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## **A psycholinguistics Study of Alzheimer and the Process of Speech Production**

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### **Abstract**

The work is a psycholinguistics study which attempts to define Alzheimer with the connection of the process of speech production. It also views that Alzheimer causes various types of speech production. To clarify more, the part of the brain which is responsible for producing the language is exposed by a figure that presents the damaged area leads to this disease. It also discusses how this process differs in those suffering from it with the normal people.

The paper concludes that the people who have damaged brain in the part responsible for production (Broca's area) face problems in the speaking skill and they cannot communicate coherently. This leads that the sufferers are finally disconnected to society and isolate themselves from daily communications.

### **1- The Historical Overview of Psycholinguistic:**

It is known that behind every science there is a history of its development and the stages that it contributed in. Levelt (2013:2) states that psycholinguistics first was not an independent science that was explicitly studied. The birth of psycholinguistics began in the 20<sup>th</sup> century by the German psycholinguist, Wilhelm Wundt (1832-1920) and he argued that language could be explained based on psychological principles. At that time, the language began to change from its aesthetic and cultural nature to a

scientific approach and he states that the term "psycholinguistics" was introduced by Jacob Kantor in 1936, but it was rarely used until 1946, when his student Nicholas Pronko published his article *Language and psycholinguistics*.

Foder and Garrel (1974) cited in Treiman (2003:3) state that early psycholinguistics described the human's comprehension and production of language in terms of rules that were postulated by linguists. To them psycholinguistic theories must take in

consideration the properties of human mind as well as the structure of the language.

Cowles (2011:13-14) believes that interest in mind and language dates back thousands of years and spanning many cultures (including Chinese, India, Mesopotamian and Greece). The foundation of what is considered to be psychology goes back, in a form or another, at least early as the study of language, and possibly earlier. However, modern versions of linguistics and psychology are much more recent, with modern psychology dating back to Wundt's laboratory in Leipzig in the late 1800s and modern linguistics having the same time. Both fields undergo major changes in the mid-1900s that could still be felt today.

Blumenthal (1987:313–323) explains the interests between the fields of language and psychology and confirms that they were mutual and many linguists of that time were interested in Wundt's work including a number of influential linguistic researchers such as Bloomfield and Saussure. For example, Bloomfield's approach to analysing the structure of language is important to most modern grammatical theories. De Saussure made an important distinction that is still part of the way linguists think about language which is the knowledge of a language system that exists in common among speakers of a particular language and parole, is the use of this system in practice as to say "speaking". The origin of psycholinguistics is the study of the relationship between behavior and cognitive characteristic of language users Balamurugan and Thirunavukkarasu (2018:2-3).

## **2-Definitions of Psycholinguistics**

Balamurugan and Thirunavukkarasu (2018:1) announce that psycholinguistics is the way that human mind constructs thought and applies it to language. It mainly deals with language comprehension, production, and acquisition

and it is a part of cognitive science that includes psychology, linguistics, anthropology, neuroscience, and computer science. It is therefore approached from fields with different backgrounds. They state that psycholinguistics is the scientific study of language that interprets how the human brain acquires, processes, comprehends, and produces language. It also has subdivisions; such as the study of spelling, phonology, semantics, syntax, etc. *ibid* (2).

Fernández and Cairns (2010:1) say that psycholinguistics could be defined as an interdisciplinary field of study, the aims of psycholinguistics are to understand how people acquire language, how they use language to speak and understand each other, and how language is performed and processed in the brain. It is basically a sub-discipline of psychology and linguistics, but it is also related to developmental psychology, cognitive psychology, neurolinguistics, and the science of speech.

Bangsawan (2013:2) confirms that the psychology of language which is called psycholinguistics, is the study of the psychological and neurobiological factors that enable human beings to acquire language, use, and comprehend it. The early attempts at psycholinguistics were broadly philosophical ventures, due to the lack of consistent data on the functioning of the human brain. Modern research uses biology, neuroscience, cognitive science, and information theory to study how the brain processes language.

Trask (1999:114) says that psycholinguistics can be impressively defined as the study of the connection between language and mind. In fact, what psychologists primarily examine is language processing, the procedures cause the production and the comprehension of language. In the view of Spivey et.al (2012:2) psycholinguistics is the study of how people

learn and use language and investigates their ability to speak, write, comprehend, and read.

### 3- Common Theories of Psycholinguistics

Psycholinguistics has provided numerous theories that explain how a person acquires a language, produces and comprehends both spoken and written language. There are some common theories advanced to describe how language is acquired, learnt and taught such as:

#### a. Behaviorist Theory

Skinner (1957:1-17) contributed to this by making a similarity between the process of learning a first language and a behaviourist experiment in which a pigeon was trained through giving him some prizes. He claimed that languages are acquired through a stimulus-response-reward process and the process of acquiring language can be seen as a question of imitating parents, by "creating associations between words and real-world objects". He manifests that verbal behaviour could be defined as the behaviour of an individual that achieves its effect on the world through the behaviour of someone's else, for this, its reinforcement is said to be indirect.

Field (2005:17) postulates that according to the behaviourist hypothesis, it is through exposure and positive reinforcement that language is produced and that mind is something impossible to know. Kebbe (1995 :14) says that to Bloomfieldians, "language is nothing but a habit that the child comes to learn by imitation. In their language acquisition account, the child is exposed to linguistic data that he/she acquires and then reproduces at a later stage. Therefore, language is learned from the outside, human beings learn it the same way they learn other habits. Learning a language to them, isn't much different than a laboratory mouse, which learns to expect to be fed every time someone rings the bell. They believe that, "a scientific theory must reject all data that are

not directly observable or physically measurable." *ibid* (53). Aitchison (1992:24) confirms that to the Swiss scholar Ferdinand de Saussure (1857-1913), language items are regarded basically as a game of chess in which each item is recognized by the relationship it has to all the others and language is a built structure of interwoven elements.

It could be concluded that language is a habit and brought out through repetition, memorization, and mimicry. One can say that there is no obvious distinction between learning the language and the any other behaviour according to this theory.

#### a. Innateness Theory

Chomsky (2009) argues that Language learning is not really something that the child does; it is something that happens to the child placed in an appropriate environment much as the child's body grows and matures in a predetermined way when provided

with appropriate nutrition and environmental stimulation. He claims that humans are born with a set of language rules in their brains, and that children are born with an inbuilt template or blueprint for language, which aids the kid in the work of developing a grammar for their language.

Pinker (1994:26-43) claims that "language is not just any cultural invention but the product of a special human instinct" and that it is an innate biological function of human beings just like learning to walk. To Chomsky (1977:98) all children have the same innateness and share the same internal constraints that define the grammar they are going to construct narrowly. He confirms that the mind contains blueprints for grammatical rules comes once again out of the mouths of babies and suckling. For example, looking at the English agreement suffix- s as in *He plays*, Chomsky proposed that children are

born with brains contain a Language Acquisition Device which is a set of language learning tools.

It could be concluded that innateness theory contrasts with the view that language is purely behavior and the main argument in this theory is that children are born with an innate knowledge which guides them in the language acquisition task.

### c. Cognitive Theory

Brown and Gonzo (1995:77) affirm that cognitivists argue that language acquisition is autogenic and that the environment simply play a role in triggering the maturation process. Language comes primarily through the maturation that the environment triggers off not through the environment itself.

Bruner (1957:234). In other words, cognitive thinking then is concerned with the mental changes that occur in a person's mind as a result of cognitive processes. Wilburg (2010) outlines the processes involved in learning, which include observing, categorizing, forming generalizations, decision-making, and problem-solving, which enable learners to make sense of the information presented. This theory also deals with the nature of knowledge and how humans gradually acquire, construct, and use it over time. Cognitive theories facilitate the improvement and growth of children in Aljoundi (2014:10).

Wilkins (1974:168-169) believes that cognitivists reject behaviourists' views, they believe that all people learn a language not because they go through the same conditioning process, but because they have an innate ability that allows them to acquire language as a normal maturation process. This capacity is by definition universal... the nature of language is such that it cannot be explained without postulating an innate mechanism of a fairly well-defined kind.

One can say that, cognitive theory believes that all people learn a language because they have an innate ability that allows them to acquire language as a normal maturation process not because they go through the same conditioning process.

### 4- Alzheimer Background

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. (2010:1).

After the known doctor focused on the study of dementia, he reported the first case to the academic world. In March, a patient named Auguste Deter (1850–1906) In March 1901 she showed uncontrollable behavior and suddenly accused her husband of adultery. Illusion began and eventually, her memory decreased rapidly. She had problems in writing and serious alteration was discovered in usual conversation. When her husband took her to the hospital a doctor said that she had memory impairment. In (1901) Auguste entered Frankfurt mental hospital and she was 51 years at that time and Alzheimer oversaw her care there. He noted that she can speak her name and her husband's as well but she could not write her own name but still remember some objects' name like, key, pencil and cigarette but not the name of the food that she had in her meals. Alzheimer characterized these symptoms as progressive disorder, hallucination, illusion, and psychological social disability and finally she lost all the cognitive ability. She died in (1906) when was 55 years old at the time and due to this the

name Alzheimer is given to this case Yang (2016:3-4).

**5- On Defining Alzheimer** 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 un changeable 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 Bhushan et al. (2019:1-3).

There is a relationship between educational level and the risk of developing Alzheimer's disease and it has been proved that people with fewer years of education seem to be at a higher risk as they are unaware of the common causes Bhushan et al. (2019:1-3).

Alzheimer's disease has been described as 'one of the most disabling and burdensome health conditions worldwide' and is the main reason for nearly 70% of dementia in the aging people Nee Newton and McManus (2011:1). The basic symptom of Alzheimer to Kubi and Richard (2019:17) 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.

### **6-Speech Production Process**

The study of production, is about knowing why and how people say what they say. It should be noted that comprehension and production are not mirror images in terms of the processes involved, although they may be to be closely related. In production, a speaker has a message to communicate, and the message is encoded. The hearer only has incoming speech, and not the underlying intention which generated that particular utterance, so the signal must be decoded and the intended message reconstructed. A good example of how this can happen is ambiguity, because an ambiguous sentence is often a problem for the hearer trying to comprehend the message; this is not a problem for the speaker, who knows what he wants to say as the utterance is produced. The strategies for comprehension and production might not be the same, but it is possible that the units that both make use of are either similar or related Kess (1992:8-10).

Although the production of sounds is the normal ability to produce the language yet it is not considered to be a language, since there must be other related elements such as meaning and syntax in order to call what a child utters *a language*. what is meant by a language is then the ability of expressing or presenting a linguistic production that includes the general rules of language production. In another way, language production means to utter or to write it if it is spontaneous or used to respond inquiries or instructions. Finally, language production refers to the ability of a language user to produce and comprehend infinite and novel sentences Sayd (1989:3-24).

Although Chomsky and early psychologists focused on the creative aspect of language, language also had its rote side. For example,

people store large amounts of information about word properties in their mental vocabulary, and they retrieve this information when they generate language. From some point of view, different types of mechanisms are responsible for the creative and habitual aspects of language. For example, one may use morpheme-based rules to decompose a complex word like *rewritable* the first few times they encounter it, but after several exposures he or she may begin to store and access the word as a unit Caramazza et al. (1988:297-332).

### **7- Alzheimer and the Process of Speech Production**

The temporal features of spontaneous speech are influenced by Alzheimer and the phonetical changes are present in even the mild one. The temporal characteristics of spontaneous speech, such as the tempo of the speech, the number of the pauses in it, and the speech length are sensitive signals of the early stage of the Alzheimer, Szatloczki et al. (2015:1). To (Morris:1996) cited in Szatloczki et al. (2015:1) language shortage basically become remarkable from the early stage of the Alzheimer.

Croot et al. (2000: 277–309) state that those suffering from Alzheimer have problems in their speech in the sense of naming disorder and their speech is fluent but empty, in spite of that their repetition abilities as well as their articulation relatively remain intact. Linguistic patterns difficulties differ from stage to another in the speech production of Alzheimer sufferers and the language domains of language that are, phonetics, phonology, morphology, semantics, syntax and pragmatics are affected in different ways in Alzheimer Bayles and Boone (1982:210–217).

Linguistic functioning requires memory functions in Alzheimer and they are related to each other, difficulties in speech production and

memory functions overlap. Aged changes in language expression leads to lessen the speech performance, and weaken the powerful memory which cause the limitation of the active vocabulary Kempler (2004) cited in Szatloczki (2015:2).

The main findings about speech production in Alzheimer's is that there is a high degree of increasing hesitation and pauses could be noted in speakers undergoing speech process. Progression to Alzheimer case is defined by a reduction in key temporal properties and a parallel increase in temporal interruptions in speech. Speech rate, which corresponds to the number of phonemes produced per second, gets significantly reduced in narrative discourse with the progress of Alzheimer Hoffmann et al. (2010: 29–34).

Balthazar et al. (2007:619–622) confirm that lexical semantic system is affected in the early stage of Alzheimer case and shortage in language and memory functions, particularly in semantic memory are common in patients with Alzheimer. Croot et al (2000: 277–309) say that the most common error made by Alzheimer patients are semantic errors and Saito and Takeda (2000:1-9) postulate that the patients use superordinate category instead of the target names. Syntax, seem to be impaired because the task of fluency and naming tasks show deficits. The comprehension of sentences and texts and production of speech are also impaired Juncos-Rabadán et al. (2010: 73–83).

Alzheimer patients requires more efforts than for healthy individuals in their speech and they speak more slowly with longer pauses, they also need more time to find the correct word in their conversations, which in turn leads to speech disfluency or break messages López-de-Ipiña et al. (2013:6730–6745).

### **Conclusion**

It could be concluded that Alzheimer affects the process of speech production in different ways and that the fields of a language differ in being influenced in the case of Alzheimer. Linguistic patterns difficulties differ from stage to another in the speech production of Alzheimer sufferers and it could be stated that the language deficit in Alzheimer's language is present in the early stage of it and the most affected domain by such case according to this study seems to be semantics system.

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