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Investigating Brain Disorders Effects on Language Perception and
Production
The Case of Children Patients at Clinics of Neuropsychiatrist and
Speech Pathologist at Ain- Temouchent

*A Dissertation Submitted in Partial Fulfillment of the Requirement for a Master's Degree
in Didactics and Applied Languages*

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DEDICATIONS

Every challenging work needs self-efforts and guidance from those close to our hearts.

My humble effort is dedicated to

My father and my mother

Whose love and trust always strengthen my will.

Three strong and gentle souls, who taught me to trust Allah, believe in hard work, and that so much could be done with little.

My sisters

Amina & Sakina

&

My young brother

Mohamed

A special dedication goes to **My nephew & niece** Abd El kader & Lina

Who fill my heart with joy

I dedicate this dissertation also to **My friend** Fatima Zahra

Acknowledgments

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Special thanks go to the doctors who contributed to achieving the work through their insightful responses without neglecting all the patients who were part of this study; their willingness to give their time so generously has been appreciated.

LIST OF ABBREVIATIONS AND ACRONYMS

CT: Computed Tomography

MRI: Magnetic Resonance Imaging

PET: Positron Emission Tomography

SLP: Speech-Language Pathology

List of figures

Fig 1.1	- Parts of the brain	7
Fig 1.2	- Brain's hemispheres	9
Fig 1.3	- Brain's lobes	10
Fig 1.4	- Brain hemisphere's features	10
Fig 1.5	- Broca's area	12
Fig 1.6	- Wernicke's area	14
Fig 1.7	- The language center on the brain	15

Liste of Tables

Table 1.1	- The stages of language development in children	7
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Abstract

People can encounter various obstacles during their language development. It is hypothesized that speech-language therapy helps overcome obstacles to improving and developing language skills. The present research is devoted to shedding light on the language disorders people can face daily. It covers mainly the effect of psychological, genetic, or developmental disorders related to neurological and brain problems on language perception and production. Thus, the overall aim of this study is to investigate the effect of brain disorders, more specifically on language. The study seeks to reveal the language development problems that children can face. In order to gather data, two semi-structured interviews were addressed to doctors in Ain Temouchent; one was for a neuropsychiatrist and the other one for a speech pathologist; another tool of research was used, observation, during the internship at both doctors' clinics. Furthermore, the results obtained from the research findings revealed that various developmental diseases connected to neurological and brain disorders could affect language perception and production; the speech-language pathologist uses several medical procedures with children suffering from language disorders to achieve better results.

TABLE OF CONTENTS

Dedication	I
Acknowledgement.....	II
List of acronyms.....	III
List of figures.....	IV
Abstract	V
General Introduction.....	1
1- Chapter One: Review of Literature.....	3
1. 1. Introduction	4
1.2. Language	4
1.3. Stages of Language Development.....	6
1.4. Language and brain.....	7
1.4.1. How brain works.....	8
1.5.Language center	11
▪ Broca’s area.....	12
▪ Wernicke’s area	13
▪ Angular Gyrus	14
1.6.Speech and language disorders.....	15
1.6.1. What is aphasia.....	15
1.6.2. Types of aphasia.....	16

▪ Expressive aphasia.....	16
▪ Receptive aphasia	16
▪ Mixed receptive-expressive aphasia.....	17
1.6.3. What causes aphasia.....	17
1.6.4. How is aphasia diagnosed.....	18
1.7.Treatment.....	19
1.8. Conclusion.....	19
2. Chapter two: Methodology and Data Collection.....	20
2.1. Introduction.....	21
2.2. Research motivation.....	21
2.3. Research design	21
2.4. Research approaches	21
2.5. Case study and sample population.....	22
2.6. Research Instruments and data collection procedures.....	24
2.6.1. Neuropsychiatrist interview.....	24
2.6.2. Speech pathologist interview.....	25
2.6.3. Observation.....	26
2.7 Conclusion.....	26
Chapter three: data analysis and recommendation	27
3.1. Introduction.....	28
3.2. Data analysis.....	28

3.2.1. Analysis of the interview with neuropsychiatrist.....	28
3.2.2. Analysis of the interview with the speech therapist.....	32
3.3. Recommendations and directives.....	37
3.4. Conclusion.....	39
General conclusion.....	41
General conclusion.....	41
List of references.....	42
Appendix 01	44
Appendix 02.....	45

General Introduction

General introduction

The results of several investigations into the difficulties that kids face as they develop their language skills have revealed that there are many factors that can impact how well a language is perceived and produced, one of which is brain abnormalities.

The present research sheds some light on the process brain disorders and how it affects human language. It covers mainly the many factors that affect language perception and production, either directly or indirectly. Thus, the overall aim of this study is to investigate on difficulties that children face with their development of language.

For this purpose, the following research questions are put forward:

- How can brain disorders affect language perception and production?
- What is the role of the speech therapist in the management of the language disorder?

Furthermore, it is hypothesized that:

- Damage on parts responsible of language perception and production of language cause language disorders which we call also aphasia.
- A speech therapist also called a speech language pathologist assesses diagnoses and treats speech disorders and communication problems.

The present work is divided into three chapters; the first chapter, a literature review, consists of different items. It begins with an overview of language and of the brain moving to language center on brain. Then it deals with aphasia which is language disorders. The chapter ends with an overview of language disorders' treatments. The second chapter is more practical is devoted to the methodological phase of the study. Its objective is to supply a

thorough investigation of the factors that cause children's language disorders. The aim is to investigate how brain disorders affect child's language development. Two interviews were addressed to doctors, one to neuropsychiatrist and another one for the speech pathologist. The last chapter involves two significant parts: the data analysis; however, the chapter will be closed by providing some recommendations and suggestions.

Chapter one: Literature Review

Chapter one: literature review

1.1.Introduction

According to various sources, the study of the brain and therefore, language disorders, originated in the 19th century and linguistic analysis of those disorders began throughout the 20th century. Understanding how the brain works and how it changes after an injury is made easier by studying language impairments in the brain following injuries. When this happens, the brain has an impairment that is referred to as "aphasia".

This first chapter is devoted to shed the light on the main concepts including language, language and brain in addition aphasia. Besides, the chapter will highlight the types of aphasia, principles and its effects on the language.

1.2. Language

“The principal method of human communication, consisting of words used in a structured and conventional way and conveyed by speech, writing, or gesture.” (A study of the way children learn language)

“A system of communication used by a particular country or community.” (The book was translated into twenty-five languages)

The ability to create an infinite number of new structures and ideas out of "old" ones makes language a strong engine of human intellect and creativity. In the human brain, it plays a crucial role. It guides our ability to categorize items, distinguish between aromas and musical tones, present mental mathematics, make financial decisions, experience and express emotions, allow conversation that results in the flow of information, construct relationships, and produce art.

Languages are at the very core of what it means to be a person, being charmingly structured, complex, and a gift only given by humans. For instance, the sound of "blue" is

Chapter one: literature review

likely to have little relation to the characteristics of light we experience as blue, and the written word "blue" will sound differently in different languages depending on the language in which it is used. There won't even be a word for "blue" in many languages that might distinguish colors in fewer, more, or other ways.

It's difficult to define language. Language has been defined in many ways by various linguists. However, if we carefully examine the definitions, we will discover that each one is lacking in one way or another. These definitions will bring up a lot of queries.

The following list includes some of the most popular definitions of language offered by linguistics experts:

Edward Sapir says: "Language is a purely human and non-instinctive method of communicating ideas emotions and desires by means of voluntarily produced symbols" Since language conveys more than just "ideas, emotions, and wants," this definition is rather insufficient. Language has a broad range of implications, including body language, sign language, and animal communication.

According to Noam Chomsky, language is "a set of (finite or infinite) sentences, each finite in length and constructed out of a finite set of elements." Chomsky focuses on the linguistic structures. He demonstrated how language may be studied by dividing it into its component parts.

In the words of Hall, language is "the institution whereby humans communicate and interact with each other by means of habitually used oral-auditory arbitrary symbols." Hall's definition is limited since it only considers language as a human institution.

Each of these linguists emphasizes some facets of language while ignoring others. But what they have said about language is accurate, though incomplete.

Chapter one: literature review

"Language" has two main meanings as a subject of linguistic study: an abstract concept and a particular linguistic system. Such as "French." The distinction was first made explicitly by the Swiss linguist Ferdinand de Saussure, who established the modern field of linguistics. He did so by using the French words *langage* for language as a concept, *langue* for Chomsky's competence in a particular language system, and *parole* for Chomsky's performance in a given language (Trask, 1999:92)

As the assignment stated clearly, language is a system of communication that makes use of sounds or gestures combined in meaningful ways in accordance with predetermined rules. People may express their emotions, create poems and novels, and even think, all via the use of language. Language is fundamentally human, while it may not just be so. On the other hand, linguistics is the method of analyzing language that is based on science. This science attempts to provide an answer to questions like what is language knowledge (competence) and how is it used (performance).

1.3.Stages of Language Development:

One of the fundamental components of linguistics is the stages of language development. The ability to communicate with one another beyond national borders depends heavily on language. Every language has its own characteristics and objectives. The issue at hand is how children develop a language.

A child acquires a language or mother tongue at different ages. The child can acquire their mother tongue once all the phases have been completed. Let's examine the phases of development of language. We primarily examine the four stages of a child's language acquisition. The table below illustrates the stages of language development in children:

Chapter one: literature review

Stage	Typical age	Description
	1-2 months	Crying and fusing
Pre-linguistic stage	2-4 months	Grunts or sighs and later coos
	4-6 months	Squeals, growls, yells, raspberries and snorts
Babbling stage	6-9 months	Repetitive consonant-vowel (CV) patterns
One-word stage	9-18 months	Single open-class words or word stems
Two-word stage	18-24 months	Mini-sentences with simple semantic relations
Telegraphic stage	24-30 months	Telegraphic sentence structures of lexical rather than functional or grammatical morphemes
Later multiword stage	30+ months	Grammatical or functional structures

Kid Sense Child Development Corporation Pty Ltd © 2022 | Privacy Policy

Table 1.1: Stages of language development in children

However these stages of child’s language development can be interrupted or may not develop as described on the figure above, this can be raised to many reasons, for examples:

- Birth defects such as cerebral palsy, fragile X syndrome, and Down syndrome (trisomy 21)
- Hearing Loss in Children: Hearing loss can affect a child’s ability to develop speech, language, and social skills.
- Autism: Children with autism have less activation in the parts of the brain that are responsible for processing grammar and remembering word sounds.
- External and internal factors: The development of children's language is affected by a number of internal and external factors. The environment, family stimulation, customs, and habits are examples of external factors; maternal health during pregnancy (both physical and mental) and parental genes are examples of internal elements.

1.4. Language and brain

The brain is a complex organ that manages every bodily function as well as thought, memory, emotion, touch, motor skills, vision, respiration, temperature, and hunger. The central nervous system, or CNS, is made up of the spinal cord that emerges from the brain.

Chapter one: literature review

The cerebrum, cerebellum, and brainstem are the three key parts of the brain.

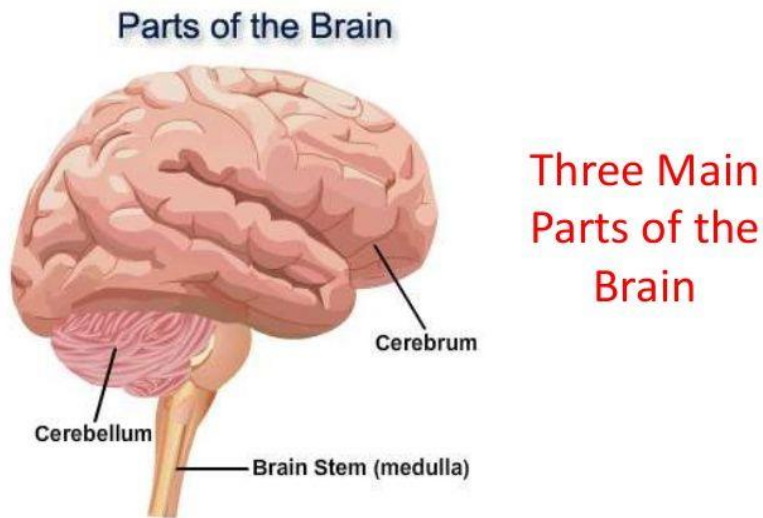


Fig 1.1: Parts of the brain
The Johan's Hopkins University, the Josh Hopkins Hospital. Copyright ©2022.

1.4.1 How the brain works:

Our brain serves as our computer's motherboard, data storage, operating system, and more. Its functions cannot be reduced to a simple black-and-white dichotomy, which is how the idea of a left-and-right brain emerged.

The left and right hemispheres of the brain are symmetrical with one another. The opposing side of the body is controlled by each hemisphere; therefore, your right brain controls your left hand. The right hemisphere also takes in sensory input from your left side and vice versa.

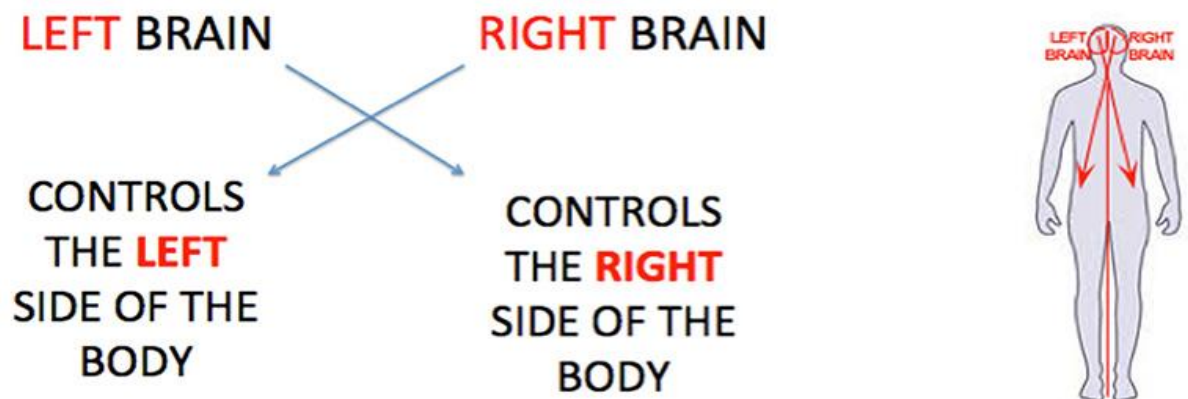


Figure 1.2: Brain's hemispheres

Medically reviewed by [Nancy Hammond, M.D.](#) — Written by [Ann Pietrangelo](#) —
Updated on May 9, 2022

The lobes are the geographic divisions of the brain. Your lobes control the activities of different parts of your brain.

- **The frontal lobe** of your brain, also known as the frontal cortex, is responsible for your personality, problem-solving skills, planning, emotional responses, and sense of smell, word meaning, and general speech.
- Your sensation of touch and pressure, sense of taste, and body awareness are all controlled by your **parietal lobe**, which is in the top part of the brain.
- The center part of your brain, known as **the temporal lobe**, controls your sense of hearing, social cognition, emotional regulation, and long-term memory.
- The crucial sense of sight is controlled by **the occipital lobe** on the left side of the brain.
- **The cerebellum**, located in the lowest part of the brain, controls coordination, balance, and fine motor function.

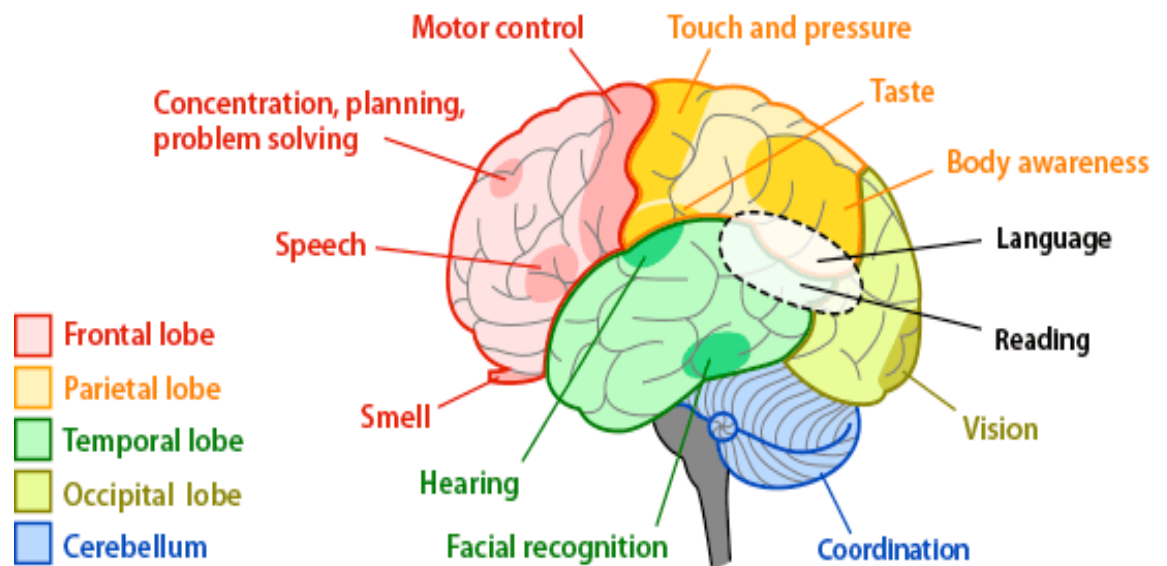


Figure 1.3: Brain's lobes
Physiology, Cerebral Cortex Functions
Khalid H. Jawabri; Sandeep Sharma

The next picture shows us an explanation of its most important features of each hemisphere of the brain:

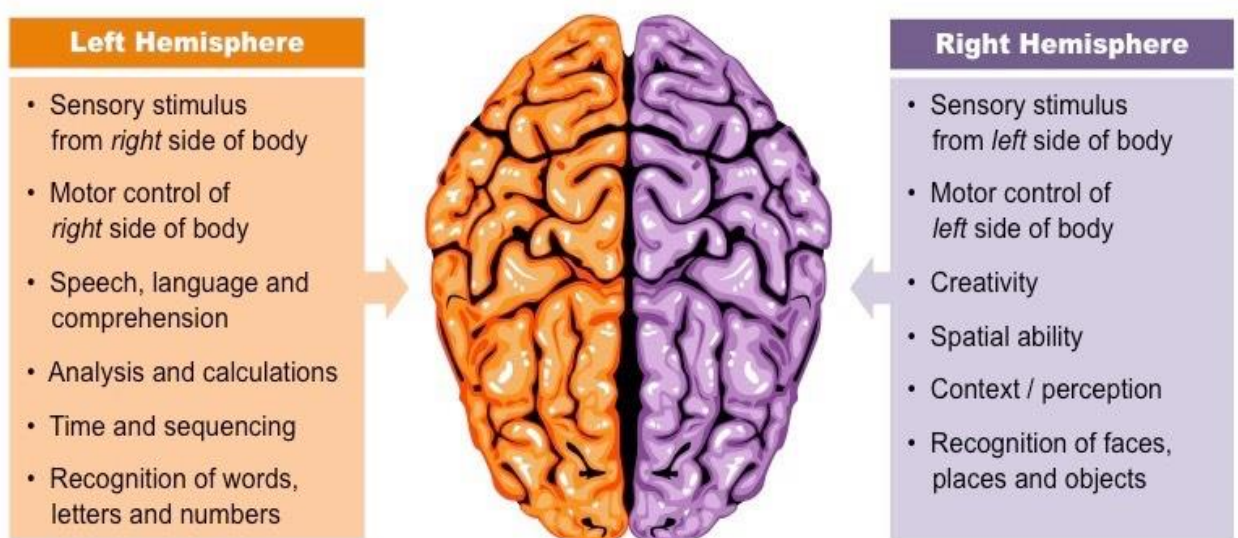


Figure 1.4: Brain hemisphere's features
AP Psychology Study
Resource: Cerebral Hemispheres Information

Chapter one: literature review

In general, language and speech are controlled by the left hemisphere or side of the brain. It has been considered as the "dominant" hemisphere as a result. The interpretation of visual data and spatial processing are major functions of the right hemisphere.

1.5. Language center

We are aware that the brain aids in the acquisition and development of a wide range of skills, including walking, cooking, driving, typing, dancing, etc. In this case, language is not an exception. The brain serves as both the seat of our thoughts and the source of our language. It has been discovered that specific brain regions are responsible of both language perception and production. The parts of the brain that control language perception and production are usually referred to as the "language center."

The analysis of the speech of patients with brain damage served as the foundation for a large portion of early (20th century) research on the relationship between the brain and language. However, non-invasive methods and electrophysiological recordings of human brains have made great strides in identifying areas and their functions in speech processing and production as a result of technological improvements.

The brain's Wernicke's, Broca's, and Angular Gyrus areas have all been recognized as being principally in charge of language-related functions. Muscle control and mediating connections between Broca's and Wernicke's areas are two more very important functions of general regions and processes like Motor Cortex and Arcuate Fasciculus. These areas are shown in the graphic, along with a quick explanation of how they work. Then there are explanations in detail.

- **Broca's area:**

This region of the brain was identified as being responsible of language processing by the French anthropologist and neurologist Paul Broca in 1861. Paul Broca discovered that

Chapter one: literature review

patients who had damages in this area located in the inferior frontal Gyrus were unable to speak while under his care. He came to the conclusion that speech processing and production were impacted by this area of the brain. Since then, the approximate region he identified became known as Broca's area.

Broca's area is a part of the cerebral cortex which is involved in ensuring that language is produced fluently. This area is found in the frontal lobe of the dominant hemisphere, which is typically the left side of the brain. It is also known as the motor speech area. It aids in speech production and is located close to the motor cortex. This region controls the vocalization necessary for typical speech as well as the breathing patterns used when speaking. It synchronizes the movements of the tongue, cheeks, lips, jaws, and the muscles of the larynx, pharynx, and respiration. When Broca's region is damaged, sounds can be produced but words cannot be formed.

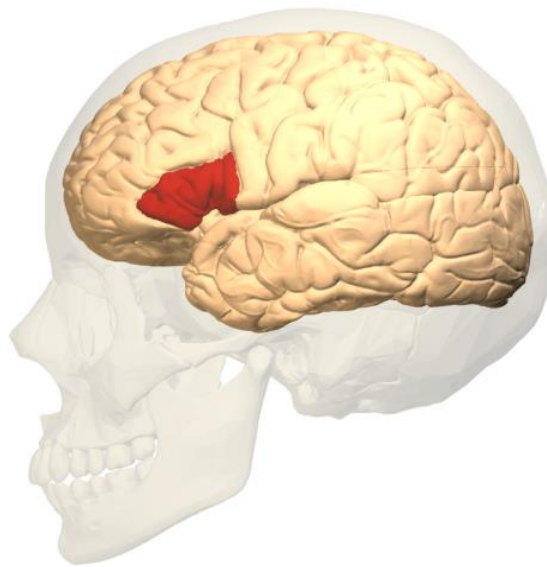


Figure 1.5 : Broca's area

Contributed by Katherine Humphreys

From: Neuroanatomy, Broca Area Copyright © 2022, StatPearls Publishing LLC

Chapter one: literature review

The figure above shows the Brocas area situated in the human brain.

- **Wernicke's area:**

This region was identified by the German physician Carl Wernicke in 1874 as being crucial for language comprehension. His studies on patients with damage in this area, which is in the lower part of the temporal lobe, revealed that they were unable to understand speech. He came to the conclusion that speech comprehension was impacted by this area of the brain.

Wernicke's area is a part of the cerebral cortex which is responsible for ensuring that language makes sense. It contributes to oral and written language understanding. This area is located in the superior temporal Gyrus in the dominant cerebral hemisphere

This area is known as the receptive language or language comprehension center and appears to be particularly crucial for understanding speech sounds. Furthermore, Wernicke's area damage leads to receptive, fluent aphasia (Wernicke aphasia).

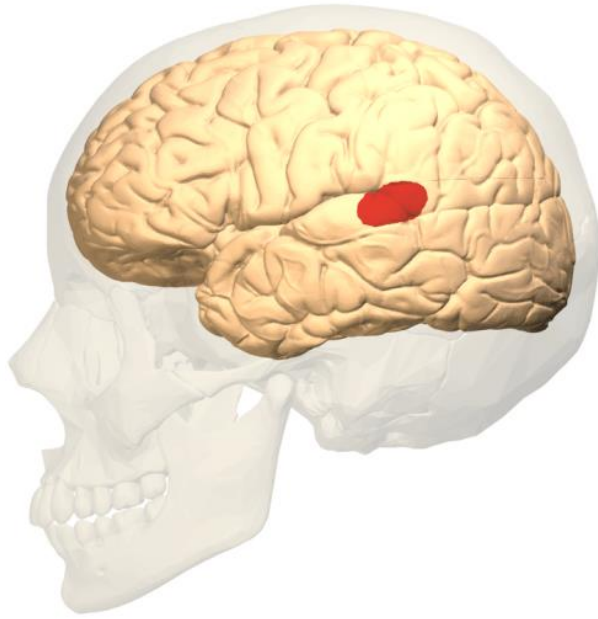
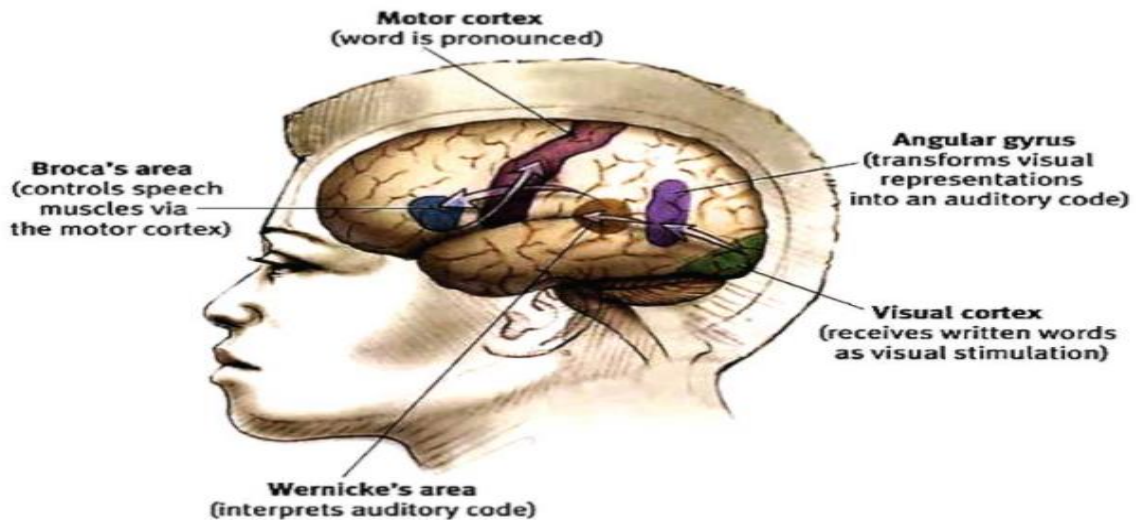


Figure 1.6: Wernicke's area
Image courtesy O.Chaigasame
From: Wernicke Aphasia Treasure
Island (FL): StatPearls Publishing; 2022 Jan-.

- **Angular Gyrus:**

It is situated in the parietal lobe's anterolateral area. It moves visual data into Wernicke's region to speed up the extraction of meaning from visual symbols. Thus, it helps to translate written language into spoken language by recovering verbal and visual information. Additionally, it is claimed to aid in particular cognition and numerical processing.



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Figure 1.7: The language center on the brain

1.6. Speech and language disorders

“Aphasias are speech disorders caused by brain damage. The relations between these disorders and specific kinds of brain damage suggest a model of how the language areas of the human brain organized” Norman Geschwind

1.6.1 What is aphasia?

Aphasia is language disorder caused by damage in specific area of the brain that controls language expression and comprehension. A person with aphasia finds it difficult to communicate with others.

There are many types of aphasia. These are often identified depending on the extent of the damage and the area of the language-dominant side of the brain that is damaged. For example:

Chapter one: literature review

- People with Broca's aphasia have damage in the frontal area of the language-dominant part of the brain.
- Those with Wernicke's aphasia have damage in the side area of the language-dominant part of the brain.
- Global aphasia is the result of damage in the largest area of language-dominant part of the brain.

1.6.2 Types of aphasia:

There is three common types of aphasia as follow:

- **Expressive aphasia (Broca's aphasia):**

A person with expressive aphasia has trouble expressing their thoughts, ideas, and messages to other people.

This makes it difficult to carry out daily duties like using the phone, writing an email, or speaking to family and friends. It may also affect speech, writing, gestures, or drawing.

Some of the following symptoms and indicators may be present in those who have expressive aphasia:

- Speech that is slow and halting and has trouble forming complete sentences.
- Having difficulty saying particular words, such as names of things, locations, or people.
- Using simply common nouns and verbs, such as "want drink" or "go town today".
- Typographical or grammatical mistakes.
- Employing an incorrect but related term, as saying "chair" instead of "table".
- Using nonsense words, or speaking incoherently (speech-sound errors).

Chapter one: literature review

- **Receptive aphasia (Wernicke's aphasia):**

Receptive aphasia makes it difficult for a person to understand what they hear or read. Additionally, they could have trouble understanding gestures, drawings, numbers, and images.

This may affect routine tasks like checking email, managing finances, holding conversations, listening to the radio, or watching TV.

Some of the following symptoms and indicators are often present in people with receptive aphasia:

- Difficulties comprehending what others are saying.
- Having trouble understanding written words.
- Misunderstanding the meaning of gestures, words, visuals, or drawings.
- Giving responses that might be illogical if they misinterpreted questions or remarks.
- Not being aware of their own speaking mistakes or understanding issues.

- **Mixed receptive-expressive aphasia (Global aphasia)**

This is the most severe type of aphasia, and it is used to refer to people who have little or no ability to understand spoken language and create few recognizable words. People who have global aphasia are unable to read or write. Greater brain injury, however, may lead to severe and long-lasting disability.

1.6.3 What causes aphasia?

Aphasia is brought on by injury to the side of the brain that controls language, typically the left side. So people at risk for a language disorder include those with:

Chapter one: literature review

- Stroke
- Autism
- Head injury
- Brain tumor
- Infection
- Dementia
- A family history of language disorders
- Premature birth
- Low birth weight
- Hearing loss
- Genetic disorders such as Down syndrome

1.6.4 How is aphasia diagnosed?

A set of comprehensive language examinations conducted by a speech-language pathologist can be used to confirm the presence of aphasia, estimate the degree of the disorder, and predict the probability of a successful therapy program. Examining speaking, naming, repetition, comprehension, reading, and writing are all part of these tests. Additionally making a diagnosis may also involve scanning the brain using imaging techniques, such as:

Computed tomography (CT): In this imaging test, the body is captured in fine detail using X-rays and a computer. Bones, muscles, fat, and organs are all clearly visible on a CT scan. General X-rays are less precise than CT scans.

Magnetic resonance imaging (MRI): a diagnostic process that produces exact images of the body's organs and structures using a mix of powerful magnets, radio frequencies, and computers.

Chapter one: literature review

Positron emission tomography (PET): A computer-based imaging technique uses radioactive materials to look at bodily functions.

1.7 Treatment:

The healthcare provider will talk with patient about the best treatment plan for his or her aphasia based on:

- Age, overall health, and medical background
- The origin and severity of the disorder
- Their handedness (left handed or right handed)
- Their tolerance for particular treatments, procedures, or therapies
- Expectations regarding the disorder's progression

The goal of the treatment is to improve the patient's abilities to communicate through methods that may include:

- Speech-language therapy or pathology (SLP)
- therapies of nonverbal communication using images or computers
- Group therapy for patients and their families

1.8.Conclusion

This chapter has provided definitions of prominent concepts and terms that will be useful in understanding the process of this research such as language, language center on brain and what we call aphasia. In addition, the concept of language disorder is being highlighted and the researchers gave some definitions and previous studies on these terms.

Chapter two: Methodology and Data Collection

Chapter two : Methodology and Data Collection

2.1. Introduction

The present chapter is devoted to the methodological phase of the study. Its objective is to supply a thorough investigation of the factors that cause children's language disorders. The aim is to investigate how brain disorders affect a child's language development. To achieve this purpose two semi-structured interviews were designed addressed to a neuropsychiatrist and a speech therapist. The data collection procedures will also be described.

2.2. Research Motivation

Research is commonly described as gathering information, analyzing and interpreting that data information following suitable methodologies set by specific professional fields and academic disciplines. Its main aim is to answer questions or to solve some issues.

The motivation behind conducting this research is to investigate brain disorders that affect language perception and production. Because of the researcher's interest in psycholinguistics and brain anatomy, the idea of this study came to light to contribute in assisting children suffering from language disorders.

2.3. Research Design

The present study investigates brain disorders' effects on language perception and production. The semi-structured interviews were designed to reveal difficulties in developing language and what factors lead to this situation. For this purpose, a case study was carried out with some patients (children) who are suffering from language disorders caused by many factors related to the brain.

Chapter two : Methodology and Data Collection

2.4. Research Approaches

Research approaches are the plans and procedures for research to be structured. There are various research approaches, such as; the quantitative approach, qualitative approach and mixed-method approach.

The methodology used in this research is “qualitative research” since it gives detailed information concerning the cases examined. Creswell (2014) defines qualitative research as the meaning people or groups attribute to a social or a human issue. Similarly, Shank (2002) defines it as “a form of systematic empirical inquiry into meaning” (p. 5). Furthermore, according to Vanderstoep and Johnston (2009), the significant benefit of the quantitative approach is that it offers profound information about the population being studied.

2.5. Case study and sample population

A sample population is the statistical selection of a group’s characteristics, which will be studied during a research study to provide specific findings. Sampling is considered a crucial stage in any research study. According to Polit (2001), sampling involves selecting a group of people, events, attitudes or other elements which will act as a basis for the study. Similarly, Gibilisco (2004) states, “In statistics, the term population refer to a particular set of items, objects, phenomena, or people being analyzed” (p, 38). However, a case study has been described as an intensive, systematic investigation of a single individual, group, community or some other unit in which the researcher examines in-depth data relating to several variables.

In order to investigate the issue raised in this study, a sample population was addressed in an attempt to require a suitable amount of valuable data. The informants are doctors from Ain Temouchent, one is a neuropsychiatrist, and the other one is a speech therapist.

Chapter two : Methodology and Data Collection

Among the many patients the researcher met with the doctors during the internship, there are five whose medical files was relevant to the researcher's interest and whose cases helped immensely in research development.

- The first case involves a 7-year-old boy who has a severe language delay.

The causes of this case are: Watching TV and English cartoons frequently as a young child made him learn some English words instead of his native tongue; his mother has diabetes, and the birth was premature.

Doctors take these factors into account because they have a relationship with brain disorders affecting the child's language development.

- The second case involves a 5-year-old youngster who is autistic and experiences a delay in developing his language. Now he is following the treatment of Autism that the neuropsychiatrist gave him and attending speech therapist's sessions to improve his language perception and production. The possible factors related to this child's problem are a family history of language disorders, late pregnancy at the age of 45, and Autism.

- The third case is a child of 8 years old. When he was four years old, he suffered from a high fever that caused him to lose hearing. So the first cause of his language disorder is hearing loss. At the age of six, he does have a cochlear implant and started his sessions with the speech therapist to develop his language.

- The fourth case is a seven-year-old girl who suffers from a language delay due to a cause, which is that her mother was exposed to trauma during her pregnancy, which led to the fetus being exposed to brain trauma or what we call stroke, and this is what caused a problem in her language development. So now, she is

Chapter two : Methodology and Data Collection

attending sessions with a speech therapist to improve her language perception and production abilities.

- The fifth case involves a 16-year-old girl who had a stroke in her mother's abdomen due to her mother's involvement in a car accident while pregnant, which led to premature birth in the eighth month. The girl is now paralyzed, but she attends sessions with a speech therapist to improve her language because she has never spoken since birth.

2.6. Research Instruments and data collection procedures:

Research instruments are the tools used by a researcher to collect the appropriate data. The data collection tools enable obtaining information from the sample population participants. Various instruments are used to collect data in research, such as questionnaires, tests, observations and interviews.

During the study investigation, two research instruments were used to collect the data; semi-structured interviews and observation. In a semi-structured interview, the participant is allowed to answer the question using his wording. It is still structured, but the participant can have some freedom while answering.

Two semi-structured interviews have been used as a research instrument to go deeper in the research. The interviews were conducted with two doctors: a neuropsychiatrist and a speech pathologist, for a better understanding of the study. Each interview consists of six questions.

2.6.1. Neuropsychiatrist interview

The interview consists of six questions as follows:

1. What factors can affect language perception and production?
2. How can brain disorders affect language perception and production?

Chapter two : Methodology and Data Collection

3. How can the child's exposure to TV affect his language development?
4. How can pregnancy factors affect the child's language development?
5. How can Autism affect the child's development of language?
6. How can parents suspect a speech development disorder in their child?

2.6.2. Speech pathologist interview

The interview was in French translated to English and consists of six questions as follows:

- 1- Qui est l'orthophoniste ?
- 2- Quel est le rôle de l'orthophoniste dans la prise en charge des troubles de langage ?
- 3- Sur quels points se base-t-on avant de prendre en charge un enfant malade?
- 4- Quelles sont les méthodes appliquées dans la prise en charge orthophonique?
- 5- Est ce que vous constatez vous une amélioration pendant et après les séances d'orthophonie et quelles sont les difficultés rencontrées lors de ces séances?
- 6- Les parents jouent-ils un rôle pendant la prise en charge de l'enfant? Et comment?

Furthermore, this is the translation of the interview in English:

1. Who is the speech therapist?
2. What is the speech therapist's role in managing language disorders?
3. What should be considered before taking IN charge a sick child?
4. What methods are applied in speech therapy?

Chapter two : Methodology and Data Collection

5. Do you notice an improvement during and after the speech therapy sessions, and what difficulties do you face during these sessions?

6. Do the parents play a role during the charge-taking process of the child? And how?

2.6.3 Observation

The observation method of data collection involves seeing people in a certain setting or place at a specific time and day. Essentially, researchers study the behavior of the individuals or surroundings in which they are analyzing. This can be controlled, spontaneous, or participant-based research.

Observation was employed as a study strategy while the researcher was receiving instruction from the two doctors. Since Wednesday was designated for children, the researcher used to visit the neuropsychiatrist every Wednesday for two months to observe how the doctor diagnosed the children's issues and how they were tested; and have attended several sessions with the speech-language pathologist, observing the therapeutic techniques utilized with children suffering from language disorders.

2.7. Conclusion

The chapter was devoted to describing the empirical phase. Two research instruments in the form of semi-structured interviews were addressed to two doctors (neuropsychiatrist and speech pathologist). The next chapter will tackle their analysis and present some suggestions and recommendations to parents concerning their children.

Chapter three: Data analysis and Recommendation

Chapter three: data analysis and recommendation

3.1. Introduction

This last chapter encompasses two significant parts: data analysis, recommendations and directives. After collecting the needed data, the analysis is going to be done. However, the chapter will be closed by providing some recommendations and suggestions.

3.2. Data analysis

The interviews with the neuropsychiatrist and the speech therapist are presented to you below with the analysis, followed by the analysis of each answer of each interview

3.2.1 Analysis of the interview with neuropsychiatrist

Q1- What factors can affect language perception and production?

Answer 01- “The cause of this disorder is often unknown but is thought to consist of several factors working in combination, such as:

- *Genetic susceptibility (family history of receptive language disorder)
- *Limited exposure to hearing language in their day-to-day environment
- *General developmental and cognitive (thinking) abilities.

It can also be associated with developmental disorders such as autism or Down syndrome. (Although, for some children, difficulty with language is the only developmental problem they experience.)

In other cases, it is caused by damage to the brain, for example, trauma, tumor or disease.”

Analysis of the first answer

The doctor reveals that various psychological, genetic, or developmental disorders related to neurological and brain problems can affect language perception and production.

Chapter three: data analysis and recommendation

Q2- How can brain disorders affect language perception and production?

Answer2- “- Children and adolescents with brain injuries exhibit various language disorders described by members of different disciplines, in different journals, using different descriptors and taxonomies. Conditions correlated with abnormal brain development causing language disorders:

*Primary language acquisition failure (specific language impairment)

* Conditions defined by abnormal behavior (autism; attention deficit hyperactivity disorder, ADHD)

* Basic sensory loss (deafness)

* Mental retardation of genetic origin (Down syndrome, Fragile X syndrome, Williams–Beuren syndrome).”

Analysis of the second answer:

The doctor revealed the common cases associated with abnormal brain development that cause language disorders, most of which we had discussed, and explained their relationship to brain development. Therefore, the brain issues the doctor has listed above can affect either language perception or language production, or both at once, resulting in a language disorder.

Q 03- How does watching TV impact language development?

Answer 03- “The study findings revealed that toddlers with more than two hours of television viewing time had a 2.7 times more risk of language delay than those with less than one hour. Children who viewed television for more than three hours a day had three times more risk. For every 30-minute increase in screen time, there was a 49% chance of expressive language delay. Research shows that increased screen time puts young children at high risk

Chapter three: data analysis and recommendation

for language delay. This includes late talking or difficulty developing language and literacy skills.”

Analysis of the third answer:

According to the data obtained from the doctor’s answer, there is a 49% higher probability of expressive language delay for every 30 minutes of additional screen time. This means that the more time a kid spends watching television, the greater the risk of language delay. So the study shows that more screen time puts young children at considerable risk for language delays, such as problems developing language and literacy skills or late talking.

Q 04- How can pregnancy factors affect the child’s language development?

Answer 04- “A high level of prenatal stress exposure, particularly early in the pregnancy, can negatively affect the fetus’s brain development, reflected in the toddlers’ lower general intellectual and language abilities. It has been linked to sub-optimal developmental outcomes in toddlers, while maternal emotional availability is associated with better cognitive and language abilities.”

Analysis of the fourth answer:

According to what the doctor said, we can understand that everything the woman experiences while pregnant might have a positive or negative impact on the fetus. The worst is when the mother experience negative things during the pregnancy, either emotional issues like stress; shock; fear; sadness or physical issues like accident or diseases; these will affect the development of the fetus negatively. For example, as the doctor said, the exposure of the mother to fatigue; stress or exhaustion, especially at the beginning of the pregnancy, can negatively affect the brain development of the fetus, reflected in the lower general intellectual

Chapter three: data analysis and recommendation

and language abilities in the toddlers which cause a problem in the child's language development when he or she born.

Q 05- How does autism affect language development?

Answer 05- "Autistic speech delays usually occur along with other communication issues, such as not using gestures, not responding to their name, and not showing interest in connecting with people. Other possible causes of speech delays include hearing loss and developmental delays. Autistic children might have difficulty learning the language because they tend to show less interest in other people in the first 12 months of life. They might be more focused on other things going on around them. Because they might not need or want to communicate with other people as much as typically developing children do, they do not get as many chances to develop their language skills."

Analysis of the fifth answer:

According to what the doctor is trying to explain, speech difficulties in autistic children sometimes go hand in hand with other communication problems. Because autistic children typically display less interest in other people throughout their first year of life, they may have trouble acquiring language. They do not have as many opportunities to practice their language skills since they might not need or desire to interact with others as frequently as typically developing kids do.

Q 06- How can the parents suspect a speech development delay in their child?

Answer 06- "By 12 months: Is not using gestures, such as pointing or waving bye-bye. By 18 months: Prefers gestures over vocalizations to communicate; has trouble imitating sounds; has trouble understanding simple verbal requests. By two years: can only imitate speech or actions and does not produce words or phrases spontaneously; Says only some sounds or words repeatedly and cannot use oral language to communicate more than their

Chapter three: data analysis and recommendation

immediate needs; Cannot follow simple directions; has as an unusual tone of voice (such as raspy or nasal sounding). “

Analysis of the sixth answer:

The doctor explains some of the signs that indicate the kid is experiencing language difficulties in the developmental phases that he or she is going through, which enables the parents to determine whether their child has a language delay or not.

3.2.2. Analysis of the interview with the speech therapist:

This interview was done in French with the speech pathologist and then translated into English as shown below:

The interview in French:

1- Qui est l'orthophoniste ?

« L'orthophoniste est un professionnel de la santé, spécialiste de la correction des troubles de la parole et du langage. Il prévient et prend en charge les troubles de la communication écrite et orale. Il peut-être aussi sollicité en matière de déglutition et de motricité bucco-faciale. »

2- Quel est le rôle de l'orthophoniste dans la prise en charge du trouble de langage ?

« L'orthophoniste diagnostique les troubles de la communication de l'enfant. Lorsqu'un enfant présente des troubles d'expression et de compréhension, présents à l'oral comme à l'écrit, le médecin généraliste dirige les parents vers l'orthophoniste. Ce dernier va établir un bilan orthophonique, afin d'évaluer ces troubles et en détecter l'origine. Lors de ce bilan, il s'entretient avec les parents afin de dresser un portrait global de l'enfant, puis évalue les compétences communicatives du jeune patient. Il pose ensuite un diagnostic qui permet de confirmer ou d'infirmer l'éventuel déficit et propose, si besoin est, un projet de rééducation. »

Chapter three: data analysis and recommendation

3- Par quels points on se base avant de prendre en charge un enfant malade ?

« Un diagnostic orthophonique permet à un spécialiste de diagnostiquer, prévoir, prévenir et annoncer les troubles qu'il a examinés. Le spécialiste construit un programme de traitement individuel ou collectif selon l'histoire de la maladie, le type et le degré du trouble, et l'âge chronologique et mental du malade à travers les résultats des tests et des examens médicaux. »

4- Quelles sont les méthodes appliquées dans la prise en charge orthophonique ?

« La méthode appliquée pour la prise en charge orthophonique est de commencer d'abord par un entretien avec les parents de l'enfant ou bien le patient directement si il s'agit d'un adulte, ce qu'on appelle l'anamnèse, ou on poses plusieurs questions pour connaître le déroulement du développement de l'enfant depuis sa naissance, après ça on doit faire passer au patient divers tests qui concernent le trouble de l'enfant et aussi des tests pour les fonctions cognitifs, sans oublier de passer par des tests complémentaires pour éliminer toutes pathologies physiques »

5- Est ce que vous constatez une amélioration pendant et après les séances d'orthophonie et quelles sont les difficultés auxquelles vous faites face lors de ces séances ?

« On trouve un résultat quand les patients et leurs parents sont sérieux et ponctuels lors de leurs séances et suivent les consignes et les directives de l'orthophoniste, aussi quand ils font les exercices et les activités que leurs donne ce dernier à faire à la maison pour un meilleur résultat »

6- Les parents jouent-ils un rôle pendant la prise en charge de l'enfant? Et comment?

« Absolument oui; Le rôle des parents et de l'entourage de l'enfant est très important car seul les séances chez l'orthophoniste ne sont pas suffisantes sans l'aide des parents qui a leurs tour reproduiront les activités qu'on leur demandera de faire à la maison pour la bonne continuité du développement de l'enfant »

Chapter three: data analysis and recommendation

Translation of the interview in English:

Q 01: Who is the speech therapist?

Answer 01: “The speech therapist is a health professional, a specialist in correcting speech and language disorders. It prevents and supports written and oral communication disorders. It may also be required in terms of swallowing and oral-facial motor skills. “

Analysis of the first answer:

The doctor here is trying to explain to us the speech therapist’s specialty in treating speech and language difficulties and helping patients with written and spoken communication disorders and other skills.

Q 02: What is the speech therapist’s role in managing language disorders?

Answer 02: “The speech therapist diagnoses the child’s communication disorders. When a child has expression and comprehension problems, both oral and written, the general practitioner refers the parents to the speech therapist. The latter will establish a speech therapy assessment to assess these disorders and detect their origin. During this assessment, he talks with the parents to draw an overall portrait of the child and assesses the young patient’s communicative skills. He then makes a diagnosis which makes it possible to confirm or invalidate the possible deficit and proposes, if necessary, a rehabilitation scheme.”

Analysis of the second answer:

The answer above reveals to us the role of the speech therapist in treating language disorders and how it is that much important to people suffering from speech and language disorders; and how he or she works to foster the development of social communication skills and improve an individual’s ability to carry out tasks necessary for successful daily living.

Chapter three: data analysis and recommendation

Q 03: What points should be considered before supporting a sick child?

Answer 03: “A speech therapy diagnosis allows a specialist to diagnose, predict, prevent and announce the disorders he has examined. The specialist builds an individual or collective treatment program according to the history of the disease, the type and degree of the disorder, and the chronological and mental age of the patient through the results of tests and medical examinations.”

Analysis of the third answer:

The answer above explains the points the speech therapist considers as the basis before planning a therapy program for patients. It is based on the disease’s history, the disorder’s kind and severity, and the patient’s chronological and mental age.

Q 04: What methods are applied in speech therapy?

Answer 04: “The method applied for speech therapy starts with an interview with the patient’s parents or with them directly if they are an adult. This is known as an anamnesis, and it involves asking questions to learn about the child’s developmental history since birth. Next, the patient must pass some tests related to the child’s disorder as well as tests of their cognitive abilities, without also forgetting to pass additional tests to rule out any physical pathology.”

Analysis for the fourth answer:

The speech therapist reveals in this answer the methods followed during the therapy based on some essential points, such as the child’s developmental history, which also involves several necessary tests so the speech pathologist can plan the introductory sessions for the patient.

Chapter three: data analysis and recommendation

Q 05: Do you notice an improvement during and after the speech therapy sessions, and what difficulties do you face during these sessions?

Answer 05: “We find a result when patients and their parents are serious and punctual during their sessions and follow the instructions and directives of the speech therapist, also when they do the exercises and activities that the latter gives them to do at home for a better result.”

Analysis of the fifth answer:

The speech pathologist emphasizes in the answer the importance of following the instructions and directions given during the therapy to improve the patient’s skills; the highlighted point here is that the more severe and accurate the patients’ parents are, the better and better the results will be.

Q 06: Do the parents play a role during the supporting process of the child? And how?

Answer 06: «Absolutely yes; The role of the parents and the child’s entourage is significant because only the sessions with the speech therapist are not sufficient without the help of the parents, who in turn will reproduce the activities that they will be asked to do at the house for the good continuity of the child’s development.”

Analysis of the sixth answer:

The pathologist here sheds light on the importance of parents and the child’s entourage during the therapy by repeating the activities they will be requested to complete at home for the best continuity of the child’s development.

Chapter three: data analysis and recommendation

3.3. Recommendations and directives

The ability to communicate effectively comprehends people and knows what to say are essential life skills. Communicating helps children make friends, learn and enjoy life to the full. You will be your child's first and most important teacher.

Being a parent is a particular role. Parents must teach their kids about life and how to live it to the fullest. This may be a tough challenge, particularly if your child struggles with communicating. Parents often need information about how to meet their child's needs best. Your child's speech and language therapist may provide you with valuable details on your child's progress in these areas. The therapist can also provide particular recommendations for at-home learning activities for your child. In addition, there are a few basic guidelines that can help you and your child succeed:

- Get your child's attention: Face your youngster or sit next to them. Before you speak, say their name. Discuss something that both of you can see in front of you. This teaches children the meaning of words.
- Have fun together: Use gestures, songs, sounds, and funny expressions. Do not be timid; being a little ridiculous can help you get their attention, make them laugh, and perhaps even help them improve their language.
- Not questions but comments: Having many questions might make it seem like an exam. Make it a dialogue. Instead of talking about what is occurring, comment to your infant about what they are doing.
- Allow them time to think: Children require more time than adults to comprehend what they have heard and determine how to respond. While you wait for them to answer, keep an eye on them.
- Use simple language: Your sentences should be brief, for instance, "Food time now" or "Wow, you are building a tower".

Chapter three: data analysis and recommendation

- Specify your words again: Repeating the same message is beneficial.

To understand concepts and pick up new words, babies and toddlers need to hear phrases and words again. This is a crucial element of infant talk.

- Make it easier for them to listen: Turning the music, radio or TV off helps children focus on your words.

- Extend what they have said: Your youngster can go on to the next stage of speech by adding one or two words to what they are saying. Therefore, you respond “Yes, huge bus” if your youngster says “bus”.

- Speak in your native tongue: Kids must pick up their first phrases and words in their native tongue. Other languages will be taught to your child later at nursery and school.

- Speaking and listening come more naturally to some kids than to others. They could have difficulties understanding the meaning of words and sentences; some struggle to find the right words and sounds to use and put them in order; these children may need extra help.

If you are worried about your child, speak with a professional who can offer help, such as your health visitor or a speech and language therapist.

You are your child’s first and most important teacher. You set an example for your child of listening and talking with others. You can make a big difference in how well your child develops communication skills. It is crucial to help your child learn and practice communication skills at home. As your child uses these new skills in everyday activities, you can feel proud of your child’s success.

Chapter three: data analysis and recommendation

3.4. Conclusion:

This last section enveloped two significant parts: the data analysis, recommendations and directives addressed to parents. One of the interviews was done in French and then translated into English, with the analysis of both interviews.

The results obtained from the analysis of the neuropsychiatrist responses revealed that there are various developmental diseases connected to neurological and brain disorders that can affect language perception and production; and the examination of the speech pathologist responses revealed the methodologies used with children suffering from language disorders to achieve better results.

General Conclusion

General conclusion

The stages of language development for some children go through difficulties, and there are several factors that have a role in these. And one of the most important factors affecting the language perception and production are brain disorders. Therefore, this research attempted to investigate on that.

This research work comprised three chapters: the first one was devoted to the theoretical part. It presented the various concepts concerning the theme of the research. Therefore, an overview language center on brain and how brain disorders affect language were explained like expressive language disorder where people have trouble expressing their thoughts, ideas, and messages; or receptive language disorder where they can't understand language. The second chapter dealt with the research methodology and the tools that have been selected in order to gather the data needed to reach our research objectives. Furthermore, it comprised a description of the participants involved in this study. The third chapter presented the analysis of the data collected from both interviews. The results obtained from the analysis of the neuropsychiatrist responses revealed that there are various developmental diseases connected to neurological and brain disorders that can affect language perception and production; and the examination of the speech pathologist responses revealed the methodologies used with children suffering from language disorders to achieve better results. It was concluded with recommendations to help parents to avoid difficulties their children can face.

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Appendix 01: Neuropsychiatrist interview

This interview investigates the effects of some factors on language perception and production. I would be very grateful if you could sincerely answer the following questions. Your honest answers will be of great use for this research.

1. What factors can affect language perception and production?
2. How can brain disorders affect language perception and production?
3. How can the child's exposure to TV affect his language development?
4. How can pregnancy factors affect the child's language development?
5. How can Autism affect the child's development of language?
6. How can parents suspect a speech development disorder in their child?

Appendix 02: Speech pathologist interview

This interview investigates speech therapist's role in managing language disorders and the methods used during the therapy. I would be very grateful if you could sincerely answer the following questions. Your honest answers will be of great use for this research.

1. Who is the speech therapist?
2. What is the speech therapist's role in managing language disorders?
3. What should be considered before taking in charge a sick child?
4. What methods are applied in speech therapy?
5. Do you notice an improvement during and after the speech therapy sessions, and what difficulties do you face during these sessions?
6. Do the parents play a role during the charge-taking process of the child?
And how?