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A Comparative Linguistic Study of Cohesion and Coherence in Arabic-Speaking Aphasic Patients

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Absract:

Our research focuses on analyzing and interpreting aphasia based on the principles of the neokhalilien theory linguistic theory. This study was grounded on several hypotheses, primarily that aphasia affects cohesion (formal verbal analysis) and coherence (semantic propositional analysis). To achieve our objective, we developed a psycholinguistic protocol consisting mainly of a language analysis grid, in addition to a cohesion and coherence scale. This protocol was applied to a sample of 30 individuals: 10 typical individuals, 10 individuals with Broca's aphasia, and 10 with Wernicke's aphasia.The statistical and qualitative results of the study indicated that while aphasia represents a disorder at the levels of cohesion and coherence, there are statistically significant differences in these abilities, attributed to the type of aphasia (Broca's aphasia/Wernicke's aphasia), the degree of morphological derivation (root forms/derived forms), the type of affixes (structural affixes/connecting affixes), and variations in discourse contexts.

Keywords: Aphasia, Cohesion, Coherence, Neokhalilien Theory.

1. Introduction:

Language is one of the most prominent processes of adaptation and social harmony. An individual's behavior and thinking cannot occur in the absence of language. Since humans do not live in isolation within society, language acts as the mediator between the individual and their community. However, language can sometimes be disrupted or impaired due to various factors, leading to aphasia—a condition typically caused by brain injury, particularly in the left hemisphere. This condition can affect individuals in their daily lives, resulting in a breakdown of linguistic systems and leaving the affected person unable to perform language functions normally.

The causes of aphasia include strokes (AVC), vascular diseases, neurodegenerative diseases, tumors, inflammatory diseases, traumatic injuries, and infectious diseases (J.A. Rondal et al., 1977; Chomel-Guillaume et al., 2010). Due to these causes, a significant number of individuals with aphasia seek treatment daily at hospitals and various health centers to receive speech therapy. This therapy aims to help them overcome the language difficulties caused by the condition and attempt to restore their linguistic abilities, even if only partially.

From our field observations of speech therapy sessions conducted by specialists, we found that the rehabilitation process for individuals with aphasia often takes a considerable amount of time and, in many cases, does not yield the desired results. This observation is also confirmed by the specialists themselves.

Based on these findings, the starting point for our research emerged in the form of the following questions:

- What tools are currently available to analyze and diagnose aphasia in adults?
- When foreign diagnostic tests for aphasia are applied, what results have been obtained to date?
- Are there tools for analyzing and diagnosing aphasia in Arabic?
- Do these tools enable specialists to achieve scientific and objective results?

It is essential to emphasize that speech therapy cannot yield effective outcomes unless it is preceded by a thorough, scientific, and objective analysis and diagnosis of aphasia.

1.The Problem of Diagnostic Tools for Aphasia in Arabic-Speaking Patients:

Specialists in language and speech disorders have developed tests and protocols to analyze and diagnose aphasia. Among the most notable are the Montreal-Toulouse Protocol for Linguistic Examination of Aphasia (MT-86) and the Boston Diagnostic Aphasia Exam (BDAE), designed by Goodglass, Kaplan, and Barresi (2001). These tests were created to evaluate individuals who speak English or French. However, due to the near-total absence of linguistic tools tailored for Arabic speakers, specialists have resorted to using translated versions of these Western tests. Unfortunately, these translations often do not align with the cultural context or linguistic structure of Arabic, hindering accurate diagnosis.

Nevertheless, it is important to acknowledge the efforts of some Arab researchers who have attempted to adapt certain linguistic tests, such as the Comprehensive Aphasia Test (CAT) originally designed by Swinburn, Porter, and Howard (2004), adapted into Arabic in 2013, and the Labell Battery (Labbel, Béland, & Mimouni, 2012). The latter is a tool for evaluating and treating oral and written language disorders in children and adults who speak Arabic.

Despite these adaptations, these tools remain insufficient as they often fail to address the unique characteristics of Arabic.

They primarily focus on describing symptoms based on the location of brain damage, such as impairments in oral and written expression or comprehension, without providing an in-depth explanation of these symptoms. This oversight is critical because language is a cognitive ability governed by mental processes that may vary not only by language but also by linguistic system. Simply describing symptoms such as naming, repetition, or comprehension does not suffice.

Moreover, most adaptations involve little more than translations or superficial adjustments, such as replacing culturally irrelevant images or translating instructions into Arabic. True adaptation requires a deeper integration of the linguistic system's unique aspects, such as Arabic grammar, phonology, and syntax, which differ significantly from those of other natural languages. Without such adjustments, these diagnostic tools fail to achieve their intended goals.

This highlights the urgent need to develop scientific diagnostic tools tailored to the Arabic language, built on a precise methodology that aligns with the linguistic, cultural, and social realities of Algeria. Such tools would facilitate the creation of diagnostic protocols enabling specialists to save time during assessment, mitigate the severity of the disorder, and ultimately reintegrate patients into their family, social, and professional lives.

Having identified the lack of appropriate diagnostic tools for aphasia in Algeria, additional questions emerged in our minds:

-If all these clinical tools fail to diagnose aphasia due to the previously mentioned shortcomings—particularly their incompatibility with the Arabic linguistic system—are there additional reasons linked to the theoretical framework from which these tools were derived?

-Could the shortcomings of these tools be attributed to deficiencies in the theoretical foundations upon which researchers based their designs?

-Are there linguistic theories more suited to the Arabic language, offering a deeper perspective on analyzing linguistic phenomena, that could be relied upon to study aphasia?

Regardless of the tools used to analyze aphasia, it remains a linguistic disorder. Consequently, research should focus on studying this specific ability and the linguistic impairments it entails, necessitating a precise focus on language itself. Since linguistics is dedicated to the study of language and its levels, uncovering the causes of this disorder is only possible through the analytical tools and methods provided by this discipline.

2.The Neokhalilien Theory:

The belief that aphasia is merely a disorder of selection or syntactic structure (R. Jakobson, 1969) can lead to a misunderstanding, not only in describing and interpreting the disorder (clinical field) but also in defining its linguistic concept itself (theoretical field). This functionalist belief only allows for the identification of elements related to the substitution axis, following a single morphological-syntactic criterion, without considering their relationship with other elements at the vertical level.

According to the neokhalilien theory (A. Hadj Salah, 1979), linguistic units are built according to a generative schema unique to each level. It takes both axes—the substitution axis and the composition or insertion axis—into account simultaneously. Thus, coherence relies on the process of incremental transformation (la variation incrémentielle) as a fundamental principle in the formation of linguistic units (O. Nasri-Boudali, 2001, 2005, 2010). In this process, roots are not simply linked to affixes as in functionalist models, but instead involve a relationship between two operational elements: the root and the schema (la racine et le schème). These relationships occur in highly complex contexts, far beyond mere concatenation or selection, as Jakobson had believed. Instead, they involve processes of structuration, incremental and disjunctive variability, derivation, and more. All of these operations vary depending on the type of generative schema—whether lexical (schème générateur lexical) or syntactic (schème générateur syntaxique).

For example, in lexical schemas, morphological processes evolve from the nucleus (the root of the word) to sub-units (branches), forming affixes to the right and left of the root according to specific construction positions. Additionally, John Caniupan's (Gagnepain, 1990) model of "the word" focuses on syntactic structures while ignoring meaning. While this model provides a static view, lacking dynamic principles of language, it reduces sentence structure to simple concatenation of words.

Moreover, the theories of Caniupan and Jakobson fail to address an important aspect of language: its practical, communicative dimension, which was emphasized by Abderrahmane Hadj Salah (A. Hadj Salah, 1979). According to him, the primary goal of linguistic activity is communication. The neokhalilien theory acknowledges this dimension, distinguishing between language as a system of symbols (the formal aspect) and its use in communication (the meaningful, functional aspect). This communicative context is characterized by non-verbal cues that allow one to adapt to the situation, freeing the speaker from rigid structures and leading to what is known as "expansion" in the neokhalilien theory.

Thus, the neokhalilien theory is not just a linguistic theory; it is a psychological-linguistic or pragmatic theory in the full sense of the word. It emphasizes the cognitive nature of language, treating it as a dual intuitive ability—both system and use—governed by the rules of mathematical logic, which makes it a dynamic cognitive process. From this perspective, it controls both structural composition (system) and adaptation to surrounding reality (use).

In conclusion, the deficiencies in the analysis of aphasia according to Jakobson and Caniupan stem from the limitations of their theoretical foundations. Therefore, the neokhalilien theory represents the appropriate framework for studying

aphasia.

3.Research Objectives:

Based on the previous criticisms, the primary goal of this research is divided into two main parts:
- To emphasize that the deficiency in explaining aphasia stems from the theoretical standards themselves.
- To attempt to develop a psychological-linguistic protocol for diagnosing aphasia, based primarily on the neokhalilien theory.

Additional objectives that branch from our primary goal can be summarized as follows:
- To develop a precise methodology for analyzing aphasia based on the neokhalilien theory.
- To provide a reliable scientific tool for academic training, scientific research, and clinical application in the evaluation and diagnosis of all types of aphasia. This protocol can later be used to alleviate the severity of the disorder.
- The protocol can be used as a tool to monitor the degree of language recovery in aphasia patients, thus enabling the creation of a framework for evaluating and analyzing verbal productions based on the neokhalilien theory.
- To contribute to reducing the unstudied use of imported diagnostic tools that are unsuitable for the Arabic language system.

4.Research Hypotheses and Methodology:
Our main hypothesis states that aphasia is a disorder at the level of incremental transformation, which governs the process of cohesion and/or a disorder in the communicative contexts related to coherence (Wahiba Nasri-Boudali, 2017). Consequently, other hypotheses can be summarized as follows:
- There are differences in cohesion and coherence at the sentence level between typical individuals, those with Broca's aphasia, and those with Wernicke's aphasia. These differences are due to variations in the degree of phrase branching (Level 1, Level 2) and the type of affixes (constructive affixes/connecting affixes).
- There are differences in coherence at the narrative topic level of major sequences between typical individuals, those with Broca's aphasia, and those with Wernicke's aphasia.
- There are differences in the use of speech acts and ambiguous cues in semantic-pragmatic coherence in major sequences for individuals with Broca's aphasia. These differences are attributed to variations in narrative contexts (free narration/narrating a story from pictures/narrating a heard story) (Wahiba Nasri-Boudali, 2017).

As for the research methodology and tools, it seems most appropriate to take into account the specificity of this disorder by developing a psycho-linguistic and cognitive protocol that contributes to analyzing, evaluating, and interpreting aphasia in Arabic-speaking adults. This protocol includes:
- A language analysis framework.
- A measure of formal verbal cohesion and semantic-pragmatic coherence.
- Narrative criteria.

The protocol's contents can be further detailed as follows:
4.1. Language Analysis Framework: Our framework for analyzing aphasia is based on the principles of the neokhalilien theory, particularly *"state"* and *"use"*. These terms respectively refer to *"formal verbal analysis"* (semiologico-grammatical analysis), which we have termed *cohesion*, and *"semantic-pragmatic analysis"* (logical-semantic analysis), which we have termed *coherence*. These two principles were chosen for their complementarity in studying linguistic activity in all its aspects.
The key points of our new framework for analyzing aphasia, from which our measure was developed, can be summarized as follows (Wahiba Nasri-Boudali, 2017):
-**Cohesion**: The concept of cohesion is dedicated here to studying the purely structural aspects of language, independent of meaning. According to the neokhalilien theory, cohesion is defined based on the principle of incremental transformation, which does not rely solely on syntaxico-semantic links tied to speech acts but rather on purely structural rules that connect two procedural elements: the root and the pattern. These linguistic rules are responsible for maintaining verbal connectivity within each linguistic unit, regardless of its level—whether it is a morpheme, phrase, or word (*segment signifiant*)—and regardless of its degree of cohesion, whether root or derivative.
-**Coherence**: Coherence pertains to all contextual frameworks that enable the practical use of cohesion within a communicative situation. The Neokhalilien Theory emphasizes this level by focusing on the sentence, or what Khalil terms *self-contained discourse*. This informational semantic unit is governed by rules of communication, most notably the processes of predication (including its core components and complements) and the conveyance of meaning. In these processes, the predicate is connected to the subject (*core predication*), transforming the sentence into a unit that not only conveys meaning but also provides utility (information), such as performing acts of informing, prohibiting, commanding,

etc.
The sentence may adhere to the original linguistic rules (default language structure) or exhibit expansion, granting the speaker some freedom within the constraints of these rules. This freedom, however, is regulated by another set of rules dictated by the circumstances surrounding the communicative act. Contextual indicators (e.g., direct observation or previous discourse, *verbal or situational context*) can replace some prescribed linguistic rules.
Additionally, expansion can result from the speaker's ability to convey their intent through rhetorical devices acquired culturally, such as the use of figurative language, metaphors, or other stylistic tools. These adaptive processes, which allow the speaker to align with discourse conditions, are termed *expansive strategies*.
In our analysis of discourse-text (*discours-texte*), two levels were identified, inspired by Hussein Nouani's discourse analysis framework (H. Nouani, 1996, 1991) and F. François (1991), with some modifications. It is insufficient to analyze the structural and semantic aspects of aphasia alone, as pragmatic studies consider discourse-text to be a comprehensive event or act resulting from multiple speech acts (*actes du langage*) governed by communication laws. This creates a balance between interlocutors, reflected through the sequencing of actions and discourse roles.
The first level pertains to discourse analysis from a semantic-relational perspective (*sémantico-discursif*), referred to as *macro-sequences*. The second level views discourse from a perspective specific to speech acts (*syntaxico-énonciatif*), referred to as *micro-sequences.*

The macro-sequences encompass the following concepts:

- **The Topic** (*le champs ou le thème*): This refers to what occurs in the exchanges, the unit of the topic, its transmission, and its development. All of this represents the key factors in managing and guiding the axis of communication, as well as the linguistic formulation mechanisms (*les mécanismes de la mise en mots*). In our study of the topic in narrative texts, we divided the discourse structure into two elements: the narrative core and narrative additions. The first element includes the signals, the plot, and the resolution. The second element encompasses the events' development, the solution, and the conclusion.
- **The Genres** (*les genres*): This refers to what we do with language, such as describing, explaining, justifying, etc. These actions are carried out through linguistic means, but the variation in speech types is seen as a source of linguistic effectiveness.

As for the *micro-sequences*, we focused on discourse markers (*les embrayeurs*), which are the links between utterances and within them, indicating the speaker’s impact on the discourse. These include tools of reference, pronouns, and temporal adverbs, among others.
It is important to note that, given the concepts of *genres* and *discourse markers* in the neokhalilien theory, these correspond to the terms *speech acts* and *vague indicators*, respectively. Consequently, we adopted these latter terms, dividing speech acts into informative and performative acts.

4.2. The Verbal Cohesion and Semantic Harmony Scale: This scale includes a set of items that serve as tools for applying the data specific to the analysis of cohesion and harmony. In designing this scale, we took into account the linguistic reality of the Algerian dialect, relying on a methodology based on two levels (Wehiba Nasri-Boudali, 2017): the nominal and verbal levels (including the word’s vertical analysis) and the syntactic structure level, including adjuncts (la surrection). In designing the items of this scale, we adhered to the principle of procedural boundaries (the generative models) to define these levels, and consequently the linguistic units. The main principle here is the principle of incremental branching (i.e., incremental transformation) from the core or nucleus of each unit in these levels to their branches. The analysis of cohesion and harmony is thus based on these two levels, from the simplest structure to the most complex.
It is worth noting that this scale was subjected to psychometric study, and the scale’s validity was assessed through two methods: construct validity and discriminant validity. As for the reliability of the scale, several methods were used to calculate it, including the split-half method, Cronbach's alpha, and the Guttman method. The results of the psychometric study showed the validity and reliability of the scale. The scale includes 37 items and 165 phrases. The nature of these items can be summarized as follows:

- Naming ten images.
- Forming sentences from words.
- Filling in gaps within sentences.
- Constructing sentences based on given examples.
- Completing sentences.
- Conjugating verbs in the past, present, and imperative tenses.
- Performing transformations related to gender (feminine/masculine), plurality (singular/plural).

4.3. Narrative Items: Narrative items were applied based on three different situations: free narration, narrating a story through images, and narrating a heard story. In our study of aphasia, we relied on 30 cases (10 normal cases, 10 cases with

Broca's aphasia, and 10 cases with Wernicke's aphasia). We conducted two types of studies: the first was statistical (descriptive quantitative based on numbers), and the second was qualitative (interpretive). We focused our attention on two levels of analysis: cohesion and harmony (Wehiba Nasri-Boudali, 2017).

To analyze the collected data, we used the Statistical Package for Social Sciences (SPSS), applying the T-test and one-way analysis of variance (ANOVA), depending on the requirements of each hypothesis. This statistical analysis was based on two main aspects:

-**Cohesion Study**: This involves counting various verbal operations related to the incremental transformation of nominal and verbal elements, including their origins (i.e., words analyzed vertically) and branches, as well as syntactic structures, including their origins, branches, and level of expansion. These statistics were derived from the subjects' responses using the "Verbal Cohesion and Semantic Harmony Scale," with a focus on all structural operations related to construction and connection.

-**Harmony Study**: This involves counting all operations related to the sentence, including indicating meaning, usefulness, and the subject and its complement. Additionally, sentences were counted based on whether their strategies originated from the core of the speech or from the expansion, considering the relationship of these strategies to the degree of form branching and the type of affixes. All of these statistics were derived from the subjects' responses to the scale items. Regarding narrative discourse, various elements related to the theme were counted, including the narrative core and additions, as well as speech acts such as declarative and imperative acts. Moreover, aspects related to minor sequences, especially vague references, were counted. These elements were analyzed from the responses to the narrative items.

5. Results of the Psycholinguistic Study of Aphasia:

The statistical analysis results of aphasia, specifically regarding verbal cohesion (cohesion analysis) and semantic harmony (harmony analysis), are as follows: (Wahiba Nasri-Boudali, 2017).

5.1 Results of Cohesion Analysis in Aphasia Patients:

The statistical study revealed that both patients with Broca's aphasia and Wernicke's aphasia faced difficulties in the incremental transformation processes that govern cohesion. This is evident from statistically significant differences in the mean scores between them (41.4 for Broca's aphasia and 72.8 for Wernicke's aphasia) and the control group (106.7), with the control group performing better. It was confirmed with certainty, across most of the analysis levels, that cohesion in Broca's aphasia patients is significantly lower than in Wernicke's aphasia patients.

Some of the key errors made by aphasia patients regarding cohesion include:

a. Errors in Construction:

Construction is one of the most crucial processes of incremental transformation that governs the formation of linguistic units at the level of the root of nominal and verbal words (i.e., words) and syntactic structures. However, in our analysis, we focused on the level of the nominal word root, specifically the nucleus of the word. This process can manifest at this level through several contexts, the most important of which is structural integration. Errors related to this can be illustrated by the responses of the subjects to the naming task, as follows:

e images	**me responses from Broca's aphasia patients**	**me responses from Wernicke's aphasia patients**
age of scissors (صورة مقص)	**مْكَ** ıkṭ, (*scissors)*]	**مَقْصوص..لالا..مقَصَ** ıaqṣūṣ...lālā...maqṣaṣ, (*cut...no no...cutting)*]
age of grapes (صورة عنب)	**ـ** nab, (*grapes)*]	**تاع الفا** ʿ al-fākya, (*the fruit one)*]
age of ladder (صورة سلم)	**سَ...لَ** ...la...m, (*ladder)*]	**نطلعو ه** ṭla ʿū ma ʿāh, (*we climb with it)*]
age of chair (صورة كرسي)	**..كُ** ı...si, (*chair)*]	**كسكاس...كُسْ** ıskās...kusrī, (*steamer)...kusrī*]
age of hedgehog (صورة قنفذ)		**قنفذ** unfundūd, (*hedgehog)*]
age of pants (صورة سرو)		**سروْ** rūlāl, (*pants)*]
age of a clock (صورة سا)	**وَ...قـ** ra...q...t, (*time)*]	**سـ** ʿa, (*clock)*]
age of chicken (صورة دجا)	**ـ** j, (*chicken)*]	**جاجا...لالا...زج** ija...lālā...zijāja, (*chicken...no no...glass)*]
age of comb		**فرشيطا...اوه...نس**

صورة مشـ)		rshīṭā...oh...nasīt, (*fork...oh...I forgot)*]
age of flower صورة زه)	) ard, (*rose)*]	ز ahrā, (*flower)*]

The results of the naming item reveal that aphasia patients suffer from a lack of words, either through the absence of a response or errors in forming the correct word. This indicates difficulty in connecting the root letters that constitute the original material of the word analyzed vertically with the additional structural letters that form its morphological pattern. For example, if we examine the responses of Broca's aphasia patients in the previous example, we find that construction errors appear as phonological disorders, either through substitution or deletion. For instance, the letters **(م/ق/ص) [m/q/ṣ, ميم/قاف/صاد]** and **(ع/ن/ب) [ʿ/n/b, عين/نون/باء]** were substituted, respectively, with **(م/ك/ط) [m/k/ṭ, ميم/كاف/طاء]** and **(ح/ن/ب) [ḥ/n/b, حاء/نون/باء]**, and a letter from the root material **(ك/ر/س) [k/r/s, كاف/راء/سين]** was deleted to become **(ك/س) [k/s, كاف/سين]**. Additionally, the changes affected the voiceless letters **(ص) [ṣ, صاد]** and **(ق) [q, قاف]** and some voiced letters such as **(ع) [ʿ, عين]**, making them all voiceless: **(ك ← ق) [q → k, قاف ← كاف]**, **(ص ← ط) [ṣ → ṭ, صاد ← طاء]**, and **(ع ← ح) [ʿ → ḥ, عين ← حاء]**.

On the other hand, Wernicke's aphasia patients' phonological errors mostly stem from additions or reversals. Examples include **(كسري) [kasrī, كسري]**, **(قنفدود) [qunfundūd, قنفدود]**, and **(سرولال) [sarūlāl, سرولال]**, which respectively contain the root letters: **(ك/س/ر) [k/s/r, كاف/سين/راء]**, **(ق/ن/ف/د/د) [q/n/f/d/d, قاف/نون/فاء/دال/دال]**, and **(س/ر/و/ل/ل) [s/r/w/l/l, سين/راء/واو/لام/لام]**. These root materials hold no meaning in the context of the Arabic language due to the distortion caused by reversing or adding some of their letters.

These findings confirm that word construction is not limited merely to accessing the mental lexicon to retrieve the appropriate letters for a word, as claimed by most cognitive linguistic studies (Hillis, 1993; Caramazza et al.; Patterson, 1989; Rondal et al.; Howard et al.; Lerrer et Milroy, 1993; Coltheat, Bates et Castle, 1991; Linden et De Partz, 1992; Seron, 2003; and Wilson et Patterson, 1990). Nor is it merely a process of selecting and choosing these letters, followed by combining them, as proposed by Jakobson and his followers (R. Jakobson, 1969; Cohen et Hecaen, 1963). Instead, it extends to involve a dynamic structural process reflected in construction. At this level of analysis, it concerns the structural integration of two main elements in word formation: the root material and the morphological pattern.

This process is part of the incremental transformation mechanism, which is the fundamental mechanism for forming linguistic units and, consequently, the primary principle of formal verbal consistency.

B. Errors in Linking:

We find this process at several levels, the most important being the level of the branches of the word and the structures. We have chosen to present examples related to the branches of the nominal word. Most of the errors made by individuals with aphasia regarding linking are characterized either by an excess in isolation, a deficiency in sequential mastery, or a malfunction in elongation. These errors can be explained as follows:

swer from a Broca's Aphasia Patient	**swer from a Wernicke's Aphasia Patient**
شرى...خضرا...س ought...vegetables...market)	شريت **فالخضرا فَالسّ** bought vegetables at the market)

It is observed that the Broca's aphasia patient not only omitted the preposition before the word **(سوق)** *[market]* but also omitted the definite article that precedes this word. This indicates that these elements hold no significance for the Broca's aphasia patient. The preposition represents a meaningful possibility, yet the patient did not utilize it in this phrase. If the "word unit" is determined by the coherence of its components, it is absent for the Broca's aphasia patient, as they treat each part of the word as an isolated element without any connection to others.

As for the Wernicke's aphasia patient in the previous example, if we only consider the required element (i.e., examining the placement of the preposition with the nucleus), it appears from the response of the Wernicke's aphasia patient that they are capable of incremental transformation by attaching the preposition **"فَ" (in)** to the word **(السوق)** *[the market]*, as confirmed by statistical results. However, the problem lies in producing the word as a whole (with its branch). While they correctly added the necessary word in the appropriate place (the preposition **"في" [in]** within the phrase **"فالسوق" [in the market]**), they went beyond this by adding another preposition with an additional word not intended for study (**"فَالخضرا" [in the vegetables]). This does not conform to the rules of the Arabic language.

All this confirms that, despite Wernicke's aphasia patients' ability to connect at the level of nominal word branches, they use additions as positions rather than syntactical placements within the generated example. That is, they perceive the word only in its entirety, without adhering to grammatical rules governing other levels (syntax).

What is noteworthy in this study is that the type of linguistic units most retained by Wernicke's aphasia patients, despite the existing deficiency in formal verbal consistency, are the branches of the word (with mean scores of **14.9** for nominal branches and **16.2** for verbal branches). These values are very close to those of typical individuals, which are **15.6** and

16.8, respectively. This is because there are no differences between these patients and typical individuals at the level of word branches. This characteristic indicates Wernicke's aphasia patients' ability to retain connections and use extensions compared to Broca's aphasia patients, and thus their greater ability for incremental transformation at the level of word branches.

However, if Broca's aphasia patients show lower linguistic performance in terms of word branches compared to Wernicke's aphasia patients, this indicates a greater deficiency in their ability for incremental transformation through connection processes. This is supported by the total mean scores for nominal and verbal word branches, which are **14.9** and **16.2**, respectively, for Wernicke's aphasia patients, and **5.7** and **4.3**, respectively, for Broca's aphasia patients.

The most retained type of linguistic units for Broca's aphasia patients, compared to other types, is the root of the nominal word (the single word) compared to its branches, with mean scores of **14.1** and **5.7**, respectively. The higher proportion of individual units for these patients compared to other units reflects a very important characteristic: their greater ability for construction compared to connection.

This study also demonstrated statistically significant differences in consistency attributed to variations in the degree of branching of forms and the type of extensions. Broca's aphasia patients performed better when forming first-degree units compared to second-degree units, with mean scores of **28.1** and **14.3**, respectively. They also performed better when these units were associated with construction extensions compared to connection extensions, with mean scores of **18.2** and **6.2**, respectively.

In contrast, Wernicke's aphasia patients performed better with second-degree branching forms compared to first-degree forms, with mean scores of **45.8** and **31**, respectively. Their performance also improved when associated with connection extensions compared to construction extensions, with mean scores of **89.9** and **42.4**, respectively.

To clarify these differences among aphasia patients, our examples are limited to what pertains to the degree of branching of forms (Degree 1/Degree 2), as follows:

m for Nominal Integration		**rbal Consistency by Nominal Integration of the Root Word**	
ages (Some images for the item)	**ords - Names for Images by Degree of Inflection**	**amples of Responses from Wernicke's Aphasia Patients**	**amples of Responses from Broca's Aphasia Patients**
age of Scissors	gree 1 (Roots-Forms)	**مقصاص...قصا**(maqassas...qasas)	**مق** aqass)
age of Ladder		**ألي نطلع م** *y ntla3 m3ah* * the one we climb with*)	**س** oom)
age of Chair		**ركسي...لالا نسيت** aksi...Lala nset)	
age of Clock	gree 2 (Forms-Branches)	**ساعة** ı3a)	
age of Hen		**دجاجا** ajaja)	**د** j)
age of Comb		**شماطا...مش** ıamata...Mishata)	

It is evident from these examples that Wernicke's aphasia patients face more difficulty when the structural integration involves first-degree forms compared to second-degree forms. Their phrases come as attempts characterized by distortions and alterations, either at the level of the forms, as seen in the phrases **(مقصاص)** *[maqṣāṣ]* and **(قصاص)** *[qaṣāṣ]*, which appear in the forms **(مفعال)** *[mafʿāl]* and **(فعّال)** *[faʿʿāl]* instead of **(مفعل)** *[mufaʿal]*, or at the level of the root material, as seen in the phrase **(ركسي)** *[raksī]*, which appears with the order **(ر/ك/س)** *[r/k/s]* instead of **(ك/ر/س)** *[k/r/s]*. However, their responses related to second-degree forms seem less problematic than those for first-degree forms; they are closer to the target words despite passing through one or more attempts, such as in the phrase **(شماطا...مشاطا)** *[shamāṭā...mashāṭā]*.

One of the studies that attempted to analyze the differences in the behaviors of aphasia patients based on the type of linguistic context they face is a study by Halima Sahraoui (H. Sahraoui, 2009). The study reveals the role of the language system upon which the language is based and how it affects the quality of linguistic responses in Broca's aphasia patients.

We observed that as the complexity of the tasks faced by these patients increased—whether they were required to form sentences, narrate a story, or speak spontaneously—forming sentences was the most complex of these tasks, thus requiring more effort and concentration from aphasia patients. However, this study remains descriptive as it did not clearly explain the linguistic mechanisms behind these differences. The reason given by the researcher, referred to as the "degree of grammatical accuracy" *[degrés de précision grammaticale]*, was vague and all-encompassing. Therefore, it can be said, based on the results obtained, that these differences are not only due to the variation in tasks, but also to the degree of branching of the forms of the units that need to be completed.
The main disorders related to formal verbal consistency in aphasia patients can be summarized in the following table:

oca's Aphasia Patients	**ernicke's Aphasia Patients**
orphosyntactic errors and a lack of understanding of the concept of the word.	xcessive and uncontrolled use of word or lexical unit concepts.
eficient mastery, with transformational processes mostly limited to the root without extending to derivatives.	veruse of the concept of mastery, reflecting a lack of reverse transformation ability.
xcessive isolation capacity (*isolabilité*), indicating an exaggerated ability for reverse transformation (*variation décromentielle*).	eficiency in sequential mastery (*variabilité disjonctionnelle*) and poor control over syntactic rules for lexical structure.
gnificant deficit in elongation processes.	ncontrolled elongation, particularly for tasks involving topics 2 and 3.
ower performance in connection processes compared to construction, with a greater reliance on first-degree forms (root forms).	eficiency in construction processes compared to connection, with greater reliance on second-degree forms (derivatives).
evere deficiency in derivational ability.	erbal-syntactic abilities, but with poor control of situational semantics and meanings.
apacity for situational semantics, but linked to their level of verbal-visual consistency.	xcessive capacity for generating patterns and forms without understanding their appropriate use.

The variation in the types of errors significantly highlights the differences in the nature of the disorder distinguishing the two types of aphasia. These results indicate that aphasia patients experience a partial loss of their linguistic abilities. While patients with Broca's aphasia exhibit a greater ability to analyze situational semantics (*sémiologique*) compared to those with Wernicke's aphasia, they still lose the ability to control structural rules related to incremental transformations, particularly those involving second-degree forms (derivative forms) and connection processes, as previously mentioned.
On the other hand, patients with Wernicke's aphasia demonstrate a higher ability to use incremental transformational contexts, especially at the level of lexical branches. This reflects their stronger capacity for coherence through connection compared to construction. However, their inability to analyze the situational semantics of words may disrupt their overall consistency and integration.

5.2. Results of Analyzing Coherence in Aphasia Patients:
The statistical results of this study indicate that both patients with Broca's aphasia and those with Wernicke's aphasia face difficulties in coherence. This is evident from the significant differences in their average scores (58.8 for Broca's aphasia, and 27.2 for Wernicke's aphasia) compared to the control group (158.5), with the control group performing better. However, coherence at the sentence level in Broca's aphasia patients is significantly better than in those with Wernicke's aphasia. Despite the superiority of Wernicke's aphasia patients in terms of cohesion, they are unable to move beyond the framework of the verbal structure required for measurement, thus failing to provide meaning or content in their speech. Their speech is characterized by phonemic and semantic confusion, mixed phrases, and the use of incomplete, long, and unclear utterances.
The lack of coherence in Wernicke's aphasia patients is especially apparent in large sequences, where the morphological structure required for storytelling is almost entirely absent.
As for the analysis of the results from the records of patients with Broca's aphasia, despite their reduced ability to perform incremental transformations, or rather, to use linguistic rules, they are still more capable than patients with Wernicke's aphasia in providing meaning and content in their speech. This is true even though they use a telegraphic style, which indicates their greater ability for linguistic comprehension. This can be attributed to their more frequent use of meaning and utility in sentence construction. The average scores for these two processes were 33.2 and 25.6, respectively, compared to 12.5 and 14.7 for patients with Wernicke's aphasia. Additionally, patients with Broca's aphasia rely more on the main elements of a sentence (subject and predicate) for assignment, as their average scores were 22.7 and 3, respectively. Meanwhile, these values were 8.3 and 6.4 for patients with Wernicke's aphasia. These results can be further clarified with the following examples:

me items from the scale	me answers from patients with Wernicke's aphasia	me answers from patients with Broca's aphasia
m : Sentence construction by formula (G(v) ← T1) (some example sentences for construction) : • The boy / flew / fell → • The airplane / hung / took off →	**طار الولد** he boy flew) **علقتهم فالطّير** hey hung in the airplane)	**طاح** ell) **قلّع ط** he airplane took off)
m : Sentence construction by formula (G(v) ← T1 T2): • Samir / team / friend / beaten → • Salma / Sheikh / sheikh / beaten →	**بوه السمير الفريق ألي مضروب...** hey beat Samir, the team that was beaten...) **شربت سلمى الشيخ** lma drank the Sheikh) **سلمى الشيخ شر** lma the Sheikh drank it)	**ضرب** e beat) **شر...بت ش** rank...Sheikh)

It appears from these answers that both patients with Broca's aphasia and patients with Wernicke's aphasia suffer from a lack of coherence at the sentence level, in two aspects:

In terms of meaning representation: This is clearly evident, either through a lack of clarity in the sentence's meanings or through errors where the meaning does not align with logical reasoning. However, what is particularly striking is that patients with Wernicke's aphasia are often unable to form complete and logically acceptable sentences. In our opinion, this can be attributed to two main reasons:

- Either due to a lack of the original meaning represented by verbal signification, where we observe semiological errors affecting the very conventional context, leading to a mismatch between the signifiers and their situational denotations. This was evident earlier in several previous examples, such as in the phrase "الطّيرارا" (instead of the correct word "الطّيارا"). This is what aphasiological literature refers to as "paraphasias." The lack of verbal signification in these patients may be reflected in their use of words like "standards" or "passe-partouts," which are generic or vague terms that do not provide specific meaning.

-The cause may also be due to the inability of these patients to transition from the origin of meaning (verbal signification), which pertains to the situation, to the branches of meaning that concern the actual use of that situation, considering the consistency of meaning. Each sign that forms the sentence has an ambiguous situational denotation, and once it is linked with other signs within the sentence, its meaning becomes more specific. To achieve this, it is essential to ensure that each meaning in the sentence is considered with respect to its semantic relations, a concept referred to by Arab scholars as "semantic coherence." The errors affecting this aspect in patients with Wernicke's aphasia can be illustrated through many of the sentences they construct, such as in the phrases: "طار الولد" (The boy flew) and "شربت سلمى الشيخ" (Salma drank the Sheikh), where we observe that the meaning of "طار" (flew) does not match with "الولد" (the boy), and similarly, "شربت" (drank) does not align with "الشيخ" (the Sheikh). This also indicates their inability to utilize their capacity for verbal and formal consistency in usage, which involves sentence construction. Although the sentences may be correct from a structural and verbal standpoint (with the inclusion of the verb form "ع (فعل)" and references within the conventional context), they fail to make sense semantically. According to neokhalilien theory, they are ill-formed and logically inconsistent.

-The cause of the difficulties faced by patients with Wernicke's aphasia in terms of meaning can be attributed to the challenges associated with verbal and formal consistency, which often arise from an inability to construct more than one linguistic unit at the same time. Each unit is linked to a specific syntactic process, as seen at the sentence level, where patients are required to form not only words but also a grammatical structure. Since patients with Wernicke's aphasia experience more difficulties in construction than in connection, they may overcompensate in the latter by excessively linking words, such as using the relative pronoun "الذي" (which/that), and in addition to possibly failing to form the proper grammatical structure, their sentences become incomplete. They are merely a series of connected and arranged words or branches, as demonstrated in the example "ضربوه السمير الفريق ألي مضروب..." (They beat Samir, the team that was beaten...). Therefore, one of the primary reasons why patients with Wernicke's aphasia fail to convey meaning is their excessive and illogical use of the linking and elongation process.

-The failure of patients with Wernicke's aphasia to convey meaning can also be seen in their inability to use ambiguous markers correctly, such as in their improper use of reference pronouns. For example, instead of using a masculine pronoun, they may use a feminine one, which does not align with the reference (e.g., "الشاي" - tea), as seen in the sentence (سلمى الشيخ شربتها) ("Salma drank it" where "it" refers to "the Sheikh"). On the other hand, despite the noticeable linguistic deficits

in patients with Broca's aphasia, compared to those with Wernicke's aphasia, they are better at forming sentences that are more acceptable in terms of meaning. This can be attributed to several factors:
-Better control over verbal meaning or the origin of meaning, leading to a closer match between the signs and their situational referents. This is reflected in the transformations they make, which are fewer than those in patients with Wernicke's aphasia.
-Their ability to transition from the original meaning to its derived meanings while maintaining the consistency of the semantic relationships between the elements that form the sentence.
-Their ability to create simple structures that can be classified under "formula-origin" in all linguistic levels.
Errors in coherence among patients with Broca's aphasia are mainly due to difficulties in consistency, as seen in the sentence (قلّع طيارا) ("The airplane took off"), which consists only of a sequence of root words.
B. In terms of informativeness: It is observed that both patients with Broca's aphasia and patients with Wernicke's aphasia struggle to convey their thoughts to others, a difficulty that falls under what Sibawayh refers to as "communication." The reasons for this difficulty are the same as those related to meaning. Informativeness is conditioned by the presence of meaning in the sentence, and it can only be measured after evaluating the meaning. However, meaning does not require informativeness. For example, the sentence "The snow is white" contains meaning, but it is devoid of informativeness because it does not provide any new knowledge to the listener.According to neokhalilien theory, the measure of meaning is based on whether it is good (acceptable) or impossible, while the measure of informativeness, according to this theory, is based on the amount of information intended to be communicated to the listener in order to inform them. Consequently, Haj Saleh (2013) asserts that informativeness can be quantified.What we notice in the answers from patients with aphasia, as seen in the previous examples, is that the ability to convey information is affected by difficulties related to meaning. Whenever meaning becomes difficult or reduced, informativeness is also impaired. This is evident regardless of the type of aphasia (Broca/Wernicke). However, patients with Broca's aphasia seem to have a greater ability to inform, despite their reduced ability for verbal coherence and formation.
C. In terms of the subject-predicate structure and its components: Regarding the components of the subject-predicate structure, we can examine the responses of patients with aphasia in relation to meaning and informativeness, and observe that the primary reason for the absence of these components in Wernicke's aphasia patients is the difficulties they face in relation to meaning. While they may be able to form grammatically correct sentences in terms of coherence, they struggle to transition from the original meaning (the referential meanings of words in the sentence) to the extended meanings. This is primarily due to their inability to manage the co-occurrence of meanings, which is a necessary condition for moving from the ambiguous, referential meaning to the specific, defined meaning.For instance, in sentences like "شربت سلمى الشيخ" ("Salmā drank the Sheikh"), we see that while the sentence is grammatically correct, it fails to hold any meaningful or informative content. It does not contain the necessary components of subject-predicate structure, which are essential for the sentence's syntactical form. This is due to a lack of the subject-predicate structure, along with its corollary elements (such as the subject and the object), and thus cannot be considered as a meaningful or informative sentence. Therefore, sentences like "طار الولد" ("The boy flew") cannot be classified as containing the subject-predicate structure, even though they are syntactically correct, because they lack the necessary components of subject and predicate that carry meaningful information.
On the other hand, patients with Broca's aphasia, despite having a noticeably smaller vocabulary and reduced syntactical formation abilities, tend to form simpler, foundational structures. The sentences they produce are usually basic and may consist of words like "طاح" ("Fell") or "ضرب" ("Hit") that resemble root verb forms (such as فعل) or basic syntactical structures like "شر...بت شيح" ("Drank... the Sheikh") which follow a structure like "Verb → Subject → Object". These sentences tend to adhere more closely to the subject-predicate form, with the subject being a fundamental part of their structure, as without it, the sentence cannot exist.This does not mean that Broca's aphasia patients cannot form sentences with additional elements (called "modifiers"), but rather that their ability to use modifiers is more limited than their ability to form the core subject-predicate structure. This limitation is mainly due to their difficulty with syntactical cohesion, preventing them from adding further elements to the sentence structure. Therefore, it can be concluded that Broca's aphasia patients, by maintaining their foundational sentence structures, can create sentences that not only contain meaning but also fulfill the role of informativeness.
D. In terms of the origin of speech and expansive strategies: The results showed that the degree of coherence (meaning and informativeness) in patients with aphasia varies depending on the level of expansion of the forms and the nature of the modifiers. Patients with Broca's aphasia tend to use the original form of speech more when recalling linguistic units with a first-degree level of expansion compared to those of a second-degree level. The average for these, according to the degree of the forms, was 9.8 and 2, respectively. In contrast, patients with Wernicke's aphasia had an average of 1.8 and 3.9, respectively, for first-degree and second-degree forms. They are more able, in terms of using the original form of speech, to handle second-degree forms. On the other hand, patients with Wernicke's aphasia use expansive strategies more frequently when asked to recall first-degree structures compared to second-degree structures, with their averages being 0.9 and 2.5. This contrasts with patients with Broca's aphasia, who use expansive strategies more often when recalling second-degree units compared to first-degree structures. The averages for Broca's aphasia patients were 2.2 and 9.3, respectively.

To clarify these results regarding the origin of speech, we selected the following examples:

ause for syntactic integration with the element "كان" (some sentences for formation)	**me responses from individuals with Wernicke's aphasia**	**me responses from individuals with Broca's aphasia**
ntence of degree 1: محمد حنين/ ohamed Hnin / was) => ...	كان محمد الحنين as Mohamed Hnin)	**كان محمد حنين** as Mohamed Hnin)
ntence of degree 2: طبيب بابا غايب/ pa's doctor is absent / was) => ...	كان طبيب بابا غ as Papa's doctor absent)	كان...أوف... صـ as... Oh... difficult)

It appears from the responses of aphasic patients that, when sentences require first-degree forms, Broca's aphasics are generally able to construct sentences that fit the context, both in expression and meaning—what Arab linguists refer to as the "origin of speech." An example of this is the sentence *(كان محمد حنين)* (*was Mohamed kind*), which follows the required structure: *(كان)* [G1] → *(محمد)* [T1] → *(حنين)* [T2]. However, when these sentences require second-degree forms, their ability to use the "origin of speech" to produce meaning diminishes. For example, in the utterance *(كان...أوف...صعيب)* (*was...ugh...hard*), the patient utters fragmented words that reflect frustration and the difficulty of the task.

The reverse is observed for Wernicke's aphasics. When the sentences require first-degree forms, their ability to use the "origin of speech" as a source of meaning decreases, as seen in the sentence *(كان محمد الحنين)*, which fails to meet the required structure due to the unnecessary inclusion of a definite article in *(حنين)*. However, when the sentences involve second-degree forms, Wernicke's aphasics are better able to approach the "origin of speech," as demonstrated by the sentence *(كان طبيب بابا غايب)* (*was father's doctor absent*), which adheres to the required structure: *(كان)* [G1] → *(طبيب بابا)* [T1] → *(غايب)* [T2].

Thus, it can be concluded that retaining certain structural features of language, regardless of the type of aphasia, plays a significant role. This retention not only facilitates the production of accurate structures but also helps patients achieve meaningful and functional communication.

Many studies have examined aphasia based on what is retained or lost in language (Nespoulous, 1980, 1986, 1990, 1994, 1996; Watzlawik et al., 1972; Tran, 2000). However, these studies often focus predominantly on Broca's aphasia. They consistently describe Broca's aphasia as being characterized by simple, unelaborated forms that are nonetheless capable of conveying informational messages. Yet, these studies do not provide a clear explanation for this phenomenon.

We attribute this to a greater retention in Broca's aphasics of construction processes compared to connection processes, as well as a stronger retention of first-degree forms compared to second-degree forms. Some studies (Rondal & Seron, 2003) have found that Wernicke's aphasics struggle with naming objects and tend to use periphrasis (circumlocution) instead of providing the target word. However, these studies fail to offer a linguistic explanation, attributing this difficulty to impaired access to phonological representations while retaining semantic representations (Rondal & Seron, 2003; Caramazza & Hillis, 1993). They overlook the fact that periphrasis itself involves forms beyond the word level, requiring compound forms that can only be produced by individuals who retain them.

This aligns precisely with the findings of our study, which show that Wernicke's aphasics perform better with sentences requiring second-degree forms.

As for the results related to expansive strategies, they can be clarified through the following examples:

me sentences for composition from the scale items	**me answers from patients with Wernicke's aphasia**	**me answers from patients with Broca's aphasia**
m of construction according to the formula (A (V) ← M): **ntence of the first degree:** The boy/flew/fell <=.....	**رابلهم ا** he boy was amazed.)	**الولد طاح** he boy fell)
ntence of the second degree: The plane/stuck/took off <=.....	**قلعت الطيارة** he plane took off.)	**طيارة ....سما** he plane... sky **(**while pointing to the sky with her hand)

m of syntactic integration for the element "kan" (كان): **ntence of the first degree:** Samir Smein/kan <=..... **ntence of the second degree:** Samir, a famous baker/kan <=.....	**كان الراجل الي هو سمير س** he man, who is Samir, was fat) **كان خباز معروف هذا س** amir was a famous baker (while pointing with his finger to the word "Samir")	**سمير سمين** amir is fat) **كان معر** e was famous)
m of integration in the position M1 for the structure (ا): **ntence of the first degree:** Ali, beaten/Omar <=..... and he runs away **ntence of the second degree:** The naughty girl, beaten/Fred <=..... and he runs away	**ـ المضروب علي و هرب** mar, the one who was beaten, Ali, ran away) **ـ يضرب الطفلة الشريرة و يهرب** arid is hitting the naughty girl and runs away)	**ـ ضرب علي و هرب** mar hit Ali and ran away) **ـ يضرب و يهرب** arid hits and runs away)

What we observe from these examples of responses by aphasic individuals confirms the last two hypotheses, which state that there are differences in the use of expansive strategies due to variations in the degree of form branching. We see that individuals with Wernicke's aphasia, when asked to create sentences with first-degree forms, may fail to do so, as in the phrase *"عمر المضروب علي و هرب"* (Omar, the one hit by Ali, ran away), or they may resort to other methods to convey their intentions by employing strategies related to expansion, which we have called expansive strategies. These strategies involve the aphasic individuals attempting to approximate the target meanings, either by:

-Through the use of metaphorical meaning, as seen in the phrase *"رابلهم الولد"* (The boy collapsed), we observe a similarity between the meanings of "طاح" (fell) and "راب" (collapsed, in Algerian dialect). Although the word *راب* is not conventionally used to indicate falling, this method demonstrates the ability of individuals with Wernicke's aphasia to form something resembling a metaphor, which is considered one of the rhetorical mechanisms.

-Additionally, through syntactical expansion, as in the phrase *"كان الراجل الي هو سمير سمين"* (The man, who is Samir, is fat), we observe the integration of a relative clause (الذي) into the sentence. This is further evidence that individuals with Wernicke's aphasia can, at times, utilize their remaining ability for incremental transformation to form sentences.

When individuals with Wernicke's aphasia are asked to form sentences with second-degree structures, they are more successful in completing the task compared to when asked to form first-degree sentences. For example, in phrases like *"قلعت الطيارة"* (The plane took off) or *"فريد يضرب الطفلة الشريرة و يهرب"* (Farid hits the naughty girl and runs away), they tend to have more success. However, individuals with Wernicke's aphasia may still resort to expansive strategies even when tasked with forming second-degree sentences, as shown in the phrase *"كان خباز معروف هذا سمير"* (There was a famous baker, this is Samir), where they introduce the demonstrative *"هذا"* (this) and use gesture to refer to سمير(Samir).

The reason for the increased use of expansion strategies by individuals with Wernicke's aphasia when facing first-degree sentences, in our opinion, lies in their difficulty with coherence, especially when it comes to the "roots" (original structures). Since first-degree sentence formation requires the use of these "roots," they struggle to form them and resort to using alternative strategies to overcome the difficulty, such as non-verbal cues, metaphor, syntactic expansion, and circumlocution. Given the connection between verbal expression and the communicative meaning, most of the strategies they employ are based on what remains of their syntactic abilities, particularly their capacity to form branches more easily than roots, in contrast to individuals with Broca's aphasia. Therefore, they make use of these remaining linguistic abilities to convey meaning and comprehension.

As for individuals with Broca's aphasia, we observe through their responses that they tend to use expansive strategies more when asked to form sentences with second-degree structures, compared to those with first-degree structures. These strategies are as follows:

-Use of non-verbal communication (also known as non-verbal language), as exemplified in the phrase "طيارة ....سما"

(airplane ...sky), where the phrase is accompanied by a gesture pointing to the sky. This underscores the significance of non-verbal cues in aiding comprehension for these individuals.
-Use of omission and condensation, as in the phrase "كان معروف" (was known), where both the subject (سمير) and the attribute (خباز) are omitted. Similarly, in the phrase "فريد يضرب" (Fred is hitting), the object (الطفلة الصغيرة) is also omitted, resulting in an elliptical sentence.
-Use of ellipsis in several expressions, such as the earlier example "كان معروف" (was known), where the subject "سمير" (Samir) is replaced by a hidden pronoun, illustrating the process of implicit or covert reference.
As shown in the examples of responses from individuals with Broca's aphasia, they too are able to use expansion strategies, even when asked to form sentences with first-degree structures, as seen in the phrase "سمير سمين" (Samir is fat), where the element "كان" (was) is omitted. However, as mentioned earlier, these individuals tend to use these strategies more when forming second-degree sentences, as this type of structure requires a specific ability for incremental transformation. Given that the previous results showed the incapacity of individuals with Broca's aphasia in this ability, they resort to other methods to convey their messages, such as omission, condensation, ellipsis, and even the use of non-verbal communication. Since there is a connection between verbal-visual elements and their semantic functions, their strategies are based on the remaining processes of incremental transformation, particularly when dealing with core structures.
Many studies have addressed the concept of strategies, often referred to as compensatory strategies (stratégies palliatives), including those by Nespoulous (1980, 1986, 1990, 1994, 1996) and Watzlawik et al. (1972). However, most of these studies interpret these strategies as evidence of what they call cognitive flexibility (flexibilité cognitive). Since these are phenomena of usage, they are seen as dynamic processes that belong to the cognitive aspect, in contrast to linguistic (systemic) phenomena, which are viewed as static and unchangeable. Referring to modern structuralist theory, we see that this cognitive flexibility also exists within the language system, through the dynamic processes of structural operations that characterize the models, ensuring the verbal coherence of linguistic units at all levels.
Additionally, these studies focused more on Broca's aphasia and neglected Wernicke's aphasia. They also did not provide a precise explanation for these strategies, merely considering them as evidence of intact semantic representation and a result of difficulties in phonological or lexical access. The semantic and meaning-related abilities of individuals with Broca's aphasia at the sentence level allow them, at the macrostructural level, to respect the core components of the morphological structure of a narrative, ensuring coherence in their speech. These components include retaining the narrative nucleus (le noyau du récit), using deictic markers (les déictiques), and speech acts (les actes du langage).
The results revealed statistically significant differences in the use of speech acts by individuals with Broca's aphasia at the macrostructural level, attributed to different narrative contexts. The results showed more frequent use of performative verbs in a situation where a folklore story was orally recounted, with an average score of 4.7, compared to other situations (free narration, storytelling through picture sequences), which had average scores of 0.1. This indicates the pragmatic ability of individuals with Broca's aphasia to consider the specific nature of an orally recounted folklore story, which relies on memory and involves creating suspense and dialogue. An example is: "A man from an old age home: 'Where's my grandfather, Dad? Where is he? ... What's going on?'"
Moreover, the results showed statistically significant differences in the use of deictic markers at the microstructural level, due to different narrative contexts. More deictic markers were used in the situation of storytelling through picture sequences, with an average score of 6.6, compared to other situations (free narration, orally recounted folklore), where the scores were 1.9 and 2.4, respectively. These results again confirm the pragmatic ability of individuals with Broca's aphasia, considering the specific nature of storytelling through pictures, which relies on visual cues. This is because the reference in this case is iconic, in the form of images, and the individuals with Broca's aphasia tend to point to the images. For example: "That one shouted... the ambulance arrived... then we went to the hospital," where the individual used the demonstrative pronoun "هذاك" (that one) as a means to continue the narrative and maintain semantic continuity.

Conclusion:
In conclusion, this research has confirmed that aphasia is a disorder that affects both linguistic abilities of coherence and cohesion. The difference between Broca's aphasia and Wernicke's aphasia can be attributed to the varying degrees of impairment in these two abilities. Broca's aphasia is characterized by a greater disruption in the process of incremental transformation, which impacts coherence. On the other hand, Wernicke's aphasia is primarily defined by a more pronounced issue with cohesion. This distinction not only supports our hypotheses regarding aphasia but also reinforces the credibility of the principles of neokhalilien theory.

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