

Language Impairment: An outlook of interrelated research field

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Human beings on this earth have occupied a unique position among the other animal beings due to the possession of language. It is precisely because language is very often considered as a biological inheritance that its association with human society is both frequent and powerful. It is “acquired with the mother’s milk”. It is not only shaped by the inherited organism of speech but it, in turn, shapes the mind and the mental processes. It is saturated with the tears and joys of the ancestors. It is loved with all one’s being. To be without language for human being is to be faced with one’s death.

Inability to perform in any skill of language is a curse in our modern society. There are basically four skills of language namely, listening, speaking, reading and writing. If a person has any problem with the performance either in the skills, he cannot take part whole heartedly as others who do not have such problems in the development of his own as well as society. He is looked upon by the others. Keeping this view in mind, the purpose of the present study has been set to highlight those problem areas in language performance, such as deafness and dumbness, stuttering, voice disorders, lack of speech, etc. So as to make the society aware of such language impairments for remedial measures. These impairments in language performing skills are considered as language loss in a sense. Language loss is a great loss to the society. As we all know that deaf and dumb people or the people who have impairments in any skill of language performance cannot participate meaningfully in the development of society.

Language processing:

In order to understand language performance we will have to look into the relationship between language and mind focusing mainly on how language is learnt, stored, recognized, expressed and occasionally lost. The relationship between language and mind mainly has three aspects, acquisition, association, and performance and they are intimately linked. What we acquire is the ability to perform that is, to use language with appropriateness, and performance is essential to complete and successful acquisition, and thus association between performance and acquisition is obligatory.

The basic fact calling for explanation in this area is the remarkably short time that a child takes to acquire an extensive knowledge of, and high degree of control over, the language or languages of his environment. Expressing another way, we can say that a normal child of five has, without any obvious difficulty, learnt to control a language that no mature linguist can fully explain this. Let us look a little closer at what a child of five can actually do: he can understand utterance that he has never heard before; produce sentences that are totally new to him and to his listeners; and he can use his knowledge of speech to acquire the new skills of reading and writing. He can do all of this because, somehow, he has managed to extract from the speech he has heard, the underlying system of the language. Furthermore, he has acquired essentially the same underlying system as all his little friends, in spite of the fact that no two children are exposed to identical circumstances or to the same samples of language.

Theories of language learning:

During the past fifty years there have been two main theories to account for the phenomenon of language learning by children. The first known as ‘behaviourism’ was fully formulated by B. F. Skinner in ‘Verbal Behaviour’ (1957). This theory claims that language learning in children can be accumulated for in very much the same way as we can account for a dog learning to stand on its hind legs to beg for a biscuit: training, stimulation, imitation, reward, and repetition.

The second theory known as ‘mentalism’ argues that just as human children are genetically programmed to walk when they reach a certain stage of development, so they are programmed to talk. Research suggests that all children of all nationalities, irrespective of race, class or intelligence, learn language in regular steps moving from babbling to one word utterance, then to combining two words until their speech is indistinguishable from the adult norms of their community. Mentalists suggest that language is a natural part in the development of human beings as the growth of the body. Given the right environment, that is, exposure to speech, a child automatically acquires language. Obviously, if a child is not exposed to language he will not learn it.

Neurolinguistics:

Let us look into the understanding of how language is represented and processed in the brain. This field of study is called neurolinguistics. We have learnt from the various researches that parts of the brain are involved in various aspects of language production and comprehension. It is the brain, which functions as to understand how the breadth and depth of human experience is coded in brain matter. There is cerebral cortex at the highest level of the brain. It is the human cerebral cortex that accounts for our distinctness in the animal world and it is that part of the human brain where the secrets of language representation and processing are to be found.

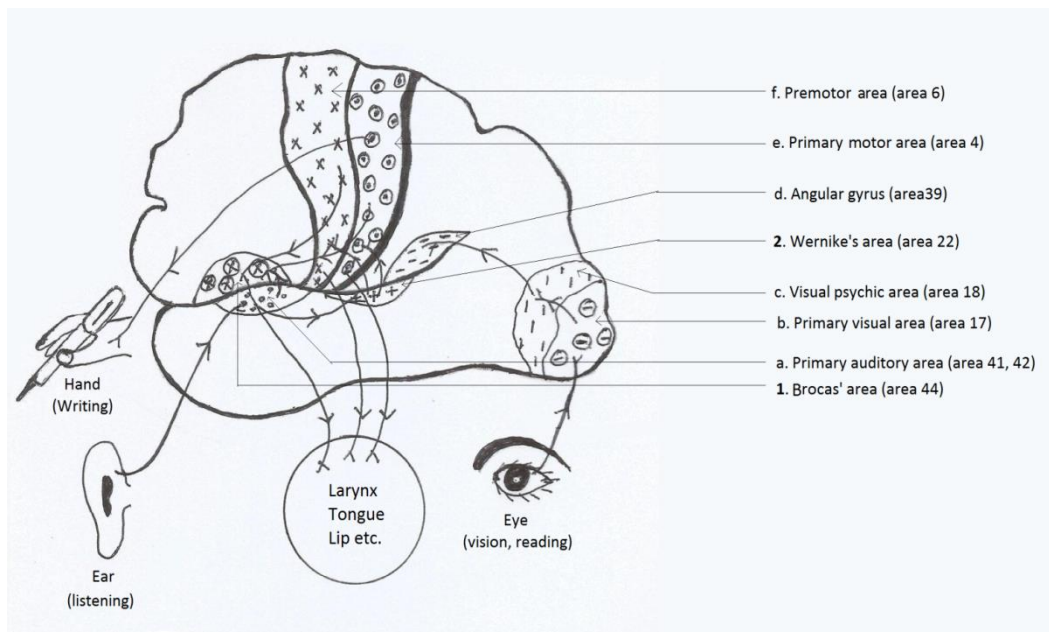


Fig 1: Different parts of the cerebral cortex of human brain and sensory motor area involving language processing and speech.

Among the areas of the cerebral cortex related to language development and its performance, Broca’s area or speech area, the area 44 of frontal lobe and the Wernicke’s area or auditor-psyhic area, the area

22 of temporal lobe of cerebral cortex are most important. These areas are found in dominant hemisphere of cerebral cortex, that is left cerebral hemisphere for right handed person.

Excepting these two some ancillary areas are present in the cerebral cortex, necessary for proper perception and expression of verbal and written language. These are

- a.) Primary auditory area or the area 41 and 42 of temporal lobe,
- b.) Primary visual area or the area 17 of occipital lobe,
- c.) Visuo-psycho area or the area 18 of occipital lobe,
- d.) Angular Gyrus, or the area 39 of parietal lobe,
- e.) Primary motor area or the area 4 of frontal lobe, and
- f.) Premotor area or the area 6 of frontal lobe, etc.

Mechanism of speech:

Let it be thought that a person, 'Ram' says, "snake" and other person 'Hari' says "where?" The sequence of neural mechanism in the person 'Hari' is as follows:

'Hari' listens the word "snake" with the help of auditory organ, ear, Organ of Corti, and then from the Organ of Corti auditory information goes to auditory area, the area 41. From area 41 information goes to the auditor-psycho area or Wernicke's area, the area 22. The Wernicke's area understands and interprets the word "snake" (by cognition) and then sends information to the Broca's area (speech center). After firing of Broca's area information then goes to primary motor area, the area 4 and preemtor area, the area 6, so that necessary muscles contract appropriate movements of the lips, tongue, and larynges take place. After these neurophysiologic phenomena 'Hari' pronounces "Where?" When a person reads a book, the necessary sequence of events are: seeing of the written word → Eye → Retina → Optic nerve → Primary visual area (area 17) → Visuo-psycho area (area 18) → Angular Gyrus (for understanding the meaning of the word) → Wernicke's area.

If the person now wants to speak loudly what he is reading, the impulse from the Wernicke's area will go to speech center or Broca's area and then to motor area of Frontal lobe for regulation of construction of appropriate muscle leading to uttering.

Again if the person wants to write what he has seen or what he has thought the appropriate motor area to control hand and finger for writing will be stimulated from Wernicke's area or Broca's area to produce writing on the paper.

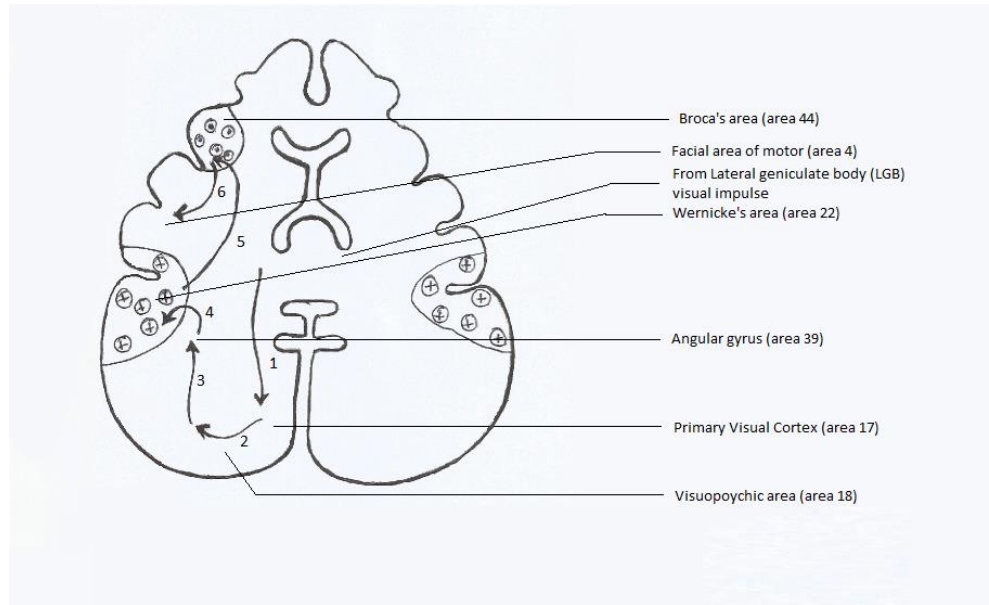


Fig 2: Pathways of impulses when a person names a visual object. (Modified from Patton, H. D. et al., 1976. Introduction to Basic Neurology. Saunders.)

Language Disorder:

As said earlier, that language is occasionally lost, we will have to consider it seriously as the human being without language can neither establish them as scientists, doctors, engineers, teachers, nor as administrators, politicians, writers, and so on. As a result, the human society is going to lose a great number of its citizens for its development purpose. One such linguistic impairment is Aphasia, which is not due to defects of vision or hearing or to motor paralysis. It is mainly due to localized lesions in the dominant hemisphere. The most common cause is embolism or thrombosis of cerebral blood vessel leading to cerebral hemorrhage or as a result of accidental injury. Aphasia is a lack of ‘phasia’ or speech (language). It is a term which is used to denote the impairment of the faculty of using or understanding language, both spoken and written. Aphasia is a multi-dimensional disorder that results in total or partial inability to use language. The severity of the disorder depends upon the site or location of the damage, the extent of the damage and the individual’s age.

Classification of aphasia:

Aphasia has usually been classified into two broad types depending upon the abnormalities found in two areas. One type is called expressive or motor aphasia while the other type is called receptive or sensory aphasia. The expressive aphasia is considered to be a disorder at the level of production or at Broca’s area of the brain. For this reason the expressive aphasia is also called ‘Broca’s aphasia’ and patients have to make a great effort to produce what little speech they do utter. Their articulation is poor and speech is slow (thus also called non-fluent aphasia). Their sentence is incomplete and they face great difficulty in word finding and only limited to two to three words. Their intonation and pausing is erratic. They substitute and add irrelevant sounds in words rendering their speech incomprehensible. They make errors more on initial consonants, consonantal clusters, affricates, etc. They tend to first drop the sounds acquired late in childhood.

In one form of receptive aphasia the damage of Wernicke's area takes place. In this condition speech is normal and sometimes excessive. But what they say is full of jargon that makes little meaning. They also fail to comprehend the meaning of spoken and written words. Another form of receptive aphasia is a condition in which patients can speak relatively well and have good auditory comprehension but cannot put parts of words together. This is also called conduction aphasia because it was thought to be due to lesions of the accurate fasciculus connecting Broca's and Wernicke's area. This type of aphasia also takes place due to damage in and around the auditory cortex (area 40, 41, and 42).

The other form of receptive aphasia is called anomic aphasia where there is damage in Angular Gyrus (area 39) of dominant hemisphere of cerebral cortex, without affecting Wernicke's or Broca's areas. There is no difficulty with speech or the understanding of auditory information but there is trouble in understanding written language or pictures, because visual information is not processed and or transmitted to Wernicke's area. The cerebral damage due to injury or stroke is often not localized but general, consequently more than one form of aphasia is observed in patients. Thus the developed aphasia is also called general or global aphasia, involving both receptive and expressive functions. In this situation, speech is scant as well as non-fluent.

Though the aphasias are produced by the damage of the dominant cerebral hemisphere, damage in the other hemisphere (non-dominant) also has effects. In this type of injury, the patients may impair the ability to tell a story or make a joke; they may also impair to comprehend the meaning of differences in inflection and the colour of speech.

In the treatment of aphasia, since every facet of speech production and comprehension can be involved, it is easy to see that almost every bit of linguistic knowledge is of practical use and potentially of great value. The more we know about the language function in the normal human being, the more chance there is that we will be able to do something significant about cases of language impairment.

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