Review of Contemporary Philosophy
ISSN: 1841-5261, e-ISSN: 2471-089X
Vol 24(01), 2025
pp. 486 - 499

# Brain Tumors and Effect on Cognitive Functions : Memory, Perception, Attention (Clinical Study)

**Boucherit Saci**

Lecturer in Clinical Psychology, Badji mokhtar University, Faculty of Humanities and Social Sciences – Annaba- (Algeria)

**ABSTRACT:** This study aims to understand the nature of cognitive disorders associated with brain tumors through an in-depth analysis of case studies, focusing on cognitive performance in three areas of brain function. Brain tumors directly affect an individual's performance of various ognitive tasks. The most prominent of these effects are memory impairment, attention deficits, and perceptual difficulties. The pattern of cognitive disorders in female patients with brain tumors was analyzed, and the relationship between the location of the tumor in the brain and the nature of the disorder in each cognitive domain was revealed. We used the clinical approach with case study technique as the most appropriate for analyzing complex psychological phenomena in their natural context, especially in individual neurological cases, by studying three cases selected according to specific clinical and diagnostic criteria. The study tools, including the Wechsler Memory Test, the Stroop Test, interviews, and observation, contributed to obtaining data on the cognitive performance and personal context of each case, yielding the following results: clear disturbances in working and visual memory. Difficulties in selective attention and cognitive inhibition, according to the Stroop test results. General cognitive slowing and decline in mental processing efficiency. It also showed variation in the severity of disorders depending on the location of the tumor, reinforcing the effect of brain structure on cognitive performance. Therefore, brain tumors negatively affect basic cognitive functions, especially memory, attention, and perception.

**Keywords:** brain tumor, cognitive functions, memory, perception, attention, neuropsychological assessment.

**Received:** 04 July 2025 **Received:** 29 July 2025 **Accepted:** 08 Aug 2025

## 1. Problematic Introduction :

The brain is the most important organ in the human body, as it constitutes the supreme command center that manages and coordinates the various activities of the individual, whether internal or related to the outside world. It is the main driver of all human thinking, learning, communication and interaction, and is responsible for maintaining the overall balance of the body and ensuring the continuity of its vital functions. The brain is responsible for receiving signals and information from the surrounding environment or from within the body, processing and analyzing them to make appropriate decisions that ensure the brain's superior ability to adapt, learn, and acquire skills and experiences over time, which makes it the main pillar of human development and growth at the personal and social levels. When exposed to any malfunction or injury, such as tumors, the effects of this are reflected in the individual's daily life clearly, highlighting the pivotal role that this organ plays in maintaining mental and physical balance, and in shaping the human relationship with himself and others.

A brain tumor is a neurological condition of great concern due to the delicate nature of the brain and the vital role it plays in regulating various bodily functions. A tumor is the result of abnormal and excessive cell growth within the skull, both in the brain tissue itself and in surrounding structures such as the meninges and cranial nerves. This growth may lead to pressure on neighboring

areas within the brain, disrupting the normal balance of neurological function. Depending on the location and size of the tumor, it can affect motor or sensory abilities or even cognitive functions such as attention, memory, and perception. A brain tumor does not only affect the physical aspect of the patient, but it can cause changes in the psychological and emotional state, such as anxiety, irritability, or loss of motivation, and these changes are indicators that may reflect on the quality of life of the individual and affect his/her communication with his/her social and family environment. Understanding the nature of a brain tumor and its impact on the human brain is an essential step in understanding the complexity of this disease and its multiple repercussions on the individual.

Statistics show that more than 90% of central nervous system tumors originate from glial cells, such as astrocytes, oligodendrocytes, microglia, and endothelial cells. Since glial cells play a crucial role in regulating the neural microenvironment necessary for the functioning of cognitive networks, their pathological lesions, such as brain tumors, may negatively affect a number of higher cognitive functions, especially attention, perception, and memory. When it comes to information acquisition and learning, the brain plays a pivotal role through a set of complex and overlapping mental processes called "cognitive processes." These processes include a number of higher psychological functions. These processes include a number of higher psychological functions that directly contribute to the reception, processing, storage, and retrieval of information. These processes include: Attention, perception, and memory. These functions are considered to be the main pillars of the successful learning process, as their degree of efficiency directly affects the effectiveness of acquiring new knowledge. (Ostrom et al, 2022)

Memory disorders associated with brain tumors affect the ability to retrieve or store information intact, and patients may suffer from forgetting recent events or losing distant memories, affecting their personal and professional lives. For example, tumors in the temporal lobe lead to impaired processing of verbal and auditory information, causing difficulties in recognizing words and sounds, while tumors in the frontal lobe affect short-term memory and the ability to remember daily tasks.

As for attention, one of the functions most affected by a brain tumor, patients often have difficulty focusing on different tasks or switching between mental activities. This mental distraction can lead to poor performance in tasks that require sustained focus, such as studying or working, and can affect social interaction and the ability to make sound decisions.

In terms of cognition, the impact of a brain tumor is reflected in difficulties interpreting sensory information and understanding the relationships between objects and events. The patient may have difficulty recognizing faces, understanding meanings, or perceiving distances and dimensions, especially if the tumor is in the parietal or occipital lobes. These cognitive disorders lead to a significant decline in the patient's ability to interact with their surroundings, and may progress to more complex cognitive disorders such as the inability to understand social cues or distinguish between reality and fantasy.

Studies show that tumors affecting the lobes associated with cognitive functions, such as the frontal and temporal lobes, lead to varying degrees of memory, attention, and cognition disorders.

Neuropsychological tests play a key role in understanding the impact of brain disorders, such as tumors, on higher cognitive functions. These tools not only describe symptoms, but also allow quantitative and qualitative analysis of subtle changes in memory, attention, and cognition, even before they are clinically noticeable.

In this context, the use of psychological tests such as the Wechsler Memory Scale (WMS) and the Stroop test is particularly important, as they allow for an in-depth analysis of the affected cognitive functions. The Wechsler Memory Scale (WMS) enables the assessment of various aspects of memory, while the Stroop test allows for the measurement of selective attention and executive functions. These tools enable the clinical psychologist to accurately track cognitive changes, thereby guiding diagnosis and treatment more effectively. With this in mind, the question of our study is posed:

The following question: To what extent does a brain tumor affect basic cognitive functions such as memory, attention, and perception?

**2. Hypotheses of the Study:**

- **General Hypothesis:**

- Brain tumor negatively affects cognitive functions, attention, perception and memory.

- **Partial Hypothesis:**

- The larger the tumor, the greater the pressure on surrounding brain tissue leading to greater deterioration in cognitive function.

- Malignant tumors may affect cognitive functions faster and more aggressively than benign tumors, which may have a more gradual effect.

- Depending on the extent of neurological damage caused by the tumor before it is removed, some patients can regain function over time while others experience permanent deterioration.

**3. Factors Affecting Cognitive Function:**

Memory, attention, and cognition are affected by many psychological and health factors that determine the extent of a person's ability to receive, store, retrieve, and utilize information normally. The way an individual deals with information varies according to his psychological and physical state when he receives it, in addition to the nature of that information and the extent to which it is related to his previous experiences and its emotional and mental impact on him. (Foster, 2008, p 148)

**3.1. Psychological Factors:**

The psychological factors affecting cognitive functions are divided into two types:

- **Psychological Processes associated with information processing:**

Humans subconsciously sort information, retaining what brings them psychological balance and reinforces their positive emotions, while they tend to forget or suppress information that causes them psychological pain or threatens their emotional stability. Although this technique helps in some cases, its excessive use may be an indicator of psychological instability and reliance on illusions to explain reality and escape from it. (Cautier, 2020, p 59)

- **Mood and Emotional State:**

When receiving and retrieving information, the individual's emotional state at the time of receiving the information affects the extent to which it is stored in memory, perceived, and then used in reality, as traumatic or sudden experiences can sometimes lead to total or partial memory loss. Negative emotions such as anxiety and fear may hinder the recall process, which is evident in situations such as exams or encounters with stressful personalities, but some information may be more deeply embedded when associated with strong emotions such as anger or fear.

- **Health Factors:**

The health of the body and nervous system plays an essential role in the efficiency of cognitive functions, and influential factors include the following:

- The health of the senses: The senses act as channels for receiving information, and if they are malfunctioning or impaired, this leads to inaccurate reception of information, which negatively affects its storage, retrieval, and utilization (Belzung, 2024, p 213).

- Nervous system health: The nervous system controls the routing of information to the appropriate memory, attention, and perception centers, and any malfunction of its functions may result in the loss or distortion of information, making it difficult to remember or use.

- Abuse of mind-altering substances: Drugs, alcohol, smoking, and caffeinated beverages negatively affect brain function, leading to poor concentration and impaired cognitive function.

- Physical and mental fatigue: Constant stress leads to a decline in brain efficiency and consequently a deterioration in higher cognitive processes, and lack of sleep negatively affects the performance of these processes. (Eustache & Guillery-Girard, 2021, pp. 132-134)

- Poor health and malnutrition: Diseases, accidents, and lack of essential nutrients, especially in children, may lead to impaired brain function, affecting memory and attention in particular.

- Aging: With age, mental abilities may deteriorate, leading to memory impairment, and in some cases what is known as dementia, which causes a gradual loss of attention and cognition. (Pereira, 2022, pp 133)

Based on these factors, it is clear that maintaining a healthy body and mind, along with taking care of the psychological state, helps improve cognitive functioning and enhances the ability to remember, retrieve, and utilize mental abilities.

**4. Psychological Examination:**

The location of the tumor has known effects on the clinical, neurological, and psychological functioning of our patients. A sign or symptom that is often underestimated in the context of brain tumors are cognitive, behavioral or psychological changes. Changes in mental and emotional health that result from the location of the tumor in brain regions responsible for thinking, mood, perception, attention, memory, alertness, sleep, and cognitive functions are often misdiagnosed or lead to a delay in tumor diagnosis.

It is important to note that these syndromes have been observed to have a profound impact on quality of life and may be the primary feature guiding patient decisions and goals of care. Cognitive disorders, issues with attention, concentration, perception, cognition, and memory are the most common syndromes associated with the anatomical location of the tumor, affecting approximately 70% of patients with brain tumors at some point in the course of the disease. (Thomas, 2020, p 264)

The rate at which a tumor grows or the extent to which it invades specific areas within the central nervous system can complicate the severity of symptoms. Tumor-associated swelling may exacerbate issues with attention, awareness, and cognition, but depending on the anatomical location of the tumor and associated angioedema, the ability to recognize these issues becomes critical when assessing patient capacity to give consent for medical procedures and treatments, as well as when discussing the extent to which these syndromes can be reversed or treated. (Fournier, 2024, p 210)

**5. Cognitive Styles can be Categorized and Measured :**

Psychologists have sought to categorize cognitive styles, with conceptualizations varying according to different research interests. These methods can be categorized as follows:

Domain-dependent vs. Domain-independent, cognitive complexity vs. cognitive simplification, ambiguity tolerance vs. Ambiguity intolerance, and finally impulsivity vs. reflectivity.

With a variety of instruments, cognitive styles can be measured using verbal and non-verbal tools, helping to avoid issues caused by cultural differences between individuals. Thanks to this characteristic, cognitive styles acquire a general character that is used to assess human behavior. (Moutin & Moutier, 2022, pp. 69-71)

**6. Applied Side:**

**6.1. Approach to the Study:** We chose to rely on the clinical approach, especially the case study method, due to the nature of the topic, which deals with the relationship between brain tumor and the emergence of cognitive disorders such as impaired memory, attention, and cognition. This approach allows us to delve deeper into the individual case of a patient with a brain tumor, through

a comprehensive analysis of his medical history, the development of his cognitive symptoms, and the psychological and social circumstances surrounding him. It is also suitable for understanding individual differences and symptom complexities that may not be evident in quantitative studies. Through this approach, we were able to observe the subtle interactions between neurological changes caused by the brain tumor and cognitive performance, which is difficult to achieve with the same accuracy using other approaches.

**6.2. Temporal, Spatial and Human Limitations of the Study:** The final study was conducted at the Ibn Rochd Surgical Hospital, Annaba, Algeria, on three (03) cases. The study started from 24/03/2025 until 19/05/2025 in the same hospital institution.

**6.3. Study Tools:**

**A.** To ensure the accuracy and credibility of the information obtained in our study on "brain tumor and its impact on cognitive functions (memory, cognition, attention)", we relied on objective methodological tools and techniques in line with the nature of the research questions. We selected tools that accurately measure the cognitive functions under study, namely: **The Wechsler test to measure general cognitive abilities, and the Stroop test to measure attention span and cognitive control**. These tests represent validated diagnostic tools that contribute to revealing the nature of cognitive disorders associated with brain tumors.

**B. Observation:** Structured observation was used because this type of observation relies on pre-planning and accurate data recording using scientific tools, such as observation forms or psychometric scales, which is in line with the nature of research in the field of neuropsychology where accurate observation of cognitive behavior and its changes associated with brain injury is required.

**C. Interview:** We adopted a strategy to evaluate the interview in the form of basic axes presented to the examinee in the form of open-ended questions, and our interview guide contained 05 axes.

**7. Analysis of Cases:**

**7.1. The first Case: (Sarah) : 25 years**

After applying the Wechsler test to Sarah, we arrived at the following result:

**Table (1) Represents the results of the Wechsler-Sarah test.**

| Axis | Maximum degree | The result obtained |
|---|---|---|
| General and current information | 6 | 3 |
| Orientation | 5 | 4 |
| Mental control | 9 | 5 |
| Logical memory | 23 | 15 |
| Re-numbers | 15 | 09 |
| Visual memory | 14 | 09 |
| Inductive learning | 13 | 11 |
| Total | 85 | 56 |
| Benchmark point | 56+14=70 | Very weak memory standard 62% |

**Standard Score:**

The total is converted from a raw score to a standard score. Using the evidence and the age of the case, we find 14 + 56 = 70. After converting, we find: The standard score is 62%, and the memory percentage is considered very weak.

After applying the Stroop test, the result was as follows:

**Table (2) Represents the results obtained from the Stroop-Sarah test.**

| Task | card | Number of correct answers | Number of errors | Number of frequencies | degree of error | Performance analysis |
|---|---|---|---|---|---|---|
| **Task 1** | A | 42 | 3 | 2 | 8 | Acceptable reading performance, with some distractibility and mild attention deficit. |
| **Task 2** | B | 27 | 6 | 4 | 16 | Weakness in cognitive inhibition mechanisms with impaired control of cognitive interference |
| **Task 3** | C | 38 | 2 | 1 | 5 | Relatively good performance, with slowness that may be related to a slight effect on visual processing. |
| **Task 4** | B | 17 | 9 | 6 | 24 | Significant impairment in cognitive function; a possible indicator of frontal lobe executive dysfunction. |

**Interpretation:** A high negative value (−21) indicates a marked difficulty in controlling cognitive interference, reflecting an executive dysfunction in the mechanisms of cognitive inhibition and selective attention.

After applying all the study tools (observation, essay, Wechsler cognitive test and Stroop test) to Case 1, it was found that the posterior location of the brain tumor (occipital or cerebellar) has a significant impact on multiple cognitive functions, especially visual perception, balance, and memory. The anatomical connection between this region and the occipital lobe and cerebellum explains symptoms such as vision disorders, loss of balance, and concentration difficulties. Localized pressure from the tumor may lead to neural excitability responsible for seizures, as well as temporal and spatial disorganization. The progressive deterioration in the ability to remember and pay attention reflects that neurocognitive networks are affected, which requires urgent cognitive-psychological intervention, complementing surgical and medical treatment, to preserve the remaining cognitive functions and improve the quality of life.

### 7.2. Case 2: (Sabrina) : 43 years

After applying the Wechsler test to Sarah, we arrived at the following result:

**Table (3) Represents the results obtained from the Wechsler Memory Test – Sabrina.**

| Axis | Maximum degree | The result obtained |
|---|---|---|
| General and current information | 6 | 2.5 |
| Orientation | 5 | 4.5 |
| Mental control | 9 | 4 |
| Logical memory | 23 | 12 |
| Re-numbers | 15 | 10 |
| Visual memory | 14 | 7 |
| Inductive learning | 13 | 9 |
| Total | 85 | 49 |
| Benchmark point | 49+42=91 | Memory benchmark average 90% |

**Standard score:**

The total is converted from a raw score to a standard score. Using the index and the age of the case, we find 49 + 42 = 91. After converting, we find: The standard score is 90%. The memory percentage is considered average.

After applying the Stroop test, the result was as follows:

**Table (4) represents the results obtained from the Stroop-Sabrina test.**

| Task | card | Number of correct answers | Number of errors | Number of frequencies | degree of error | Performance analysis |
|---|---|---|---|---|---|---|
| **Task 1** | A | 40 | 2 | 1 | 5 | Relatively good performance, reflecting good general attention and speed of simple verbal processing |
| **Task 2** | B | 30 | 5 | 3 | 13 | Moderate cognitive difficulties; possibly associated with impairment of executive functions |
| **Task 3** | C | 45 | 1 | 1 | 3 | Excellent performance, demonstrating intact color discrimination and visual processing |
| **Task 4** | B | 20 | 7 | 5 | 19 | Obvious difficulties with inhibition and selective attention; an indicator of frontal lobe involvement |

**Interpretation:** A high negative value (−25) indicates significant difficulty in dealing with cognitive interference, reinforcing the hypothesis of a dysfunction in cognitive inhibition and executive control mechanisms.

After applying all the study tools (observation, essay, Wechsler test to measure cognitive abilities and Stroop test to measure attention and cognitive control) to the second case, it turned out that the right temporal lobe is responsible for processing visual memory, recognizing patterns and faces, regulating emotions associated with auditory and visual experiences, and selective attention. The presence of a tumor in this area threatens these functions, even if it is not overtly apparent at the initial stage. The accompanying physical and psychological symptoms indicate a dysfunctional neural integration between perception and emotional processing. The acute psychological context associated with the miscarriage deepens the cognitive and emotional crisis, necessitating preventive and supportive cognitive-psychological care, in parallel with the medical treatment protocol.

### 7.3. Third case: (Louisa) : 39 years

After applying the Wechsler test to Sarah, we arrived at the following result:

**Table (5) represents the results obtained from the Wechsler Memory Test – Louisa**

| Axis | Maximum degree | The result obtained |
|---|---|---|
| General and current information | 6 | 3 |
| Orientation | 5 | 5 |
| Mental control | 9 | 4 |
| Logical memory | 23 | 12 |
| Re-numbers | 15 | 8 |
| Visual memory | 14 | 8 |
| Inductive learning | 13 | 11 |
| Total | 85 | 51 |
| Benchmark point | 51+44=95 | Memory Standard Average 96% |

**Standard score:**

The total is converted from a raw score to a standard score. Using the index and the age of the case, we find 51 + 44 = 95. After converting, we find: The standard score is 96%, and the memory percentage is considered very weak.

After applying the Stroop test, the result was as follows:

**Table (6) represents the results of the Stroop-Louisa test**

| Task | Number of correct answers | Number of errors | Number of frequencies | degree of error | Performance analysis |
|---|---|---|---|---|---|
| Task 1 | 39 | 2 | 2 | 6 | Acceptable performance, with two hesitations and two errors. Indicates good verbal ability with minimal distractibility |
| Task 2 | 26 | 4 | 5 | 13 | Difficulty inhibiting automatic responses, with |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | cognitive interference and executive dysfunction |
| **Task 3** | 36 | 2 | 1 | 5 | Average performance without interference, with a slight impact on processing speed |
| **Task 4** | 19 | 7 | 6 | 20 | Marked weakness in cognitive inhibition and control of cognitive interference |

**Interpretation:** A high negative value (-17) indicates significant cognitive interference, reflecting difficulty controlling automatic responses and difficulties in cognitive inhibition, which supports the hypothesis of a disorder in executive functions, especially those related to the frontal lobe.

After scrutinizing and applying all the study tools, including observation, essay, Wechsler test to measure cognitive abilities and Stroop test to measure attention and cognitive control to the second case, it became clear that the case from a cognitive and psychological perspective highlights a clear impact of the cerebral cyst on mental functions, especially with regard to short-term memory and selective attention. The cyst is located on the right side of the brain and is associated with areas responsible for visual processing, spatial attention, and sensory perception. Frequent forgetting of simple tasks and mental interruptions during daily activities indicate impaired momentary storage of information and a deterioration in the ability to direct and sustain attention. The psychological stress resulting from anxiety and fear of losing her role as an active and caring mother increases the severity of symptoms and affects cognitive processes, creating a vicious cycle between the neurological and psychological aspects.

**8. Hypothesis testing:**

**8.1. Testing the first partial hypothesis:**

The results clearly indicate that this hypothesis is true, as a direct correlation was observed between tumor size and the severity of cognitive symptoms. The larger or more invasive the tumor is within the adjacent lobe or lobes, the more it affects the surrounding neural structures through mechanical compression or concomitant vascular or inflammatory changes. This pressure not only disrupts neurons in the tumor area, but also affects neighboring neural networks that contribute to higher functions such as memory, attention, and cognition.

This was reflected in the varying degrees of cognitive deficits between cases; in cases where the tumor was large or accompanied by significant compression, there were marked cognitive impairments involving more than one function, indicating that the effect was widespread. Cases where the tumor was small or the pressure was low showed a milder deterioration, sometimes limited to a single function.

In this context, a study by Helen Dugery (2023) showed that patients with supratentorial tumors suffer from cognitive impairment even before surgical intervention, suggesting that tumor size and location may exert sufficient pressure to disrupt cognitive networks. Siham Karbou's study (2023) also revealed that the impact of the tumor varies depending on its location and the nature of the

damage, with large tumors in cortical areas being associated with a high level of cognitive and intellectual impairment.

**8.2. Testing the second partial hypothesis:**

Clinical data also confirm this hypothesis, as it has been observed that the nature of the tumor plays an important role in the speed and severity of cognitive symptoms. Malignant tumors are typically characterized by rapid growth and invasion of neighboring tissues, leading to a direct and immediate impact on neural structures, often without the brain being able to adapt or compensate, which is reflected in a sudden and rapid deterioration in cognitive performance.

In contrast, benign tumors tend to grow slowly, allowing the brain to adapt through mechanisms of "neuroplasticity," in which the brain redistributes functional tasks to other unaffected areas. This adaptation leads to a gradual onset of cognitive changes, which may be unnoticeable at first or require careful testing to detect.

This was supported by a study by Zainab Qadri and Anfal Tafar (2021), which showed that brain injuries—whether tumors or strokes—lead to varying degrees of cognitive decline, partly due to the nature and speed of the damage. Husni Emad Al-Aib (2017) also pointed out that severe deterioration in attention and working memory is particularly noticeable in cases of severe or aggressive damage to the frontal and temporal lobes, which can be explained by the growth of the malignant tumor and its direct impact.

**8.3. Testing the third sub-hypothesis:**

This hypothesis has been partially confirmed, as some cases have shown marked improvement after surgical or medical treatment, indicating a degree of neural plasticity or the ability to restore affected functions. This improvement usually occurs when the nerve damage is not permanent, i.e., the nerve cells were disabled by pressure or inflammation but not completely destroyed. The time factor is also very important; the earlier the tumor is detected and treated, the greater the chances of restoring function.

Conversely, some individuals have been observed to continue to experience cognitive difficulties even after treatment, suggesting that the tumor caused permanent damage or that critical areas were removed during surgery, limiting the chances of a full recovery. This variation between improvement and permanent deterioration shows that the decisive factor here is not only the type or size of the tumor, but also the level of damage to the neural structures and the degree of brain plasticity in each individual.

This was confirmed by Hosni Emad Al-Aib (2017) in his study on the effect of traumatic brain injury on executive functions, where he showed that the extent of functional recovery is related to the location of the injury and the level of damage. This is also supported by the results of a study by Mia Andreoli et al. (2023), which showed that damage caused by tumors to white matter tracts is associated with the onset of cognitive impairment before surgery in 62.6% of patients.

The study showed that this effect varies depending on the location of the tumor and the pattern of damage to the neural pathways, reflecting the role of the level of damage in determining the chances of recovery after treatment. The study clarified that this effect varies depending on the location of the tumor and the pattern of damage to the neural pathways, reflecting the role of the level of damage in determining the chances of recovery after treatment. These data highlight the importance of assessing the integrity of neural structures before surgery to predict the possibility of cognitive recovery or continued impairment.

**8.4. General analysis of the results in light of the general hypothesis of the study:**

Reminder of the general hypothesis: « Brain tumors negatively affect cognitive functions, attention, perception, and memory. »

Through an in-depth analysis of the results of cognitive tests administered to the three clinical cases: Sarah, Sabrina, and Louisa, it is clear that each case embodies a specific and unique pattern of cognitive disorders, accurately reflecting the structural-functional relationship between the location of the brain injury on the one hand, and the nature of the cognitive functions affected on the other. This close correlation between structure and function in the brain demonstrates the precise specialization of brain regions and shows how a defect in a specific region does not lead to a general deficit, but rather to a specific disorder in a specific cognitive function associated with that region.

In the first case : Sarah, who suffers from a brain tumor located in the posterior regions of the brain, specifically in the occipital and posterior parietal structures, showed significant impairment in tasks related to visual and logical memory, as observed in the results of the Wechsler Memory Scale test - first image. This decline is evidence of the impact on the neural structures responsible for visual and spatial integration, as the occipital and parietal regions play a central role in encoding, organizing, and storing visual information in working and long-term memory. The weakness in these functions is reflected in the difficulties Sarah encountered in recalling scenes or visual elements that rely on spatial organization or logical relationships between parts. What is striking in her case is that this weakness did not extend to all aspects of memory, as test results showed relative preservation of short-term auditory memory, indicating that the temporal regions, particularly in the left hemisphere of the brain, remain largely functionally intact. This supports the idea of the specialized distribution of cognitive functions within the brain and confirms that a localized lesion does not necessarily mean a general breakdown of all cognitive systems.

The second case : Sabrina, who suffers from a benign brain tumor in the right temporal lobe, presented a different pattern of cognitive impairment, manifested in a marked deterioration in verbal memory and auditory learning tasks. The results of the Wechsler test revealed a clear difficulty in verbal encoding and delayed retrieval of auditory information, which is attributed to the impact on deep temporal structures such as the hippocampus and amygdala, which are central to the emotional and auditory memory system, in addition to their role in forming long-term cognitive representations. Although the left temporal lobe is more specialized in explicit verbal processing, damage to the right temporal lobe may lead to indirect disruption of interhemispheric integration, impairing processes that rely on coordination between frontal and temporal networks. In addition, neural pathways connecting the temporal lobe to frontal regions, such as the frontotemporal pathway, may be affected by pressure from the tumor, reflecting on overall executive functioning.

In the third case : Louisa, who has a brain cyst on the right side of her head, showed a relatively milder pattern of cognitive impairment compared to the previous two cases. Although she had some difficulties with information organization and immediate recall, her overall memory abilities remained within the average range. This performance suggests a possible indirect effect of the cyst on the brain structures responsible for secondary executive functions, such as organization and internal attention, without direct or significant damage to the neural structures responsible for central memory encoding. It is likely that the cyst exerted localized pressure on cortical or subcortical areas near the frontal lobe or structures responsible for managing attention resources, explaining the presence of mild but more apparent disturbances in conditions requiring high cognitive effort.

When analyzing performance on the Stroop test, which is used to measure an individual's executive control and selective attention by resisting interference between automatic word reading and color processing, the results once again confirm the specificity of each brain injury. Sarah, for example, showed poor performance, manifested in slow response times and frequent errors in the conflict naming task, indicating a deficit in behavioral inhibition and cognitive control mechanisms, functions closely associated with the frontal and posterior parietal regions that contribute to selective attention and the integration of sensory and motor information. Sarah's injury to the posterior regions of the brain appears to have impaired her ability to filter out distractions and control the overlap between automatic and required responses, which is a key sign of executive function disorder.

Sabrina, although her injury was not directly in the frontal lobe but in the temporal lobe, also showed slowness and hesitation in the Stroop test, indicating that the tumor had affected the connections between the temporal lobe and the frontal lobe, which is known in neurological literature as the “network disruption” effect. meaning that localized injuries can affect relatively distant areas by disrupting functional communication pathways. This supports the hypothesis that the temporal lobe does not function in isolation from the rest of the brain, but rather cooperates closely with the frontal lobe in regulating behavior and attention, especially in tasks that require flexible cognitive control.

As for Louisa, she performed relatively average on the Stroop test, with slight difficulties in resisting cognitive interference, indicating a limited impairment in executive control mechanisms. Although these difficulties were not as severe as in the previous two cases, they reflect a possible effect of the cyst's pressure on the right frontal networks, or on the pathways responsible for coordinating cognitive attention and behavioral control, especially in situations that require rapid trade-offs between two competing responses.

Together, these findings underscore the importance of adopting an integrative approach to assessing cognitive disorders resulting from brain injuries, as it is not sufficient to rely solely on medical or anatomical data such as the location or nature of the tumor. but rather the patient's actual performance in detailed neuropsychological tests that reveal the true functional impact of the injury must also be taken into account. The marked variation in cognitive patterns between the three cases illustrates that each brain injury is unique, depending on the degree and type of impact on specialized neural networks. These findings also highlight the need for individualized treatment and rehabilitation approaches tailored to the specific pattern of impairment in each case, which contributes to improving the psychological and cognitive quality of life of patients and supports treatment decisions based on a deep understanding of the relationship between brain structure and cognitive function.

**9. Conclusion:**

In light of the findings of this study, which examined brain tumors and their impact on cognitive functions, it can be said that brain injuries, whether they are posterior tumors, temporal tumors, or even brain cysts, do not pass without affecting higher cognitive functions. The three clinical cases showed varying degrees of impairment in memory, attention, and perception, depending on the location of the tumor or mass within the brain. The results of the Wechsler Memory Test and Stroop Test clearly highlighted the extent to which cognitive performance was affected in the patients, confirming that cognitive disorders are not only caused by physiological factors, but are also a direct result of an imbalance in neurological function caused by pressure or damage to the brain structures involved in cognitive functions. This study also emphasizes the importance of accurate and early neuropsychological assessment in understanding the depth of potential cognitive effects, allowing for appropriate therapeutic and rehabilitative intervention. Therefore, the combination of clinical examination and psychological testing is an essential tool for comprehensively understanding the patient's suffering and providing psychological and neurological care that is more adapted to the specificity of each case.

The study demonstrated the importance of psychological assessment, particularly through the Wechsler Memory Test and the Stroop Test, in detecting cognitive disorders and determining their type and severity. It was found that the interaction between neurological and psychological factors plays a central role in determining the outcome of the condition, highlighting the need for a comprehensive approach to treatment that combines medical, psychological, and rehabilitative aspects. This study therefore opens up future prospects for research into the possibility of strengthening cooperation between the multidisciplinary medical team, particularly between neurologists, surgeons, and clinical psychologists, to ensure a comprehensive assessment and an integrated treatment plan that takes into account the neurological, psychological, and cognitive dimensions of patients, thereby ensuring improved quality of life and facilitating family and social reintegration after treatment.

**References:**


1. Catherine Belzung. (2024). Le Cerveau et les Sens : De la perception à la cognition, Editions De Boeck Supérieur, Belgique.
2. Emmanuel Fournier. (2024). Éthique et Consentement en Neurologie, Doin Éditeurs, France.
3. Francis Eustache & Bérengère Guillery-Girard. (2021). Le Cerveau et les Troubles de la Mémoire : Comprendre et prévenir les défaillances cognitives, Éditions Odile Jacob, France.
4. Janine Cautier. (2020). Les mécanismes de défense: Théorie et clinique, Editions Armand Colin, Paris, France.
5. Jean-Luc Moutin & Sylvain Moutie. (2022). Évaluer les styles cognitifs: Méthodes et pratiques, Presses Universitaires de Grenoble, France.
6. Jonathan K. Foster. (2008). La Mémoire: De l'esprit aux molécules, Editions Dunod, France.
7. Lucile Pereira. (2022). Développement Cérébral et Carences Nutritionnelles: De la Périnatalité à l'Adolescence, Editions INSERM, France.
8. Ostrom, Q. T., Price, M., Neff, C., Cioffi, G., Waite, K. A., Kruchko, C., & Barnholtz-Sloan, J. S. (2022). CBTRUS statistical report: Primary brain and other central nervous system tumors diagnosed in the United States in 2015–2019. \textit{Neuro-Oncology}, 24(Suppl 5), v1–v95. https://doi.org/10.1093/neuonc/noac202
9. Pierre Thomas. (2020). Neuropsychiatrie, Editions Elsevier Masson, France.