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Agrammatism and Other Aphasia-related Disorders in Moroccan Arabic Speaking Aphasics

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Abstract

This paper includes the participation of six Moroccan Arabic-speaking aphasics (four with Broca's aphasia, one with Wernicke's aphasia and one with global aphasia). In our work, we turn to a particular under-resourced Arabic Dialect, Moroccan Darija or Moroccan Arabic (MA), which is an agglutinative language; that is, a fairly large number of affixes may be added to the root. Negation, tense, aspect, person, number and gender are all expressed by affixes attached to the verb. The speech corpora were taken from samples collected from patients who have attended speech and language therapy sessions. The patients were presented with picture description, repetition and grammaticality judgement tasks in order to examine the extent of impairment on the phonological, lexical, semantic and morpho-syntactic levels. Although agrammatic production is usually described as impaired in all aspects of grammar and in all types of inflection, it was found out that the use of verbal and nominal bound morphemes was spared in the output of the subjects understudy. All the three groups in this study used appropriate verbal and nominal morphology, which does not support the traditional view of agrammatism as being amorphological.

Keywords: Moroccan Arabic, Aphasia, Broca, Wernicke, Agrammatism, Bound morphemes-Substitution, Deletion

1. Introduction

Aphasia is a language disorder which results from brain injuries caused by strokes, tumours, metabolic disorder, toxicity, or other aetiology. This involves damage to tissue in parts of the brain on which language seems to be dependent (Lesser &Milroy, 1993: 8). Aphasia syndromes affect language areas in the brain and consequently influence the linguistic knowledge of the person affected so that his/her linguistic performance is disturbed. This disorder may result in what is known as agrammatism, an impairment involving morphosyntax and manifested by the production of ungrammatical utterances with omission or incorrect use of grammatical morphemes (Caramazza & Berndt, 1985: 33).

It was believed, until recently, that all functional elements were impaired in agrammatism (ouhalla, 1993) and were substituted by non-linguistic strategies (Berndt & Caramazza, 1980; Caplan, 1985; Goodglass, 1976; Ouhalla, 1993; Kean, 1977; Grodzinsky, 1984), but most of the studies reported in the literature on agrammatism have been conducted on subjects from morphologically-poor languages. However, empirical evidence has suggested, in recent years, that some syntactic elements were found to be spared, and some were not equally impaired in different languages following the same lesion. For example, case and use of coordinating conjunctions were found to remain intact in Finnish and Polish agrammatic speakers (Menn and Obler, 1990), and negation was shown to be preserved in Japanese agrammatic speakers (Hagiwara, 1995), and verb inflections were also spared in Italian (De Blesser and Luzzati, 1994).

Cross-linguistic studies have shown that free grammatical morphemes are more likely to be omitted than bound morphemes in the speech of aphasic subjects speaking an agglutinative language, such as Turkish, Hungarian or Finnish (MacWhinney and Osman-Sagi, 1991; Niemi & Laine, 1989; Niemi, Laine, Hanninen et al., 1990; Slobin, 1991). Thus, free grammatical morphemes are more susceptible to omission than are bound morphemes in agglutinating languages. In this regard, Moroccan Arabic may serve as an excellent testing ground, for it is an agglutinative language with a complex verbal and nominal inflectional morphology. Apart from prepositions which were often omitted, verbal and nominal inflectional morphemes were found to be intact in the speech of the Moroccan aphasics understudy, which clearly supports the above findings on agglutinative languages.

A number of studies have shown, recently, that tense marking is particularly impaired in agrammatic speech in some languages,such as for example, English (Arabatzi & Edwards, 2002; Dickey, Milman & Thompson, 2005; Faroqi-Sha & Thompson, 2007), Arabic (Diouny, 2007), Hebrew (Friedmann & Grodzinsky, 1997), German (Buchert, Swodoba-Moll & DeBleser al., 2005a), Spanish (Benedett & Christiansen & Goodglass, 1998), Dutch (Bastiaanse, 2008). In

(Diouny, 1990), tense and agreement disassociation was investigated in Moroccan Arabic agrammatic speakers following the TPH (Tree Pruning Hypothesis) as proposed by Pollock (1989), and it was found out that tense, but not agreement, was impaired in these patients. However, in the data understudy, tense as well as agreement marking was found to be intact, whereas prepositions were omitted most of the time.

Friedmann (2001) explained the varied patterns of production observed in agrammatism in terms of the hierarchical structure of syntactic trees. While studying the syntactic structures of Hebrew and Palestinian Arabic, she noticed a hierarchical pattern of impairment in which complementizers were more impaired than verb tense inflections, and verb tense inflections were more impaired than verb agreement inflections (Friedmann, 1998, 2001, 2002). Friedmann formulated the TPH (Tree Pruning Hypothesis) to account for this agrammatical variation. The idea was that if agrammatic speakers could no longer inflect verbs correctly for tense but had no problems inflecting them for subject agreement, this is mainly due to the inaccessibility of high nodes of the syntactic tree (Friedmann, 2006). This does not seem to be the case for Moroccan Arabic speaking agrammatic subjects, for both inflection for tense and subject agreement was observed to be retained in the corpora understudy.

Thus, as the studies carried out by Grodzinsky (1984, 1990) and Menn & Obler (1990) have shown, agrammatism can take different forms depending on the language explored, and this is due to the fact that grammatical morphemes behave differently in different languages (Benedet, Christiansen and Goodglass, 1998).

This paper aims to examine the speech of some Moroccan-Arabic speaking aphasics in order to check areas of similarities and differences in what concerns types of impairments involved. We, therefore, contribute a corpus of Moroccan Arabic, which is an agglutinative language where verbs are inflected for tense, aspect, and the person, number and gender of the subject and object using prefixes and suffixes. This variety of Arabic, like Modern Standard Arabic (MSA), has free word order; it allows for six permutations of word order, though the most used orders are SVO and VSO. But unlike MSA, nouns in MA are not marked for case and the dual has disappeared in this variety in both nouns and verbs. Verbs have a past (or perfective) suffixed conjugation, or a non-past (or imperfective) prefixed conjugation.

2. Data Analysis

Our corpus is taken from samples collected during speech therapy and rehabilitation sessions. The patients, from different social backgrounds and different ages and genders, were diagnosed with different syndromes, namely Broca's aphasia (Maghnia, Ahmed, Rachida and Saddiki) and Wernicke's aphasia (Fatna) and total aphasia (Karim).

2.1 Case history

***First patient*:**

*Maghnia (M) is 40 years old, unmarried. Before her illness she was working as a nurse, but she was suffering from Mitral insufficiency which means that her blood was not flowing normally. Doctors prescribed her antibiotic**s** for two weeks to secure her from any disease and to allow normal blood flow. Three months later, she was subject to a nervous breakdown subsequent to overwork. When she woke up one morning, she could not move her body. This was followed by a severe right-side hemiplegia and she was unable to speak. Then she was admitted at the hospital and her state improved, but her speech was still affected. Since blood flow could not reach certain parts in the left hemisphere she developed Broca's aphasia.*

Second patient:

Karim (K) is a 38 year-old ex-soldier. On june 15th 1997, he was run over by a car. He underwent neurosurgery and remained unconscious for one month. As a consequence of this accident, he was suffering from a right hemiplegia, but he succeeded in moving his right hand and foot four months later. Unfortunately, he was object to a hemorrhage in the left hemisphere of the brain which resulted in total aphasia. Subsequent to this, his memory became so weak that he could not remember the names of his wife and daughter. On the linguistic level, he began to jargonify, that is, utter severely disordered and meaningless speech, and then his speech became limited to few stereotyped and limited utterances. After five months, he succeeded in indulging himself in conversations, but he still has some difficulties in some phonemes articulation.

Third patient:

Saddiki (S) is sixty-one years old. Before retiring, he was an agricultural manager. He had a problem with his unstable blood pressure. One day, he woke up with a right hemiplegia accompanied with severe aphasia. He attended many sessions of kinetic therapy and speech rehabilitation because his speech was reduced to stereotyped words and limited utterances. Also, he couldn't remember anything of what he had been or what he had done before. But after the therapy, Siddiki was able to overcome most of his linguistic problems.

Fourth patient:

Ahmed (A) is 42 years old, but seems younger. He has two children. Before his illness he was working in a textile factory. Ahmed has Broca's aphasia resulted from work accident. When he was admitted at the hospital, he was unable to speak, but now he seems to have recovered most of his linguistic skills. The only remaining handicap lies in his inability to name things.

Fifth patient:

Rachida (R) is 38 years old, unmarried. She is illiterate. She has Broca's aphasia and suffers from a right hemiplegia. It was difficult for her to express herself before therapy, but now her state has improved a great deal.

Sixth patient :

Fatna (F) is 72 years old. She is the mother of five children. She suffers from Wernicke's aphasia consequent to a cerebro-vascular accident (CVA). (F) speaks fluently, but her speech is meaningless. What is more dramatic is that she cannot remember her name as well as her children's.

The above information concerning the respective social backgrounds of these patients will help us shed light on the linguistic structures that these patients have lost and those they have retained and the abnormalities in the processing of language. So, our primary focus will bear on the components of phonology, morpho-syntax and lexicon.

3. Aphasics' disorders:

3.1 Phonological disorders

The phonological paraphasias of brain-damaged patients have been the subject of numerous investigations (Alajouanine, ombredane & Durand, 1939; Jackobson, 1956; Luria, 1966, 1976, 1983; Lecours & Lhermitte, 1969; Blumstein, 1973,1981). Nearly all aphasic patients, regardless of the clinical type of aphasia from which they are suffering, display some phonological difficulties in their speech output. This study will be restricted to consonants analysis since they are more likely to cause difficulties than vowels as they are the first segments to be affected. While a broad array of phonological disorders may occur, these can be reduced to four categories:

3.1.1 Substitution

Phoneme substitution is the most frequent error in aphasics' speech. It simply consists of substituting one phoneme or segment for another. For more illustration, these data from samples collected from the patients described above have been selected:

Table1. Phoneme substitution errors

Erroneous form	Correct form	Translation
Kuta	Kura	A ball
Hawwala	Hawwama	A helicopter
Hadis	Haris	A watchman
Bu:3wi:za	Bu3wida	A pear
Kurshi:	Kursi:	A chair
Qalb	Kalb	A dog
Stanya	Spa:nya	Spain
Bahha:h	Bahha:r	Sailor

3.1.2 Deletion

The second error, which is no less important than the first, is the reduction of the complexity of syllables or phonemes within a word through deletion:

Table 2. Syllables/phoneme deletion errors

Erroneous form	Correct form	Translation
Duma	Dumya	A doll
Ma:matun	Yama:ma	A dove
Sba:h	Saba:h	A morning

3.1.3 Addition

In this error, an extra phoneme or syllable is added:

Table 3. Phoneme/syllable addition errors

Output	intended word	English translation
Ra:dya	Ra:ya	A flag
Mithanana	Mithana	A mill
Fa:haqa	Fa:ha	Is diffused

3.1.4 Assimilation

In this environment error, a phoneme which can be accounted for by the influence of the surrounding phonological context can occur. These environment errors include **metathesis** in which two phonemes may interchange their respective places:

Table 4. Assimilation errors

Yashafu	Yafhasu	Examine

Environment errors also include progressive and regressive assimilation. In the assimilation process, a segment takes on features from a neighbouring segment. A consonant may pick up features from a vowel, a vowel may take on features of a consonant, one consonant may influence another, or one vowel may have an effect on another. There are two kinds of assimilation: **progressive** (forward) **assimilation** in which the first consonant influences the second and **regressive** (backward) **assimilation** in which later consonants influence earlier ones.

Table 5. Progressive/regressive assimilation errors

Chuquq	Churuq	Sunrise
Mani:na	Madi:na	A city

For further illustration, the following table shows the error mechanisms involved in the phonemic transformations found in our subjects. For every patient the most used error type was substitution while the least used was metathesis.

Table 6. Samples of the different error mechanisms involved in the phonemic transformations

Stimulus	Response	Sound	Process	Translation
dhi'bun	Dhikbun	/ ' / x /k/	Substitution	A wolf
Ha:ris	Ha:lis	/r/ x /l/	Substitution	A watchman
Ha:ris	Ha:dis	/r/ x /d/	S	A watchman
Ha:ris	Ha:sis	/r/ x /s/	S	A watchman
Hawwa:ma	Hawwa:la	/m/ x /l/	-	A helicopter
Hawwa:ma	Hawwa:na	/m/ x /n/	-	A helicopter
Kuratun	Kutatun	/r/ x /t/	-	A ball
Bahha:run	Bahha:run	/h/ x /h/	-	A sailor
Suhubun	Suhutun	/b/ x /t/	-	Clouds
Bu:3wida	Bu3wi:za	/d/ x /z/	-	A pear
Kalbun	Qalbun	/k/ x /q/	-	A dog
Tatbakhu	Tatrahu	/b/ x /r/&/x/ x /h/	-	She cooks
Haraka	Baraka	/h/ x /b/	-	movement
Challa:l	Challa:d	/l/ x /d/	-	Waterfall
Sira:j	Chira:j	/s/ x / ch/	-	Lamp
Zara:fa	Jara:fa	/z/ x /j/	-	A giraffe
Jiha:z	Ziza:n	/j/ x /z/& /h/ x /z/&/z/x/n/		Equipment
Kursi:	Kurshi:	/s/ x /sh/	-	A chair
Ja:'iza	Za:'iza	/z/ x /z/	-	A prize
Spa:nya	Sta:nya	/p/ x /t/	-	Spain
Dumja	Duma	/j/	Deletion	A doll
Yama:matun	Ma:matun	/ja/	-	A dove
Saba:hun	Sbah	/a/&/a/&/un/	-	A morning
Kutubun	Kutu	/bun/	-	Books

Mithanatun	Mithananatun	/na/	Addition	A mill
Fa:ha	Fa:haqa	/qa/	-	Is diffused
Madi:na	Mani:na	/d/ - /n/	Assimilation	A city
Churu:q	Chuqu:q	/r/ - /q/		Sunrise
Kuratun	Kutatun	/r/ - /t/	Assimilation	A ball
Yafhasu	Yashafu	/f/ - /s/	Metathesis	Examines

These are some of the processes displayed in the erroneous speech of aphasic patients, but they are by no means exclusive. Moreover, the errors produced by aphasic subjects exist exclusively in the minds of hearers; in other words, it is the hearer who identifies the errors while the aphasic patients are not aware of them.

3.2 Morpho- syntactic disorders

Apart from Broca's aphasia, the term agrammatism is often used to refer to the syntactic disorder in aphasics speech. Caramazza & Berndt (1985:33) define agrammatism as "a speech ouput characterized by the omission of grammatical morphemes, reduced phrase length, the omission or nominalization of verbs, and difficulties with word order". Thus, the primary characteristic of many Broca's aphasics is productive agrammatism in which grammatical markers, such as inflections, seem to be affected, and grammatical words, such as articles, prepositions and verb modals are nearly lost; whereas content words, such as nouns, verbs, adjectives and adverbs seem to be retained in spontaneous speech and often in repetition and writing. So, if this seems to be true as far as English and typologically similar language speakers are concerned, speakers of Moroccan Arabic do not suffer from the same loss After examination of the extent of inflectional impairment, it was found out that the use of bound inflectional morphemes of tense and agreement was not impaired in their production, as the following sample, from an interview between the orthophonist and the first patient M who was asked how to prepare tea, shows :

The orthophonist: *Kat3amri atay?*
Prefix+fill (imperfect.) tea
Do you know how to prepare tea?
The patient: W*ah*
Yes
The orthophonist: *Wach nu akhur?*
What else?
The patient: *Qahwa lahlib*
Coffee milk
The orthophonist: *Kattajbih?kawwni jumla.*
Pref ka fem cook? Construct you a sentence
Do you cook it? Construct a sentence!
The patient: *Lahlib ifid… uttabla…… nta3 ... attabla*
The milk boil (imp) and the table of the table
The orthophonist: *Wa shnu katdiri fallawwal?*
And what prefix+imperfective prep+the+first
What do you do first*?*
The patient: *Anta3 an3ammar anta3 albarrad atay*
Of fill+imperfective of the tea pot tea
I fill the teapot….tea.
Anta3 albarrad…. iwa un 3ammar un3ammar
Of the teapot and and I fill+imperfect. and I fill
Na3na3 sukkar iwa….. an3ammar….. an3ammar
Mint sugar and and I fill and I fill (imperfective)
N*ta:3 albuta… yatjammar…. kanfarghu…… alkisan*
Of stove he+ boil+imperfect pref +I+ pour the glasses
'*Un3ammar…. uatay….. 'un3ammar…… 'unfarragh*
And I fill+imperfect. and the tea and I fill+imperfect.and pour
And I fill…and tea..and I fill and I pour.
K:as…… tlata…..walla raba unashrab
One glass three or four and I drink(imperfect.)

Even if the beginning of the conversation features a semi-telegraphic style with use of content words, especially nouns and verbs and the dropping of prepositions, as in *kanfarghu …alkisan* above, where, normally, the preposition *fi* (in) should have been used , bound morphemes of person and tense are preserved, however, as in **kanfarghu** (prefix **ka** which signals the imperfective + **n** which stands for the first person singular pronoun + verb **pour** in the imperfective) and **yatjammar** (**ya** stands for the third person singular masculine pronoun + **boil** in the imperfective) and **'an3ammar**

(where **'u** stands for **and,** and the prefix **n** stands for the first person singular pronoun + **3ammar (**verb fill in the imperfective).

Content words are retained probably because they are 'referential'-they refer to objects, actions and attributes in the real world, and they are also the first to be acquired. First acquired first lost. Sometimes, the omission of prepositions in aphasics' speech tends to create ambiguity in the meaning of the whole sentence as the following example shows:

The patient M is describing a picture showing some people eating:

The patient:	*Yaklu*	*attanjra*
	Personal pronoun+ eat	definite article +pot
	They are eating the pot	

Instead of saying

The patient:	*Yaklu*	*mn*	*ttanjra*
	They eat	preposition	definite article+pot
	They are eating	from the pot	

So, apart from the preposition, tense and agreement affixes, as well as articles, are spared in the above conversation.

Sometimes, Broca's aphasics with agrammatism suffer from a deficit in their ability to retrieve verbs, as the following utterance demonstrates:

M was asked to describe a girl who was combing her hair in front of the mirror:

The patient:	*Anta3*	*lamraya*	*sh3arha*
	Of	the mirror	her hair
	The mirror her hair		

Though the verb is absent, the NPs **lamraya** (**la** stands for the definite article + **mraya** (mirror)) and **sh3arha** (**sh3ar** (hair) + **ha** (which stands for the possessive pronoun **her**) complete the missing information. Here, again, we notice that morphology was correctly used in *sh3ar**ha.***

Below is an example where the NP- VP juxtaposition occurs.

The orthophonist asked the patient about her cooking skills. Her answer was:

The patient:	*Manaqdarch*	*anta3*
	Neg+I+can+neg	of
	I am not able of	

(M) wanted to say that she couldn't use her hands because of the hemiplegia she was suffering from, so, instead she used the preposition *anta3* (of) to complete the sentence since she was not able to find the word *hands*. In general, **productive agrammatism** is characterized by the omission of functional words and the use of short sentences with simplified syntactic structure, the absence of subordinate clauses and the almost exclusive use of nouns and verbs.

3.3 Lexical Disorders

One of the least localization characteristics and yet most common clinical attributes in aphasia is the **naming deficit**. Such a deficit is defined as the inability or inconsistency in giving the appropriate name for an object, an action, and so on. This deficit is especially found in **anomia aphasics.** The **naming disorder** may also manifest itself in **word difficulty**, that is to say groping or searching for the appropriate word. This deficiency was well observed in two patients M and S for most of the time they reached an impasse in naming objects or actions. These examples from their speech show this difficulty:

The patient	*U…. udarli*	*hadak*	
	And and make(perfect)	that (masc)	
	And and made me that		
	Urradyu …..mana3rafch	*smiytu*	
	And radio neg+I+know+neg	name+poss(masc)	
	The radio I don't know its name		

S encountered difficulties naming the action, so he used a vague verb *dar* (make), he also couldn't name the object, that's why he used *hadak* (that).

The lexical deficit may also manifest itself in empty speech which is characterized by the use of such non-specific words as *anta3* (of) which was often used in the speech of M :

The patient:	*Amsha :t*	*labsa:t*	*attabliya*	*' u:*
	Go(perfect)+suffix 't'	wear(perf)+t	the apron	and
	She went she wore	the apron	and	

Jjallaba….. 'u……hadak….' u: …..amch:at anta3

*T*he djallaba and that(fem) and go(perf)+t of

The djallaba and that and she went o

U *'amcha:t….. anta3…….albarid…… anta3 ssbitar*

And go(perf)+t of post of the hospital

And she went of the post-office of the hospital

Wa nta3

And of

This was the answer to the orthophonist's question: 'what did you do before coming to the hospital?'. In *'amsha:t* (=went she), repeated twice above, the bound morpheme, **t**, denoting the third person singular feminine (she) was preserved, which represents another argument in favour of morphological performance being spared in Moroccan Arabic speaking aphasics.

When the patients were shown some pictures and were asked to name the objects on them, most of them found difficulties in naming what they saw. (A), for example, could not distinguish between words of the same category. For him, all kinds of fruit are referred to by the word 'apple'. This example illustrates this **overgeneralization**:

Orthophonist: *Shnu hadi lli katshuf fattaswira ? (banana)*

What this(fem) that(relat) pref+you+see in the picture

What do you see on this picture ?

Patient: *Tuffa:ha*

Apple

Orthophonist : *'U ha:di ? (orange)*

And this(fem)

And this?

Patient : *Tuffa:ha*

Apple

Sometimes, (A) showed some confusion: he would pronounce the correct word but would then immediately change it for an incorrect one:

Orthophonist: *Shnu ha:di fattaswira ? (house)*

What this(fem) in the picture

What do you see on this picture?

Patient: *Ha:dik da:r …. Labsa*

That(fem) house dress

This is a house…. a dress

When the orthophonist wanted to know whether it was a *house* or a *dress* the patient could not make up his mind. The orthophonist tried again with another picture:

Orthophonist: *Shnu ha:di ?* (door)

What this(fem)

What is this?

Patient: *Da:r…….ba:b*

A house a door

In this example, (A) said the wrong word and then immediately corrected it. When the orthophonist asked him to decide whether it was *a door* or *a house* he opted for the correct answer.

(R)'s problem in naming was of a different kind. She seemed to have difficulties only in accessing the appropriate item in the phonological output. She succeeded, most often, in pronouncing only the beginning of words:

Orthophonist: *Shnu ha:da ?* (lavatories)

What this(masc)

What is this?

Patient: T*uta……. tbulij*

(the beginning of 'toilet') you urinate(fem)

You urinate

In other cases, when she fails to find the right word, she uses other words that suggest function or use, as when she was shown a chair, she answered '*fu:q'* (upon) to mean that it is used to 'sit on'. Sometimes, her answer is influenced by the preceding one:

Orthophonist: *Shnu ha:di?*
What this(fem)
What's this?
Patient: *Twal…..* *tlfaza*
(1st syllable of toilet) television

Then, she was shown another picture:

Orthophonist: *'U ha:di shnu?* (apple)
And this(fem) what
And this?
Patient: *Tlfaza*
Television
Orthophonist: *Lla*
No
Patient: *Ma:3raftha:sh*
Neg+know+perfect+her+neg
I don't know
Orthophonist: *Ka tbda b « t »*
Prefix ka+begin(imperfect) prep
It begins with « t »
Patient: *Taffa:ha*
Apple

When she gets help for the first phoneme she can quickly access the word. As for the patient (F), she was unable to name any of the objects she had been shown on pictures:

Orthophonist: *Shnu ba:n li:k fha:d ttaswi:ra? (banana)*
Hat appear prep+you prep+this def.art.+picture
What do you see on this picture?
Patient: *Ha:da: dja:l*
This… of
Orthophonist: *Shnu kandiru bi ha*
What prefix with her
What do we do with it ?
Patient: *Ha:da: ma:shi dja:l …wana … marana*
This neg of and I neg I
D*aba ab3asa u maghadi n3arfu*
Now nonsense and I won't know it
Orthophonist: *Ha:wli*
Try you (fem)
Try !
Patient: *Daba maghan. .wa: ghadi….wana wakhkha*
Now I won't and going and I yes
Gha*di if 3arfiha wana ma3arfahach*
I am going nonsense know it and I don't know

(F) seemed very confused. She said that she knew the word,but she failed to know it. Besides that, she was all the time repeating words such as *dyal* (of), *ha:da:* (this) and *ana:* (I). Her fluency and the use of nonsense words or **(neologisms)** indicate that she was indeed suffering from **Wernicke's aphasia**. Thus, if the last three patients had difficulties naming, this is mainly due to damage to **Wernicke's area** or damage to the **supramarginal gyrus**. These

patients had great difficulties accessing lexical items. Patients with such damage are said to have **anomia** or **anomic aphasia.**

In the task of **repetition,** patients were given words and sentences and were asked to repeat them. To carry out this task, some patients proved more skilful than others. (A), for instance, had no difficulty in repeating words, but when it came to sentences the task became much harder:

Orthophonist: *3a:wad muraya kanaskun fba:b Marraksh*
Repeat after me prefix+I+live in Bab Marrakech
Repeat after me: I live in Bab Marrakech

Patient : *Ih.. ih*
Yes, yes

Since (A) couldn't repeat the sentence, he just confirmed by saying "yes". (R)'s problem was somewhat different because she could not give the appropriate phonological representation to words, besides the fact that, as mentioned before, her answer was influenced by the preceding one:

Orthophonist: *Guli nnamusiyya*
Say you(fem) the bed
Say: bed

Patient: *Am*
One syllable

Orthophonist: *Nnamusiyya*
The bed

Patient: *Amas*
(One syllable of the word)

Orthophonist: *3awdi muraya ttabliyya*
Repeat you(fem) the apron
Repeat after me: the apron

Patient: *Liyya*
(Last syllable of the word)

Orthophonist: *3awdi : radyu*
Repeat you (fem) radio
Repeat radio

Patient: *Tab*
(First syllable of the preceding word)

(F), on the other hand, had a problem in the task of repetition. She was unable to repeat. Instead, she was uttering words and sentences unrelated to the context:

Orthophonist: *Guli banana*
Say you (fem) bana:na
Say banana

Patient: *Dya:l Fatima*
Of Fatima
Fatima's

Orthophonist: *Bana:na*
Banana

Patient: *Guli ha:di dya:l.....dya:l Fatima*
Say you(fem) this(fem) of of Fatima
Say this is Fatima's.

The problem of (F) is due to damage to the **arcuate fasciculus** which is a band of fibers that link Broca's area and Wernicke's area. Patients who suffer from this damage are unable to repeat the speech they hear because the auditory information reaching Wernicke's area cannot be conducted to Broca's area. As a consequence, the aphasia they suffer from is referred to as **conduction aphasia**.

3.4 Semantic disorders

Another kind of disorder that characterizes especially **Wernicke's aphasics** is the semantic disorder. Patients suffering from Wernicke's aphasia have a conspicuous problem with understanding language despite their having normal hearing. Though their speech is fluent, it is most of the time meaningless. This kind of disorder was well observed in one of the patients mentioned before, namely (F). This latter was repeating phrases unrelated to the context; she also had problems understanding questions, especially "how" and "why" questions; besides, she was unable to follow conversations. This **semantic disturbance** was also found in (A)'s case who was unable to distinguish between his brothers and his children:

The orthophonist:	*3andk wli:da:t?*
	Have you children
	Do you have any children?
The patient:	*Eh!*
	Yes
The orthophonist:	*Shnu smiytuhum?*
	What names they
	What are their names?
The patient:	*Khalid wa Btisa:m*
	Khalid and Btissam
The orthophonist:	*Wakhutak shnu smiytuhum?*
	And brothers your what names they
	And your brothers, what are their names?
The patient:	*Khalid wa Btisam*
	Khaled and Btissam

(A) had as well a tendency to use **association:**

The orthophonist:	*3la:sh jiti hna?*
	Why come (perfective)+you(fem) here
	Why did you come here?
The patient:	*Sbitar*
	Hospital

Thus, he associated the fact of being ill with the hospital. The **association technique** was previously noticed in the speech of (R) when she used the verb *eat* instead of *apple.*

4. Discussion

Generally, the error mechanisms we found in our patients are those that have been reported for speakers of other languages with the exception of the component of morphology, more particularly bound inflectional morphemes, which seems to have been preserved in the speech samples under study, with the exclusion of free standing morphemes which were omitted sometimes, as for example the omission of the preposition ***min*** (from) and ***fuq*** (on) in the speech of Maghnia.

As for bound morphemes (of aspect, tense, person and gender), they were retained in the speech of Maghnia, as when she says sh3arha: (hair+ possessive pronoun)=hair her meaning *her hair*, or when she says 'an3ammar (the verb fill + morphemes of present tense and first person singular), and also in *kanfarghu* (verb *pour* + morphemes of tense and person) and *nashrab* (verb *drink* + morphemes of tense and person). *Ma:naqdarsh* (not + I + can)= I can't is another example which illustrates the use of bound morphemes in the output of so-called agrammatic patients. So, if agrammatism is defined as the omission of closed-class elements, it is clear that these subjects cannot be labeled as agrammatic since the omission of these closed-class items were an essential component in the classical definition of agrammatism (Zurif, 1980).

So, the data above brings further evidence in support of the non validity of this definition as far as Moroccan Arabic is concerned.

A study conducted on Turkish aphasic patients (D. Slobin, 1991) revealed similar results as bound morphology was preserved in the speech of the participants.

Not all functional elements or grammatical structures are lost in agrammatic speech which raises serious questions as to the generalization, in aphasiology, of some findings to other languages. Grammar, for example, has been shown to break down differently according to the degree of inflection in a language (Slobin, 1991).

From the above data, we conclude that Moroccan aphasics display the same disorders as patients belonging to other linguistic backgrounds, with a difference in morpheme retrieval, which seems to be spared, especially bound verb and

noun morphemes, though omissions of free-standing grammatical morphemes, such as prepositions, occurred frequently. The speech of Broca's aphasics is generally non-fluent and semi-telegraphic but shows a good retention of basic noun and verb morphemes, as well as determiners (these latters may be prefixed as for the definite article or suffixed as for the indefinite article in Standard Arabic, but in Moroccan Arabic, indefiniteness is generally expressed by its absence). These patients have also a tendency to use overgeneralization in the naming task. On the other hand, the speech of Wernicke's aphasics is more or less fluent and displays a wide range of inappropriate forms, such as the blank-filling expression *nta:3* (of) and also nonsensical words, such as *ab3asa* in the speech of Fatna, but the use of bound morphemes was strikingly preserved, as in *3arfiha* (verb know + you + she) and *ma3arfahash* (negation + verb know in the perfective tense + I) taken from the speech of Fatna. Negation in Moroccan Arabic is most frequently expressed through the use of the discontinuous morpheme **ma:….sh**, which attaches to the verb after all other affixational operations have applied.

The morphology of verbs in Moroccan Arabic is very complex. They follow derived form patterns, and each form is conjugated into the perfect tense or the imperfect tense. The two tenses share the grammatical categories of person, number and gender (S. Mediouny, 2007:144-145). A set of suffixes is attached to the stem in the perfect tense; whereas the imperfect tense needs both suffixes and prefixes in accordance with number (prefixes in the singular and prefixes plus suffixes in the plural). But despite all this morphological complexity, both Broca's and Wernicke's aphasics retained the use of bound inflectional morphemes in their ouput.

5. Conclusion

The above findings suggest that some of the 'classical' views on agrammatism are in need of revision. Many studies have come up with premature conclusions with regard to typologically similar languages, hence the need for more cross-linguistic studies, especially that much research has been carried out primarily on English speaking aphasics. Omission of grammatical morphemes is not a universal phenomenon of agrammatism.

The above data showed a great preservation of bound inflectional morphemes in Moroccan Arabic aphasics' speech, which is consistent with the latest findings of Bates et al. (1987) concerning Italian and German aphasics and also the findings of D. Slobin (1991) concerning Turkish aphasics. All this suggests that patterns of language breakdown are not the same for typologically different languages. So, we cannot compare the patterns of a highly-inflected language like Arabic or Turkish with more familiar patterns such as those exhibited by the English language. Cross-linguistic studies have shown that language-specific features determine the pattern of omissions and substitutions found in brain-damaged subjects (Mimouni, 73). In a language like English, for example, reducing an affixed word to its stem would result in another word (as in cats/cat or running/run), but in a language like Moroccan Arabic, where generally, stems are not well-formed words, stripping a word of its grammatical affixes would result in a non-word, and this is, probably, one of the reasons why grammatical affixes are not omitted in the speech of Moroccan-Arabic speaking aphasics.

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Transcription System

A- The consonants :

System chosen	Arabic letters	System chosen	Arabic letters
’	أ	s	ص
b	ب	dd	ض
t	ت	tt	ط
t	ث	d	ظ
j	ج	3	ع
h	ح	gh	غ
kh	خ	f	ف
d	د	q	ق
dh	ذ	k	ك
r	ر	l	ل
z	ز	m	م
s	س	n	ن
sh	ش	hh	ه
		w	و
		y	ي

B-The vowels :

a	___–____	a:	____آ____
u	___و____	u:	___وو____
i	_____	i:	____ى_____
	–		

List of abbreviations :

Art : article
Def : definite
Fem : feminine
Imp: imperfective
Masc: masculine
MA: Moroccan Arabic
MSA : Modern Standard Arabic
Perf : perfective
Poss : possessive
Prep: preposition
Rel : relative
Sing : singular