advantages for the development of dyslexic children.

- ✓ **The sixth question**

This question related basically to the main advices for both parents and teachers. When dyslexia are identified, it is necessary to avoid words that have negative effects on the child's behavior and increase the severity of dyslexia. On the other hand, consulting the psychologist is very important by the cause, the danger and the treatment can be determined. For teacher, one of the most important condition is to create a calm and respectful atmosphere within the educational classes through which a child with reading disabilities is being ridiculed. Teachers

and educators need also to attend seminars and conferences to learn how to deal with this category of children. Then, the teacher should not neglect the dyslexic pupil to read under the excuse that he takes time or mainly he cannot read.

## 2.6. Discussion and Interpretation of the Finding

The data analysis obtained during this investigation aimed to diagnose the role of the phonological awareness in the progress of reading skills. Moreover, the present study shed the light on the origin of dyslexia whether its existence is included in the organs or acquired from the surrounding environment in which we are going to examine one of the main hypothesis in this research. From the use of both quantitative and qualitative data we have noticed that: firstly, we have an identical number of both girls and boys, among them we have determined that boys are more affected by dyslexia. Most of the scientists and medical claims state that boys are more affected by dyslexia to that female brains are more matured than male before the puberty. Also, boys are more affected by color blindness which contributes to progress the harshness of dyslexia. Another issue is revealed that some dyslexic children are unable to recognize a familiar word, which means that dyslexia degree is determined depending on the level of phonological awareness. Furthermore, it is hard for group of dyslexic pupils to differentiate between simple words with same letters in different position, they were confused about the word's form.

Additionally, most of children with dyslexia are definitely not able to read and pronounce complicated words especially words containing figures of sound and others face difficulties to articulate and repeat the same sound in one word. From all above, we have received that there are different types of dyslexia, each type reflects the level of phonological

awareness. The American Academy of Special Education Professionals' Educator's Diagnostic Manual of Disabilities and Disorders (2007) has listed more than fifteen types of reading disorder. The main disorders have been seen in children with dyslexia in this case of study are:

- Surface Dyslexia: it occurs when some children were not able to recognize the whole word even if they can identify the word phonetically. They were hesitated to read the word fluently such as in saying the word maqula, they said mmmaqula.(mmmɑʃuːla)
- Spelling Dyslexia: it refers to the hesitation when read a long word and it takes time as reading the word djomdjoma)dʒumdʒumdʒa(
- Phonological Dyslexia: it is related to the misreading of unfamiliar word like reading luelue/luʔluʔ/ as noelue/nuluʔ/ or lueluelo /luʔluʔlu/
- Neglect Dyslexia: in which the child neglect or delete one side of the word, for example: Shaf /ʃaf/for sharshaf and sham /ʃem/ for shams /ʃems/
- Dysnemkinesia Dyslexia: when the child could not distinguish between letters with the same shape as b and d. the main example in this investigation that some children could not differentiate between س /s/ and /ʃ/ش as it illustrated in /ʃems/ by saying /sems/ or /ʃemʃ/

Other important issue has been identified that dyslexia is most of time considered as an innate difficulty in which there is an organ with malfunction and the environment contributes to increase the severity of dyslexia. Moreover, the dyslexic children performed in different way, depending on the age, medical problems and whenever dyslexia are identified early, it is better to be treated. Our hypothesis about the nature of dyslexia has

been ensured that it is biological in origin in which the child suffers from medical syndromes as epilepsy, mute, autism and mental retardation. Also, we found out that there is consensus between the phonological awareness which refers to the decoding abilities and the type of reading disabilities means that whenever there are weaknesses in the phonological awareness there are more problems in reading abilities.

## 2.7. Conclusion

To sum up, this chapter has mainly covered both the discussion and interpretation of the findings provided by the data analysis in an attempt to examine whether our research questions have been answered, and most important issue is to verify our hypotheses. It has as well provided some recommendations for further research and specifically to find solutions for the issue that will be tackled, in the following chapter

## 3.1. Introduction

Within the school environment, group of people are responsible to improve the child's outcomes during the learning process, especially at the beginning of attending school. This group is constituted by the child, parents and teachers or educators. The parents have an important role in which they should work hard to obtain satisfied results. For dyslexic children, parents need to make more efforts and work harder to understand and help their dyslexic children. This chapter proposes some tips and suggestions to parents and educators by which they can help their children in easy and relaxed way. It also gives an idea about how can the environment of school can help the dyslexic children to recover their learning skills. Another issue is related to integrate information and communication and technologies in enhancing dyslexic children' level.

## 3.1. Suggestions for Parents and Educators

Both parents and educators are responsible to identify and understand the child problems generally in learning and particularly in the reading process. They should pay attention to the learner's performance. Being aware about the main difficulties and problems that the dyslexic child struggles with and trying to give some solutions that may ameliorate the level of learning skills are the main important things that parents and teachers have to know about them.

### 3.1.1. Family Climate and Language Performance

The family setting has great influence on the child's performance, on the educational, behavioral and language aspects. Parents are the first people who have to act as an ideal for their children in order to get the attention of the child to imitate them. Also, to be able to distinguish between the right and the wrong. The family climate plays an essential role for the child to

acquire beliefs, traditions, principles and language. The case for the normal and dyslexic children is not the same, there are differences. The carefulness is very important for the dyslexics more than the others. They need more attention mainly from all members of the family, more support and more assistance to develop their skills and achieve better entailment. However, the lack of caution from parents, the children with dyslexia may have bad emotional reactions to their problems, including low self-confidence, frustration and anger, which will produce additional barriers to learning. The role of family here is to establish an environment in which the child feels confident, safe and is able to progress his ability to read, write and spell correct, and also to perform as a normal child. Raising awareness among the members of the family is important. It may create different strategies and methods in which they can find the favorable and easy way for the disabled child to follow.

### 3.1.2. Parental Awareness

Most parents, whenever they hear that their child faces problems to learn, are astonished and go through negative reactions including anger, blame and fear that the child cannot perform at any educational institution and it is difficult to accept that situation. The parents should be open- minded to accept and adapt that the child has dyslexia. Acknowledging the phenomenon of dyslexia may create and allow parents for better choices to help their child especially, when they discover the problem at the beginning (early identification) in order to facilitate this issue to be treated as it is reported by Rachel Davies (2001) to increase the strengths and reduce the weaknesses. Many associations and educational groups bring some methods and strategies that parents should follow, as well as, the International Dyslexia Association (IDA) and National Educational Psychological Services (NEPS).

Parents need to expand their knowledge about dyslexia in order to recognize the way they can help their child and know that the dyslexic children do not perform in the same manner and nowadays and because of the globalization (social media), it is easy to get more information by joining groups and societies in which professionals in the field present programs for parents to help their dyslexic children. What parents need to know is, understand dyslexia and its influence on the child outcomes and also on his feelings and emotions. They have to establish good relationship with their child with reading disability to communicate with great support, believing in the child's strength and help him to recognize and set the attainable goal. Even more important, the dyslexic child achieves success somewhere in the real life like Tom Cruz, Picasso and Alexander Graham Bell are famous actors and scientist had suffered from dyslexia. For parents, they should encourage the child's strengths in other field of life such as mechanic, sports, techniques, art and others.

Therefore, Parents should find the way in which they relate the child's interest to the learning process. Parents have to support their child not only by what s/he got at school, but by supporting him/her spiritually, children with dyslexia need to be self-confident, that they are able to succeed. It is necessary for parents to control the child's level at school, look for the main difficulties that s/he faces in classroom. They have to contact the teachers and school direction to get information about their child's performance. Moreover, it is better to deal with these difficulties by managing with the child the issues and the homework which given to him/her, following some strategies which is suggested by NEPS (2016). Time management is very important to be well organized. The parents should prepare a time tables for each practice, for relax, revision, homework and others. Give him a break to relax when he comes back from school then, discuss the issues they dealt with in classroom and about the homework.

### 3.2.3. Dyslexic Child and Schooling Environment Relationship

Most of the time, dyslexia are firstly identified at school. The teacher is the main responsible to evaluate and identify each student's level. He is able to incorporate certain strategies to address the pupil's needs and he plays a significant role in enhancing the learner abilities for both the dyslexic and normal children. Keri Spielvogle (2002, p49) suggests pieces of advice and set of methods in which an educator or a teacher helps the child with dyslexia improves his/ her learning skills. Firstly, the teacher should evaluate the child's capacities and level to identify the way the child learns better. It means that for each child there is a preferable style to learn. Some of them learn visually, it is better for them to see the information using pictures and images with printed words. Others enjoy learning when they get a touch with objects (letters) in which they are able to structure words and ask them to pronounce what they produce. This style is called the tactile learning style.

The use of multisensory method to teach the dyslexic children has a positive effect on their outcomes. Also, the teacher has to take into account the level of the dyslexic learner to select the words. The auditory learning style is taught by hearing information, as an example, the teacher brings minimal paired word like /dog/ and /gog/ and ask them to look for the correct word, also ask them to write what they hear. These methods are useful to memorize the sound's forms and spelling especially, when the task repeated many times. The highest success comes from repetition of the practice till the mastery of the task. During the child training, the teacher needs to observe the way the child acts, attempt to understand why s/he makes these errors and give them the opportunity to express their difficulties in order to know what should be taught and exercised. Be sure that the dyslexic pupils have understood the lesson by asking them to

explain it back to you. Pupil with reading disabilities has to take a sit in front, near to the teacher with student who can help him.

The teacher is also responsible to create an organized and peaceful classroom so that, the dyslexic children store and absorb the information effectively and working in small groups or one by one is the best way to teach pupil with dyslexia writing skills. In this way s/he can memorize the structure of letters' order in the word. Likewise, the learner with learning disabilities should not be asked to write a big quantity or a long text because they need extra time to understand what they should write and discuss. Given the chance to the dyslexic children to express their knowledge and competences despite focusing on their problem is a significant issue for teacher to program tasks and exercises depending on the child's abilities. It is also, considered as an effective subject to develop their oral language when they speak. Psychological claims report that the teacher needs to govern the classroom environment. He is in authority to create a friendly school setting. He should not allow other pupils to laugh at dyslexics when they make errors and mistakes.

Additionally, the teacher should be aware that it is wrong to shout on dyslexic child, when s/he forgets or misses things or the right answer. Psychologically, these behaviors have an undesirable impact on the dyslexic learner's feeling and reactions. Also, it is bad to enforce the learner with difficulties to read loudly and in front of the classmates. The educator must not have a sudden change in task or time table. This act may affect the dyslexic badly, he may feel lost and it is difficult to recognize things quickly. The teacher has a significant role to raise the self-confident of the dyslexic pupils not only by practicing but, also by allowing them to show their capacities and recognize their areas of competences. Moreover, the teacher has to take into account the dyslexic's progress rather than problems and difficulties. Teaching approaches is

beneficial technique that the teacher need to use. Learners struggling with reading disabilities prefer to learn by practicing rather than being told, this performance may make the subject attentive for them.

As it has been noticed before, phonological processing plays a central role in learning to read and write, so that the dyslexic children need to improve their phonological awareness in which the teacher has to design more lessons and activities in phonology. How the sound is shaped and pronounced needs more explanation and training.

### 3.2.3.1. Methods to Teach Phonological Awareness

Developing phonological awareness in children with reading difficulties is one if the basic element needs to be improved. As it is known that phonological awareness is the core of reading and writing skills. It is related to the sounds in word not the letters which refers to the phonics. Many dyslexic pupils face difficulties to develop their phonological skills through which the teacher needs to design and organize many tasks activities in phonology. There are effective ways to enhance phonological awareness among students with reading difficulties.

The child with dyslexia needs to have more opportunities to read more than the normal one. Three main tasks need to be taught in phonology. Working with rhyme, is one of the easiest tasks to teach phonological awareness by hearing to words including rhyme, differentiating and producing rhyming words. For example: the teacher asks their pupils to listen to words consisting rhyme than recognize which words have the same rhyme and by which sound it is made, such as /ma/t, /cat/, and/ /mat/. These are rhyming words and minimal pairs the /t/ sound made the rhyme. Another task, is that the teacher provides the dyslexic learner with words and asks them to create new words with the same rhyme as in the word /play/ and /day/. The dyslexic

pupils need to be able to recognize and categorize the rhyming sound whether it is at the beginning, middle or at the end of the word. After segmenting the given words in to sounds, they will be able to read the whole word. One practice is as follow: the teacher asks them to identify the sound that shapes the rhyme in set of words as, /say/, /play/, /care/ and /day/.

Moreover, segmenting and blending and manipulating syllables and sounds is another important task to develop the phonological awareness. when the dyslexics are able to recognize the individual sounds, they can manipulate them to word. This task paves the way to recognize the word syllables in which the onset (refers to the first sound in the word) and the rime (related to the last sound in the word) are determined. Such as the word /bad/; /b/ is the onset and /d/ is the rime/. Additionally, to multisensory method, games and music provide the dyslexic learner with an effective support to promote their skills. Putkinen, (2015, p9) states that "musical activities have causal relationship with the ability to differentiate sounds in music. Therefore, it would seem possible that the ability to differentiate sounds in music could help children to be able to identify the various sounds in words".

In the study of the effect of rhyme and music on the acquisition of phonological awareness, Bostelmam, (2008) claims that the use of rhyme and music program would be beneficial to dyslexic children to acquire early phonological awareness. Through musical engagement the child with dyslexia can ameliorate his abilities to sequence, memorize in short time. Music has an important role to develop the stimulation of the brain to comprehend words and it improves attention, enhances memory and recall. It is helpful to promote dopamine which is realized in the bran. Dopamines build the child's confidence, increase pleasure and motivation and reduce anxiety. In respect to that, music is beneficial to syllabify words and promote more attention to the sounds. Also, it is a medium to improve listening skills and increase the ability

of the child to recognize the sound patterns as it is claimed by François, Chibret et al., (2013) and by repetition the information will be insert in the brain.

### 3.2.3.2. ICTs tools to Enhance Dyslexic Child's Capacities

Information and Communication Technologies (ICT) have invaded all aspects of life. Education is considered as the main aspect that has great influence in using ICTs. Before, the teacher was the centered individual in teaching and learning process and he was responsible as much as possible to provide learners with different information and developing their skills. Recently, ICTs have been emerged to be the assistive tools in teaching and learning courses.

The term ICT is generally referring to any kind of technologies that allow the users to gather and manipulate information. Many studies clam that ICT is the main useful tools can promote the child's educational experiences and it is more beneficial for children with special education needs including dyslexia, dysgraphia, dyscalculia and dysorthographia. Athanasios. S, (2013) points out that special education needs refers to all the problems and difficulties that the students face during the learning process. Various studies clearly support the integration of ICTs in this ground in which many opportunities are brought to improve those children with learning disabilities. Different issues are treated using different methods in ICTs, internet applications, communicative systems, assistive software and adaptive devices. Reading difficulties is one of the most common problems that affected by the use of ICT. The role of teacher is to inspire pupils to engage in active knowledge construction and ICTs realize this issue easily and effectively. Many software applications are used to identify and help enhancing the child's skills. Lange et al (2009) suggests an effective assistive software "homophone tools", it helps to picks out the errors during the writing process by means of computer. The SIGHT WORD is another software in which the dyslexic child can produce and read words and

speeches. It is developed by Gregor et al., (2003). It is called also as word processing environment and it helps to mastery and recognize words rapidly. In addition, there are plenty of card games which contain pictures with printed words. These games are designed to especially for children to produce word with particular sounds. Chatterbox which is known as fortune-teller, is another innovation that assists to progress the dyslexic children capacities. Chatterbox is "a poppet object with forded flaps" used by children to answer questions. It helps them to increase their vocabularies and this program has been progressed by Duk and Pearson (2002). Another program has been developed to improve decoding words by using Bookmark and it helps dyslexic child to rehear what he has been said during the task of reading and if he read wrongly, the bookmark asks him to repeat and correct the errors and mistakes.

Using kind of technologies is not limed in the school environment however, the child needs more practices at home and the parents need to control them and be selective in choosing the more helpful tools and the use of ICT tools makes children more motivated than before in such type of teaching in the classroom to be improved.

## 3.3. Recommendation for Parents to Control Their dyslexic children

We recommend that there is a need to:

- ✓ parents to be in contact with the child's school
- ✓ consult a special psychologist "closer to orthophony"
- ✓ construct a desirable school environment
- ✓ for both teachers and parents they need to be selective in using ICT tools
- ✓ it is preferable to look for special educational schools that care about those children
- ✓ avoid the foul words that create negative emotions and reactions

- ✓ Organize more courses and practices in phonological tasks
- ✓ Associations need to be activated for dyslexia

## 3.4. Limitations of the Study

During this investigation, a set of obstacles and problems have been faced.

1. Time played a major obstacle to me during my research.
2. It was hard to find the participants, as it is known that in our societies the majority of people do not know about this category of children.
3. We have not been able to use medical methods in data analysis.
4. Being unexperienced in analyzing the data

## 3.5. Conclusion

This chapter has covered sets of advices and suggestion for both parents and educators by which they can help and support to develop the dyslexic children abilities to be good pupils. The role of family to encourage and assist their children is very important to increase the child's motivation and conduct a child with self-confident to ensure the success. It has as well mentioned some limitations encountered during the preparation of this research.

## General Conclusion

After carrying out this research theoretically and practically in attempt to investigate the relationship between phonological processing which refers to the phonological awareness and dyslexia, the researcher found out that whenever there is poor phonological awareness, there is a deficiency in phonological processing in which the severity of dyslexia is increased. Also, there were various phonological processing were produced differently such as: omission, insertion, substitution. On the other hand, the present study offered an overview about the nature of dyslexia as it is neurobiological in origin and developed by the influence of the surrounded environment, including the social, cultural and socioeconomic factors that contribute in developmental dyslexia. Furthermore, the main issue that was remarkable in our investigation is that boys are more affected by dyslexia and scientists justify that by the differences in the brain maturity in both male and female. As far as the result of the analysis are concerned, it is obvious from the finding of the present investigation that the hypothesis which have been suggested are confirmed.

For the purpose to answer our major questions and verify our hypotheses, a structured record was used and analyzed consisting of three main groups of words. Familiar words, simple word in which each couple words formed by the same letters in different orders or have the same rhyme. Group of dyslexic children in Remas Pre-school and in Psycho-Pedagogical Center for Children with Mental Disabilities in Relizane, Algeria, were recorded when they read these words. Moreover, an interview with an educational psychologist was constructed consisting six main questions in relation to the nature of dyslexia and how it can be treated, in the same setting.

The current study, covered three chapters. The first is theoretical part which is a review related literature, the second chapter is practical part. It is concerned with the analysis of the

obtained data gathered from pupils' record and an interview with an educational psychologist. The third chapter which is devoted to provide suggestions and further recommendations which listed strategies that may be useful to achieve well, also give teachers and parents as well as school to help in solving the students' problems to learn generally and read particularly, which encounter them inside and outside school. In spite of the reached findings, we faced some obstacles in the process of our study such as the shortage of time and the inexperience we have in doing scientific researches.

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# Appendix (A)

The selected words which were recorded:

- Group One: familiar words

  شمس, /ʃemsˤ/, the sun

  قمر, /qʌmʌr/, the moon

  ليل, /leɪl/, the night

- Group Two: couple words

  شارع شاعر /ʃa:rɪʕ/, /ʃa:ʕɪr/ **street-poet**

  شهيد سعيد/ʃehi:d/, /seʕi:d/**martyr-happy**

  خروف خرافة/χaro:f/, /χora:fa/ **sheep-myth**

  فراش فراشة /fɪra:ʃ /, /fara:ʃa/ **butterfly-bedding**

- Group Three: complicated words:

**شرشف/ʃarʃaf/sheet**

**قوقعة /qawqaʕa/shell**

**جمجمة/dʒumdʒuma/scull**

**لؤلؤ/luʔluʔ/ pearl**

**خفافيش/χafefi:ʃ/bats**

**فساتين/feseti:n/dresses**

**قيلولة/qajlu:la/ nap**

# Appendix (B)

## اسئلة المقابلة

1. من هو مستشار التوجيه التربوي وكيف تعرفون مؤسسة افكار؟
2. ما هي اهم نشاطاتكم في الجانب التربوي؟
3. ماتعريفكم لعسر القراءة خصائصها واسبابها؟
4. اهم الحالات الصعبة على مستوى مؤسسة افكار؟
5. كاخصائي نفسي ماتصنيفكم للديسلكسيا ؟ اهي ضمن المجال الطبي ام النفسي؟
6. ماهي اهم طرق العلاج لعسر القراءة وماهي اهم الوسائل التكنولوجية المتاحة لدى مؤسستكم؟

## The Interview Questions

- ✓ Who is the educational psychologist?
- ✓ What are your most important activities in the educational aspect?
- ✓ How do you define dyslexia, its characteristics and causes?
- ✓ What are the most difficult cases in your institution?
- ✓ As a psychologist, your diagnosis of dyslexia is within the medical or psychological field?
- ✓ What are the most important methods to treat dyslexia? And what are the main available technological tools in your foundation?