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## Comprehension Process and Alzheimer: A psycholinguistics Study

**Assist. Prof. dr. Jalal Sa'dullah Hassan \***  
University of Garmian College of Education  
[Jalal.sadullah@garmian.edu.krd](mailto:Jalal.sadullah@garmian.edu.krd)

&

**Lecturer: Bahar Assi Amin**  
University of Garmian College of Education  
[Bahar.assi@garmian.edu.krd](mailto:Bahar.assi@garmian.edu.krd)

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### Abstract

The study is a psycholinguistics study which aims at explaining the process of comprehension and its connection with Alzheimer. It also investigates the impairment in comprehension which is caused by Alzheimer. To elaborate more, the part of the brain which is responsible for comprehending the spoken language is exposed by a figure. The research postulates as well how this process differs in those suffering from Alzheimer with the normal people in the process of comprehension.

The work concludes that those suffering from damaged brain in the part responsible for comprehension (Wernicke's area) face problems in the comprehension skill and they cannot communicate in an appropriate way which causes the sufferers finally to be disconnected to society and daily communications.

**Key words:** Comprehension Process, Wernicke and Broca's area, Alzheimer, Impairment.

\* **Corresponding Author:** dr. Jalal Sa'dullah, E.Mail: [Jalal.sadullah@garmian](mailto:Jalal.sadullah@garmian)

**Affiliation:** Garmian University - Iraq

عملية الاستيعاب والزهايمر: دراسة في علم النفس اللغوي

ا.م.د. جلال سعد الله حسن

جامعة كرميان - كلية التربية

و

م. بهار عاصي امين

جامعة كرميان - كلية التربية

**المخلص:** يتضمن البحث دراسة علم نفس لغوية وتهدف الى شرح عملية الاستيعاب وعلاقته بالزهايمر. كما ويبحث قصور الاستيعاب الذي يسببه الزهايمر. بهدف شرح تفاصيل اوفر, عرض الباحثان جزء الدماغ المسؤل عن استيعاب اللغة الشفوية عن طريق رسم توضيحي. توضح الدراسة ايضا اختلاف عملية الاستيعاب عند مرضى الزهايمر مع الاشخاص الطبيعيين. وصلت الدراسة الى انه الاشخاص اللذين يعانون من تلف في الجزء المسؤل عن الاستيعاب من الدماغ (منطقة ويرنيك) يواجهون مشاكل في مهارة الاستيعاب ولايستطيعون التواصل مع المجتمع بطريقة مناسبة مما يؤدي الى انفصالهم من المجتمع والتواصل اليومي.

**الكلمات الدالة:** عملية الاستيعاب، (منطقة ويرنيك وبروكا)، الزهايمر، القصور

### 1- On Defining Comprehension

Comprehension process is about what people do when they listen to speech? when they understand, store and remember it? The fact is that language comprehension is an active, dynamic process, not a passive one. The hearer takes the speech he or she hears as input in addition to other linguistic and extralinguistic information, and form the most likely interpretation for the linguistic signal being processed. The hearer does not only have the structural knowledge of the language available to do this, but he or she also has access to other types of relatively structured extralinguistic information. In addition, the speaker is aware of the previous linguistic context and the topic under discussion. The speaker is also aware of the role of the different events and participants in the narrative and how the conversational partner relates to the discussion of that narrative. There is also a great inventory of general knowledge that could be refer to. For example, an unstated fact that the majority of people know that after eating in restaurants at the end of the meal a bill will come and when ordering wine, it will come in a glass, and not a paper cup. One is reminded of how organized our underlying knowledge of such experiences is when we try to programmed computers to understand even limited scripts like the restaurant scenario kess (1992, pp.6-8).

The ultimate goal of course, is to understand the message, and as this activity unfolds, the hearer must carry out multi-level analyses on the incoming

speech. The hearer must assume a phonological analysis that construct a suitable phonological segmentation of the incoming signal. For example, is it the sound in the word just heard /r/ or /w/? While both sounds are related to the speaker's rounded lips in his production, one wondered if there were other audio cues we should be looking out for when analysing speech signal of the speaker. After deciding on this phonetic feature, it could be decided on whether the word just heard was *red* or *wed* (ibid).

The hearer must also perform grammatical analysis of the input, both at the morphological and syntactic levels. For example, it can have segments ending in the plural of the words: bee, tree, knee, key, but not on cheese. One must also analyse sentences like *John is eager* and *John is easy to please* should also be treated to reflect that John is the logical subject of both eagerness and ease in the sentences.

In the second sentence, there is an indefinite noun phrase (NP) that is the subject of *easy*, while John is the NP object of, *please*. Continuing this active process from the hearer part, note that the hearer must also assign the appropriate semantic case roles to the various participants and events in the sentence. For example, the subjects of the sentences: *The key which opened the door/The boy who opened the door/The door is opened* differ in being the underlying instrument in the first sentence, agent in the second, and acted-upon patient in the third in their semantic case roles, even though all three appear as subject kess (1992, pp.6-8).

Language comprehension is not restricted to a specific age and it could be achieved by normal and ill people equally. It is known that language as a complex behavior has its own rules and it begins from the physic characteristics which has connection with hearing covering the psychological aspect to interact with individuals. The psychological researches try to investigate the factors that govern language in normal people and the precognition extends to study them in the psychopathic ones.

Comprehension has two common meanings, according to the narrow one, it refers to the actual actions by which hearers can through them discriminate the sounds produced by the speaker and use them to analyze what they think the speaker wants to deliver. In the wide meaning however, it is the hearers' task to apply what they have derived from the speech Sayd (1989, pp.3-24).

Psychology shows the mutual understanding of comprehending the language as a general characteristic and comprehending it as a specific one and it postulates the mix between comprehension and perception term. Comprehension means the ability of deriving the speech meaning Alwajeez (2003, p.483). Perception on the other hand refers to the operation that humans by it organize the types of the stimuluses and analyze them to give them meanings and it is used in psychology to refer to the direct knowledge of the human bodies and the world as the result of the sensory signals come from the sensory organs Abdlkhalq (1990, p.160).

Listeners try to draw the acoustic signal onto a representation in the mental lexicon beginning almost as the signal starts to arrive. The first few phonemes of a spoken word activate a set of word candidates that are consistent with that input. These candidates compete with one another for activation. As more acoustic input is analysed, candidates that are no longer fit with the input drop out of the set. This process continues till only one word matches the input. In the case of no signal candidate is a clear winner, the best fitting word may be chosen Allopenna (1998, p.12).

## **2.The Major Parts of the Brain**

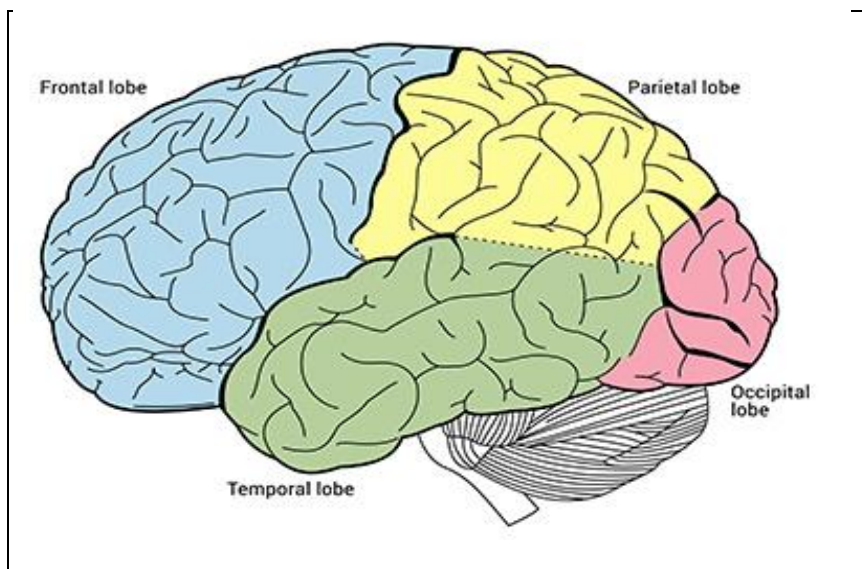
Researches over the past 150 years have proved that the brain has four primary lobes as shown in figure (1) and two hemispheres or halves as shown in figure (2), which are

connected by a bundle of fibers referred to as the corpus callosum. It is the largest structure composed of white matter in the brain Fitsiori et al. (2011, p.7)."The human brain is divided into two hemispheres. The left hemisphere is the "logical brain" and is involved in language and analysis and the right hemisphere is the "creative brain," involved in daydreaming and imagination. The left hemisphere controls the right side of the body while the right hemisphere controls the left side." Mandal (2011, pp.2).

The largest part of the brain is the cerebral cortex that divided into two hemispheres, the left and the right hemisphere and each of these hemispheres divided into primary four lobes: *frontal, parietal, occipital* and *temporal lobe* and each of these in turn has its own functions Ingram (2007, p.43).

Damage in certain areas of the brain leads to language loss. Scientists postulate that the growth in brain size has increased over the last decades due to the development of the spoken language and since the frontal lobes, parietal, occipital, and temporal lobes are areas of the brain connected to the process of language production thus they are evolved Wills (1993) cited in Qarem (2022, p.1).

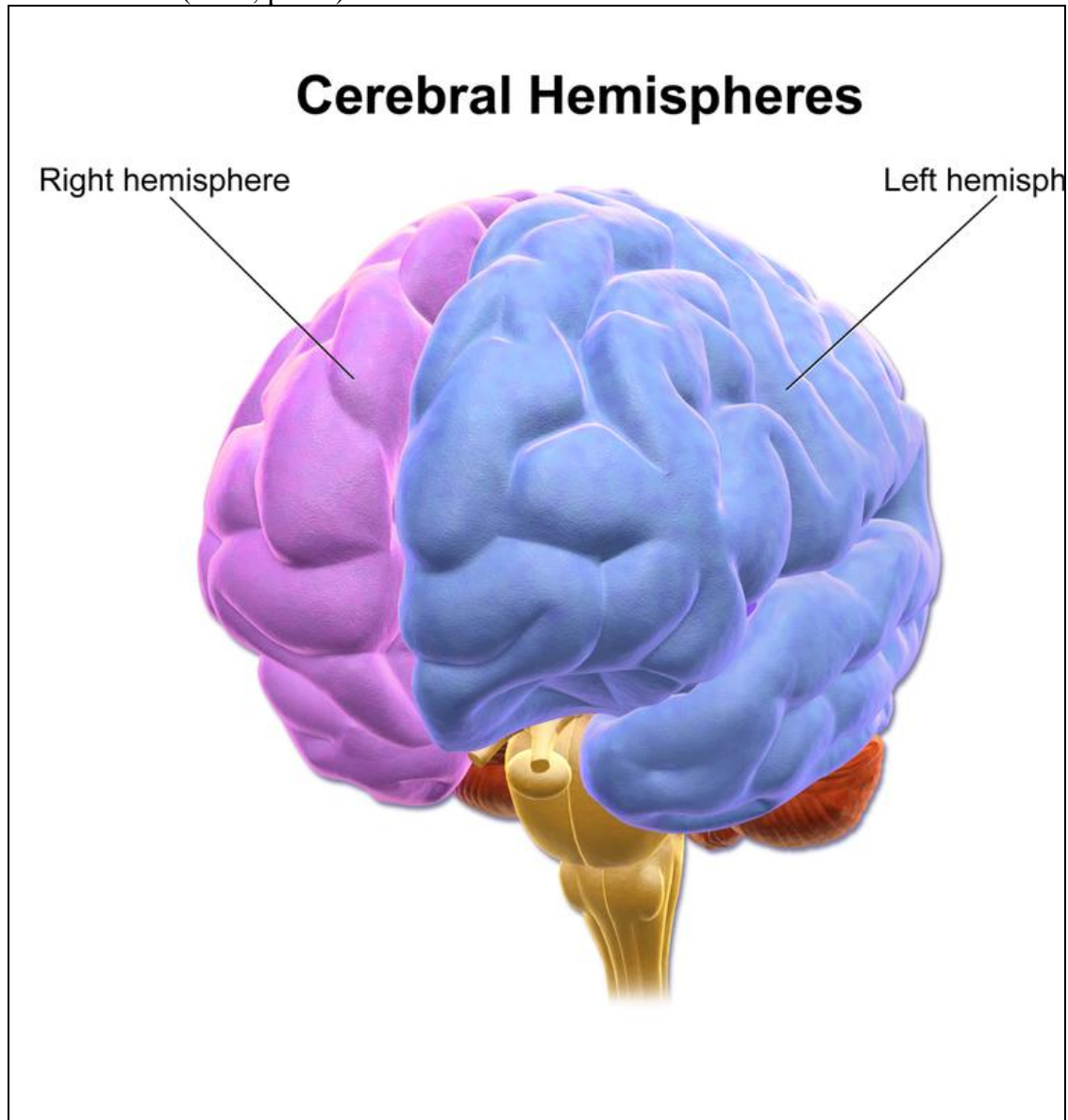
Kennison (2019, p.318) reports that from the researches of 20<sup>th</sup> century related to this topic, it could be concluded that each lobe has its own functions. Visual processing is generally performed by the occipital lobe. Temporal lobe is responsible of memory processing. In the parietal lobes, the spatial processing occurs, specially that involving the sense of touch. Frontal lobe controls the planning and the regulation of behavior. When considering the numerous types of processing involved in perceiving, producing, and recalling language, one can identify ways in which each of the four lobes plays a role.



**Figure (1) The Lobes of the Brain**

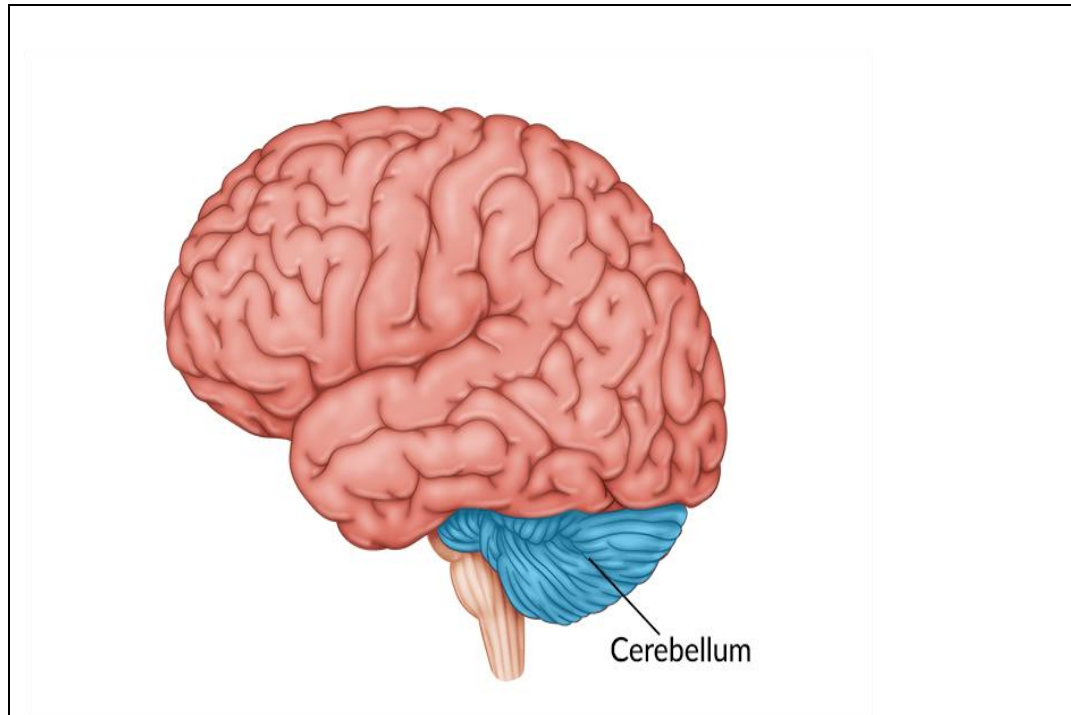
The brain is divided in to two halves called hemispheres as shown in figure (2) and these are connected to each other's by a small and hard bundle of fibers referred to as the *corpus Callosum*. It is the largest structure composed of white matter in the brain. It was discovered long ago that each hemisphere is responsible for one half of the

body. The left hemisphere of the brain is responsible for the right side of the body, and vice versa. For example, damage to the left hemisphere can cause blindness in the right eye or deafness in the right ear and paralysis of the right side of the body as well Trask (1999, p.109). The largest part of the brain, and the most important for cognitive function, is the cerebrum. The cerebrum is composed of two hemispheres, the right and the left hemisphere which are more or less mirror images of each other Falson and Connor-Linton (2006, p.237).



**Figure (2) The Hemispheres of the Brain**

Cortical regions of the cerebrum are not the only ones that have role in language. Studies have shown that other brain structures play their own role in language, a structure called the *cerebellum* (little brain) which lies below the cerebrum at the back of the head as shown in figure (3) and thought to be important for movement only is after studies considered to have a role in language, memory, emotion as well as other cognitive domains Falson and Connor-Linton (2006, p.241).



**Figure (3) The Location of the Cerebellum**

De Smet et al. (2007, p.1) believe that in the past the cerebellum was thought to be related the coordination of voluntary movement, posture, gait, balance and motor speech only but recent studies provide essential evidence of a cerebellar that it contributes the linguistic function-ing as well. to discover the role of the cerebellum in a variety of linguistic functions and to show the underlying mechanisms a search was made by electronic databases. Disorders were found to occur following acquired cerebellar lesion like impairment in phonological, semantic fluency, agrammatism (at morphological and sentence level), naming and word finding difficulties, reading difficulties, writing problems, disturbed listening comprehension.

The cerebellum function was considered to be exclusively the responsibility of motor function such as visual motor coordination and muscular tone until the beginning of the 20<sup>th</sup> century were researches started to recognize that the cerebellum has in speech production control like the chanted speech with putting pauses between syllables and words FL et al. (1975) cited in Starowicz-Filip (2017, pp.1-2).

It could be said that unlike what was supposed to be the functions of the cerebellum in the sense of voluntary movement, posture, motor function etc... before the 20<sup>th</sup> century, it is known nowadays that it contributes to language processes as well.

### **3. Language and the Left Hemisphere**

According to more than a century of researches, the agreement among the majority of people is that language processing occurs in the left hemisphere. Hence the term “lateralized for language” is used to refer to the fact that language processing is related to one side in the brain. This might be helpful in knowing that lateralization concerning language means that language processing is controlled on the left side of the brain. To prove that damage to the left hemisphere is more likely causes aphasia than injury to the right hemisphere many researches have been used like evidence Kennison (2019, p.325).

Wada (1997, pp.11-13) also confirms that, for most people, the process and production of language are located in the left hemisphere and he showed that the left hemisphere controls language. Wada testing is a technique invented by Japanese Canadian neurologist Juhn Atsushi Wada in (1949). The technique was used in the way of paralyzing one hemisphere at a time to discover what functions were presented by the non-paralyzed hemisphere and what functions were eliminated and likely handled by the paralyzed hemisphere. Studies using the technique showed that the left hemisphere controls language, because left hemisphere paralysis would result in language disability Branch et al. & Rasmussen (1964, p.4).

Another evidence about the different functions of the left and right hemisphere actually interesting. Mishkin & Forays (1952, pp. 43–48) report that in the studies of split-brain divided visual field (DVF) paradigm were used. In this procedure, researchers present words or pictures directly to only one of these hemispheres. When such individuals were tested by this paradigm, it was found that words presented to the right visual field (left hemisphere) could be verbalized, because the brain area responsible for speech production is located in the left hemisphere. When these words presented to the left visual field (right hemisphere) to the patients, the words could not be verbalized. It could be concluded that the process of naming an object initially processed by the right hemisphere requires the transfer of information about the object to the left hemisphere, where the language production system is located. Those people with connected hemisphere by the corpus callosum can transfer information from the right to the left hemisphere and vice versa but the split-brain patients cannot.

Kennison (2019, p.327) states that it has been proved that language lateralization influences listening as well and hence people prefer to use right ear when talking on the phone for listening to language.

#### **4. Language and the Right Hemisphere**

To Kaplan et al. (1990, p.10) There is a great number of researches that explore evidence of the right hemisphere's role in language processing. The studies show that the right hemisphere has an increasing role in comprehending and producing prosody, understanding humor, using figurative language, processing pragmatic and narrative information.

Kasparian (2013,pp.17-18) affirms that it is known that figurative language refers to metaphors, proverbs, sarcasm, idioms and other types of language usage in which there is no one to one word meaning and the utterances cannot be understood due to their constructions alone and claims that evidence show that the right hemisphere has a significant role in the comprehension of figurative language as some studies related to right hemisphere damage affirm that damage to this hemisphere leads to problems and difficulties in the comprehension of idioms expressions.

Winner and Gardner (1977, pp.5-6) proclaim that in one of their studies they have asked patients who had right hemisphere damage to connect the meaning of an idiom to one of two pictures. One picture was representing the meaning of the idiom, and the second was representing the literal meaning of the words in the idiom. They discovered that the patients interpret the words in the idiom literally. For example, when they were asked to select the picture that give the meaning as the sentence *the man had a heavy heart*, they selected a picture of a man carrying heart-shaped object rather than a picture of a man crying.

Kempler et al. (1999, p.16) say that in a study to compare comprehending idiom in adults and children with right and left hemisphere damage, they have found that adults with right hemisphere damage achieved more poorly than those with left hemisphere damage, while for the children the result of performance was the same for those have

right hemisphere damage and those with the left hemisphere damage. Metaphors processing has been proved to be impaired in people suffering from right hemisphere damage Schmidt et al. (2010, p.4).

Heath and Blonder (2005, p.5) announce that damage to the right hemisphere causes less appreciation of humor after the damage in comparison to that of before it. However, those individuals with left hemisphere damage have no change in their humor orientation.

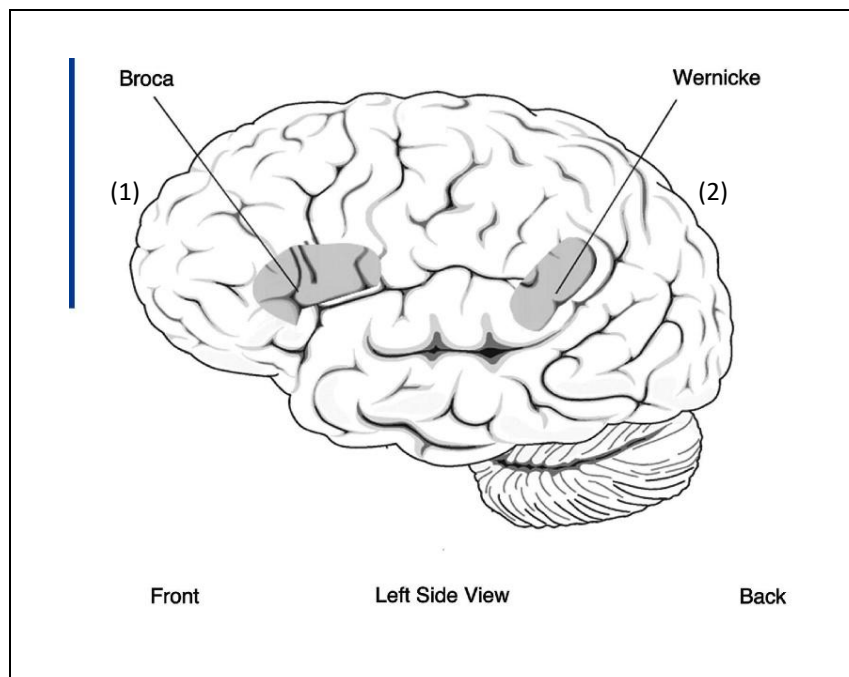
Bihrlle et al. (1986, p.8-9) reported that in their investigation of understanding cartoons for patients with left or right hemisphere damage. The patients viewed the first three panels of a cartoon then two panels that one of them was the original panel that led the cartoon to be completed humorously and the second one was about surprising resolution for the preceding panels, and had less humorous effect had been shown. The patients were asked to determine the one which would complete the cartoon humorously. The result was that patients with brain injury in the right hemisphere were less likely to select the humorous resulting panel for the cartoon than patients whose brain injury was located in the left hemisphere.

Baldo et al. (2016, p.75) say that damage to the right hemisphere causes less understanding of pragmatics as well which means facing difficulties in understanding and interpreting social situations.

It could be concluded from the above-mentioned evidence that although language is located in the left hemisphere of the brain, yet the process of the language's usage is located in the right one.

##### **5. Aphasia in Broca, Wernicke's Area and arcuate Fasciculus**

Kolb and Wishaw (2009) cited in Kennison (2019, p.22) there has been certain evidence that specific locations in the brain have basic role in language since the mid-1800s. Pierre Paul Broca (1824–80) and Carl Wernicke (1848–1905) identified in their studies the two areas of the brain with given them their names to this time. These two worked separately to connect specific language difficulties to damaged found in a specific area of the brain. Broca recognized an area located in the frontal region of the left hemisphere, which was connected to the great difficulties in the production of speech. Wernicke however, identified an area located in the left hemisphere in the back or part of the hemisphere approximately behind the ear, which was linked to the difficulties in the process of comprehending speech.

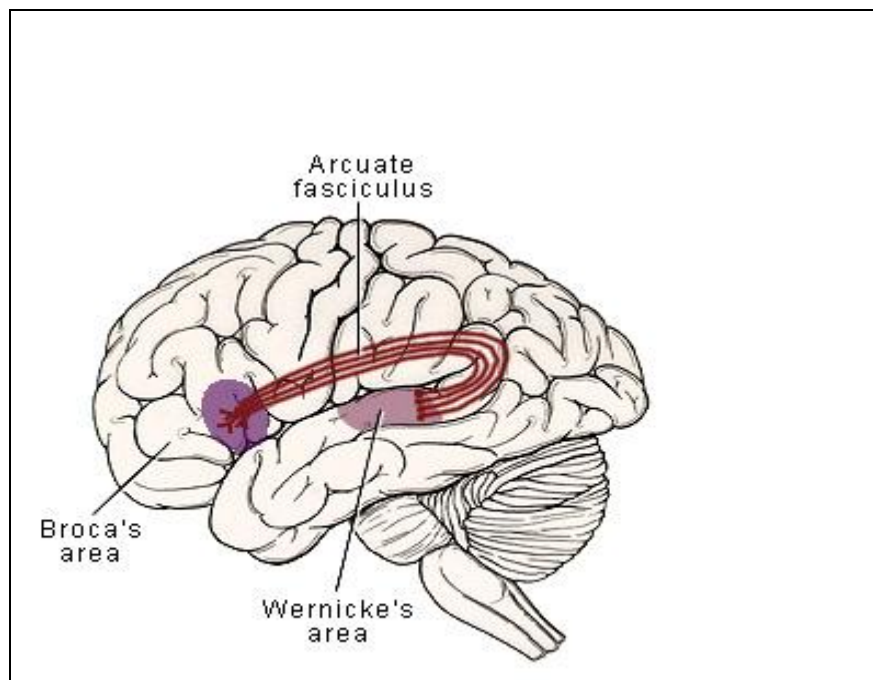


**Figure (4) Broca and Wernicke's Area**

Yule (2014, p.156) clarifies that the parts shown in figure (4) are technically categorized as the “anterior speech cortex” or, more usually, as Broca’s area. Paul Broca, the French surgeon, announced in the 1860s that damage to this specific part of the brain is related to great difficulty in the speech production and he reported that damage to the corresponding area on the right hemisphere has no such effect. The argument then was that language ability is certainly located in the left hemisphere and has been dealt with as an indication that Broca’s area is crucially involved in the generation of spoken language since that time Yule (2014, p.156).

The part shown as (2) in the above figure is the “posterior speech cortex,” or Wernicke’s area. Carl Wernicke a German doctor, whom in the 1870s, asserted that if the brain is damaged in this part, patients will have speech comprehension difficulties as he has found among them. Like Broca said, Wernicke’s finding confirmed that the left hemisphere location is related to language ability and that the part of the brain responsible to language understanding and comprehension is crucially Wernicke’s area (ibid).

To Yule (2014, p.157) it could be concluded that specific aspects of language ability are located in specific areas in the brain and this called the localization view. This localization shows that the brain activity includes: hearing a word, understanding it, and then saying it. according to the brain procedure, the word is heard and comprehended by Wernicke’s area after that, this signal is transferred by the arcuate fasciculus which is a bundle of axons to Broca’s area where preparations are made to produce a spoken version of the word as shown in figure (5) below:



**Figure (5) The Connection Between Broca and Wernicke Areas**

The last activity then is that a signal is sent to part of the motor cortex to articulate the word physically Yule (2014, p. 157).

Trask (1999, p.106) reported that in 1864 the French surgeon Paul Broca eventually declared his findings with eight patients. The area he found is called *Broca's area* and it is a small patch not much more than an inch across, of the wrinkly grey outer surface of the cerebrum, the large, walnut-shaped part of the brain and this area located on the left side of the majority people's brain. The connection between this patch and language is that damage to it, produces the symptoms of Broca's aphasia. The patients' speech becomes exhausting and slow and all the words have to be produced by pressure and effort. The intonation and the rhythms are destroyed and grammatical words like (*the, of, if, to, or and be*) are not found and they cannot construct grammatical sentences, however, they keep in position the homophonous words such as *bee-be* (ibid). The patients' speech becomes exhausting and slow and all the words have to be produced by pressure and effort. The intonation and the rhythms are destroyed and grammatical words like (*the, of, if, to, or and be*) are not found and they cannot construct grammatical sentences, however, they keep in position the homophonous words such as *bee-be* (ibid).

The patients lose also the grammatical markings upon words, like *ed* past tense marker 's' of pluralization, and 'ing' which goes on verbs. Those suffering from Broca's aphasia in fact, hardly produce the verbs, and most of their word production are nouns. Finally, their pronunciation and articulation are poor since they cannot be interpreted. The following is a sample of an aphasiac articulation:

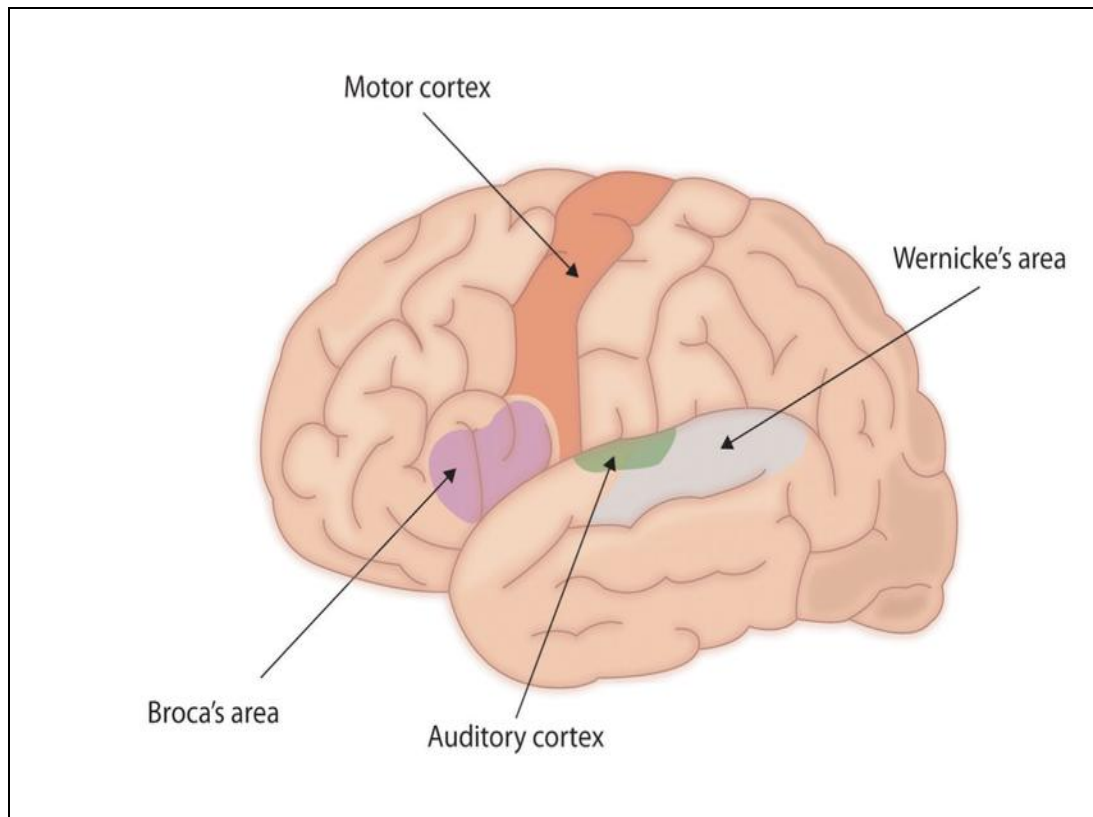
**Example (1)** "Yes—ah—Monday ah—Dad—and Dad—ah—hospital—and ah—Wednesday—Wednesday—nine o'clock and ah Thursday—ten o'clock ah doctors—two—two—ah doctors and—ah—teeth—yah. And a doctor—ah girl—and gums, and I".

It must be mentioned that Broca's aphasic people make sense and they understand what they hear except, that they have difficulty in complex sentences like: *The baby who was carried by the girl slept*. They can usually read, but they have difficulty in reading the regular inflectional forms such as *girls* while interesting in reading the irregular inflection ones like *children*. they can hardly ever be recovered, but they often show considerable improvement over time Trask (1999, p.106).

The second area related to language in the brain is Wernicke's area, which was identified by the German investigator Carle Wernicke in 1874 and he discovered that it is also located in the left side of the cerebral cortex in most people and it is nearly behind the ear and its size is slightly larger than Broca's area. People suffering from this area's damage seem to have rapid fluent and their rhythms and intonations are in fact, normal as well as their grammatical structures but, as soon as one listens carefully, he will note that what those patients say makes no sense and may make sense in short sequences in isolation. The following is a sample of speech production of Wernicke's aphasics Trask (1991, pp.106-107).

**Example (2)** "If I could I would. Oh, I'm taking the word the wrong way to say, all the barbers here whenever they stop you it's going around and around, if you know what I mean, that is tying and tying for repucer... repuceration, well, we were trying the best that we could while another time it was with the beds over there...". Damage to this area does not affect difficulty in speaking alone, rather difficulty with comprehension as well. Wernicke's aphasics hardly if ever understand what they hear and seem quite unaware that they are having difficulties they even become frequently annoyed or if others seem not to be able to understand what they are saying. Naturally Wernicke's aphasics rarely respond to treatment Trask (1991, pp.106-107).

To make the connection between the damage of Wernicke's area and the impairment of speech comprehension clear Carl Wernicke says that since it lies behind the *auditory area* that is responsible for processing input from the ears. This confirms the system of language in the brain that is the *auditory area* receives the input from the ears and send it to the responsible area for comprehension; Wernicke's area and the reason why Broca's aphasics have speech production difficulties as Broca says is that this area is close to the *motor area* of the brain which is responsible for controlling muscular movements (ibid).



**Figure (6) Location of Motor and Auditory Area**

The relation between these two areas is that the auditory area receives input from the ears and sends it to the Wernicke's area, which is responsible for comprehension and in speaking, this area which has access to ordinary vocabulary, sends the words to Broca's area, which provides the necessary grammatical structure, such as the grammatical words and affixes morphemes, and then passes its instructions on to the motor area, which orders the muscles of the vocal organs to produce the required output Trask (1991, pp.106-107).

It could be concluded that Broca's which is located in left hemisphere is responsible for speech Production and Wernicke's area which is located in the same part is responsible for Speech comprehension and the *cerebellum* (little brain) important for movement and have a role in language, memory, emotion.

#### **6- On Defining Alzheimer**

Alzheimer was first described by a doctor named Alois Alzheimer (1864–1915) more than 100 years ago when he described the characteristics of unusual brain in the meeting of southwest German Psychiatrists. The patient's name was Auguste Deter and she was suffering from memory loss, disorientation and hallucinations and in 1910 Emil Kraepelin (1856–1926) gave the name Alzheimer to the condition Cipriani et al. (2010, p.1).

Grober, E., & Bang, S. (1995, p.8) Say that changes in memory are the most significant changes in cognitive with Alzheimer's patients. Memory declines include spatial memory, such that patients might not remember their homes only a few feet far away from it and become disoriented. The patients forget the names of objects and common people also because of the declines of semantic long-term

memory. working memory impairment due to Alzheimer causes the difficulty of following the coherence of the conversation.

Bhushan et al. (2018, pp.1-3) affirm that Alzheimer's is an avoidable neurological disorder in which brain cells die and cause the loss of memory, cognitive decline, and finally lead to dementia in people 65 years of age and older. Its average of its 10% of people over the age of 65 and 50% over the age of 85 years and nearly 4million Alzheimer's patients are in the United States. It is the fourth leading reason of death in the United States and it has become widespread in many other countries. The biggest risk factor for developing Alzheimer's disease is age, it is one of the unchangeable risk factors. Most cases of Alzheimer's disease occur in older people, aged 65 years or older. studies prove that aging can damage the body's self-repair mechanism including in the brain and many other risks increase with age such as high blood pressure, high cholesterol and heart disease. Genetic factor is also a cause of Alzheimer's disease. A connection has been found between a gene and the development of Alzheimer. This gene is said to be responsible for the protein that carries cholesterol in the blood vessels.

The basic symptom of Alzheimer to Kubi and Richard (2019, p.17) is the weakness of cognitive skills because of the brain disorder which negatively affects the daily life performance and Alzheimer is not related basically to aging. Frazier (2019, p.1) reveal that it has been 20 years of studies that proved that the brain is insulin sensitive and that the decrease of brain insulin receptor causes Alzheimer and that neuronal insulin resistance might cause memory loss which is the condition of Alzheimer.

From the above-mentioned definitions, one can say that Alzheimer causes cognitive impairment and memory loss which affects the whole life of the patients.

### **7- Treatment of Alzheimer**

The treatment of Alzheimer is not known yet, the rates for clinical development in Alzheimer medication are low and medical research is mostly about how to slow the progression but not curing the patients (Doroszkiewicz and Mroczko (2022,p.1).

Although there is no cure for Alzheimer's disease right now, there is much that can be done to manage the disease and to treat its symptoms to provide a better life for those suffering from it and their caregivers. physical exercise, social activity, and appropriate food are important in maintaining overall good health. Calm surroundings may also help the patients to continue functioning as far as possible Modifications to the living environment can help them as well to maintain comfort Zeisel and Raia (2000, pp.4-6). Massoud and Leger (2011, p.7) announce that "pharmacological options are presently available for the symptomatic treatment of Alzheimer. These treatments provide mild but sustained benefits. Before disease-modifying approaches become available, optimizing the use of the available treatment options is crucial".

### **8- Speech Comprehension Process and Alzheimer**

Since the expressive role of communication in everyday life is significant, the estimation of its abilities, treatment and cognitive interpretation in Alzheimer's is essential for diagnosis. The shortage in verbal comprehension abilities and the process of accurately understanding it is one of the most important language impairments in this account Hilari (2003, p.1984).

Small et.al. (1997, p.2) suggest that due to the difficulties in understanding speech by Alzheimer's, caregivers of such patients should modify their speech to facilitate the patients' sentence comprehension. The recommendations for this suggestion are to: (a) using simple sentences, (b) do not speak quickly rather slowly, and (c) repeating is a good strategy for one's utterance with the using of the same words. To Grober and Bang (1995, p.8) One of the impairments in the Alzheimer's patients is announced as the impairment of sentence comprehension, as evidenced by impaired performance in some sentence processing tasks.

Kempler et.al. (1998, p.4) reduction of spoken language comprehension has also been reported for individuals with Alzheimer in the sense of word recognition and sentence comprehension. Poulisse et al. (2019, p.12) "various compensation strategies mitigate the negative impact of cognitive decline on sentence comprehension. Evidence suggests that the use of semantic information may counteract memory declines, and that an absence of semantic content may exacerbate sentence processing deficits".

Human cognition changes throughout their age and in the childhood age the development of the cognitive skills is progressed further ageing on the other side is characterized by progressively deficient cognitive abilities. Reduced memory capacity and less efficient memory operations have effects on older adults' language comprehension Van Boxtel and Lawyer (2021, p.2-3).

### **Conclusions**

In conclusion, the study suggests that Alzheimer is a case where the memory is declined and that comprehending language is affected by the reduction of the cognitive skills. Individuals of such case cannot understand what is said to them since their memories are not able to retrieve the names of the objects, they find difficulties when interpreting the speech. The treatment of Alzheimer is not found yet but there are ways in which improve the style of the patients' life psychologically. For pharmacological treatments, these options are presently available for the symptomatic treatment of Alzheimer not the disease itself . People that deal with such patients must use simple language to easily communicate with them and repeat what they say with in the same vocabulary. Aging which is a reason for causing Alzheimer leads to deficit cognitive abilities such as comprehension.

### **References**

Allopenna, P.D. Magnuson, J.S., & Tanenhaus, M.K. (1998) 'Tracking the time course of spoken word recognition using eye movements: Evidence for continuous mapping models',

*Journal of Memory and Language*, 38 (4), pp.419-439. Doi:10.1006/jmla.1997.2558

Baldo, J. V., Kacirik, N. A., Moncrief, A., Beghin, F., et al. (2016). 'You may now kiss the bride: Interpretation of social situations by individuals with right or left hemisphere injury', *Neuropsychologia*, 88 (80), pp.133–141. Doi: 10.1016/j.neuropsychologia.2015.11.001.

- Bhushan I, Kour M, Kour G, et al. (2018) 'Alzheimer's disease: Causes and treatment', *Annals of Biotechnology*, 1(1), p.1002. DOI: 10.33582/2637-4927/1002. MedDocs Publishers LLC.
- Bihrlé A. M., Brownell H. H., Powelson J. A., Gardner H. (1986) 'Comprehension of humorous and non-humorous materials by left and right brain-damaged patients', *Brain and Cognition*, 5(4), pp.399–411. Doi: 10.1016/0278-2626(86)90042-4. - DOI - PubMed
- Branch, C., Milner, B., & Rasmussen, T. (1964). 'Intracarotid sodium amytal for the lateralization of cerebral speech dominance', *Journal of Neurosurgery*, 21(5), pp.399–405. Doi: 10.3171/jns.1964.21.5.0399. DOI - PubMed
- Cipriani, G.; Dolciotti, C.; Picchi, L.; Bonuccelli, U. (2011) 'Alzheimer and his disease: A brief history'. *Neurol. Sci. Off. J. Ital. Neurol. Soc. Ital. Soc. Clin. Neurophysiology*, 32(2), pp. 275–279. DOI: 10.1007/s10072-010-0454-7. Springer-Verlag.
- De Smet J. H., Baillieux H., De Deyn P. P., Mariën P., Paquier P. (2007). The cerebellum and language: The story so far. *Folia Phoniatr. Logop.* 59 165–170. 10.1159/000102927 - DOI - PubMed
- Doroszkiewicz, Julia and Mroczo, Barbara. New Possibilities in the Therapeutic Approach to Alzheimer's Disease. *Int J Mol Sci.* 2022 Aug 10;23(16):8902. doi: 10.3390/ijms23168902.
- Fasold, Ralph and Connor-Linton, Jeff (2006)<sup>1st</sup>. *An introduction to Language and Linguistics* Cambridge University.
- Fitsiori, A., Nguyen, D., Karentzos, A., Delavelle, J., & Vargas, M. I. (2011). 'The corpus callosum: White matter or terra incognita', *British Journal of Radiology*, 84 (997), pp.5–18. Doi: 10.1259/bjr/21946513
- Frazier H.N., Ghoweri A.O., Anderson K.L., Lin R.L., Porter N.M., Thibault O. (2019) 'Broadening the definition of brain insulin resistance in aging and Alzheimer's disease', *Exp. Neurol*, 313, pp.79–87. Doi: 10.1016/j.expneurol.2018.12.007. - DOI - PMC - PubMed
- Grober, E., & Bang, S.(1995). 'Sentence comprehension in Alzheimer's disease', *Developmental Neuropsychology*, 11(1), pp.95-107. 10.1080/Doi:/87565649509540606
- Heath, R. L., & Blonder, L. X. (2005). 'Spontaneous humor among right hemisphere stroke survivors', *Brain and Language*, 93(3), pp. 267–76. Doi: 10.1016/j.bandl.2004.10.006.
- Hilari K, Byng S, Lamping DL, Smith SC. (2003). 'Stroke and Aphasia Quality of Life Scale-39 (SAQOL-39): evaluation of acceptability, reliability, and validity' *Stroke*, 34 (8), pp.1944–1950. Doi: 10.1161/01.STR.0000081987. 46660.ED - DOI - PubMed

- Ingram, John C . L. (2007). *Neurolinguistics: An Introduction to Spoken Language Processing and its Disorders*. New York
- Kaplan, J. A., Brownell, H. H., Jacobs, J. R., & Gardner, H. (1990). ‘The effects of right hemisphere damage on the pragmatic interpretation of conversational remarks’, *Brain and Language*, 38(2), pp. 315–33. Doi: 10.1016/0093-934x(90)90117-y - PubMed
- Kasparian, K. (2013). ‘Hemispheric differences in figurative language processing: Contributions of neuroimaging methods and challenges in reconciling current empirical findings’, *Journal of Neurolinguistics*, 26(1), pp. 1–21. [Doi: 10.1016/j.jneuroling.2012.07.001](https://doi.org/10.1016/j.jneuroling.2012.07.001). Elsevier Ltd.
- Kempler, D., Almor, A., & MacDonald, M. C. (1998). ‘Teasing apart the contribution of memory and language impairments in Alzheimer’s disease: An online study of sentence comprehension’, *American Journal of Speech-Language Pathology*, 7 (1), pp. 61–67. Doi:1058-0360/98/0701/-0061
- Kempler, D., van Lancker, D., Marchman, V., & Bates, E. (1999). ‘Idiom comprehension in children and adults with unilateral brain damage’, *Developmental Neuropsychology*, 15(3), pp.327–49. Doi:10.1080/87/565649909540753.
- Kennison, Shelia (2019). *Psychology of Language: Theory and Application*. 1<sup>st</sup> edition Red Global Press-London
- Kess, Joseph F. (1992). *Psycholinguistics, Psychology, Linguistics, and the Study of Natural Language-Canada*.
- Kubie, Bernard and Richard, Facility. (2019). ‘A B c of Dementia and Alzheimer’. National Huris Association -Alexandria
- Mandal, A. (2011). Language and the human brain. Retrieved from *News Medical Life Sciences*.
- Massoud F, Léger GC. Pharmacological treatment of Alzheimer disease. *Can J Psychiatry*. 2011;56(10):579–588. doi:10.1177/070674371105601003
- Mishkin, M., & Foroays, D. G. (1952). ‘Word recognition as a function of retinal focus’, *Journal of Experimental Psychology*, 43(1), pp.43–48. Doi: 10.1037/h0061361. pubMed
- Poullisse, C., Wheeldon, L., & Segaert, K. (2019). ‘Evidence against preserved syntactic comprehension in healthy aging’, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 45(12), pp. 2290–2308. <https://doi.org/10.1037/xlm0000707>
- Qarem, Dina Badee. (2022). ‘Speech Disorder and Brain Damage’ Middle East University—Amman-Jordan- MA thesis

- Van Boxtel W, Lawyer L. (2021). 'Sentence comprehension in ageing and Alzheimer's disease', *Lang Linguist Compass*,15(6), pp.1-16. Doi: 10.1111/lnc3.12430
- Schmidt, G. L., Kranjec, A., Cardillo, E. R., & Chatterjee, A. (2010). 'Beyond laterality: A critical assessment of research on the neural basis of metaphor', *Journal of the International Neuropsychological Society*, 16(1), pp. 1–5. Doi: 10.1017/S1355617709990543
- Small, Jeff A., Kemper, Susan, Lyons, Kelly (1997) 'Sentence Comprehension in Alzheimer's Disease: Effects of Grammatical Complexity, Speech Rate, and Repetition' ,*Psychology and aging*,12(1), pp.1-13. American Psychological Association.Inc.0882-7974/97/\$3.00.
- Trask, R.L. (1999). *Language the Basic*.2<sup>nd</sup> edition. Routledge. London and New York.
- Treiman, R., Clifton, C., Jr, Meyer, A. S. and Wurm, L. H. (2003). *Language comprehension and production. Comprehensive Handbook of Psychology*, Volume 4: Experimental Psychology. New York
- 
- Wada, Juhn. (1997). 'Clinical experimental observations of carotid artery injections of sodium amytal' , *Brain & Cognition*, 33(1),pp.11-13. <https://doi.org/10.1006/brcg.1997.0880>
- Winner E., Gardner H. (1977). 'The comprehension of metaphor in brain-damaged patients', *National Library of Medicine* ,100 (4), pp.717-729. Doi: 10.1093/brain/.
- Yule, George (2014). *The study of language* 5<sup>th</sup> edition. Printed in the United Kingdom by MPG Print group Ltd, Cambridge.
- Zeisel, John and Raia, Paul (2000). Nonpharmacological Treatment for Alzheimer's Disease: A *mind-brain Approach*,15(6), pp.331-340.Doi:10.1177/153331750001500603

---

### **Arabic Reference List**

- Abdlkhalq, Ahmed Mohamad (1990).*Auss Elm Alnafs (Basis of psycholinguistics)*3<sup>rd</sup>. Alexandria.
- Al Wajeez Dictionary* (2003). 10<sup>th</sup> edition Arabic Language Association. Cairo
- Sayd, Yusif Jum aa (1989). *Al alaqa baina addad Al mufradat wamaanaha lada Ayna mn Alaswya wamartha Alfisam Almuzmn (The Relationship Between the Vocabulary and their Meanings in the Chronic Introverted Personality and Schizophrenia. A psychological study in Language Studies in Clinical Psychology.* Cairo. Dar Garib Publication.