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A Comprehensive Overview of Aphasia: Historical Evolution and Language Teaching Strategies for Educators

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ABSTRACTS: This article aims to provide educators with a comprehensive understanding of aphasia, a complex language disorder caused by brain damage. It highlights the history of aphasia, from its early recognition to the pivotal milestones that have been achieved, and the impact of historical studies on modern neuroanatomy and neuropsychology. In addition to providing a historical overview, the article also presents effective language teaching strategies that can be used to enhance language fluency, articulation, and prosody in students with aphasia. These strategies include tailored approaches for specific aphasia subtypes, enabling educators to support students' academic achievements and communication skills effectively.

KEYWORDS: Aphasia, Language disorder, Teaching methods.

INTRODUCTION

Aphasia, a neurological condition, is defined as the loss or impairment of language resulting from brain damage (Benson & Ardila, 1996). Over the course of its historical evolution, multiple definitions of aphasia have surfaced, each shedding light on different aspects of this language disorder. Aphasia is defined as a malfunction of specific language components caused by focal lesions (Lesser, 1987, as cited by Papathanasiou et al., 2013). This complex language impairment affects various language components, including phonology, morphology, syntax, semantics, and pragmatics. Moreover, it encompasses all language modalities, such as speaking, reading, writing, and signing, influencing both language input and output (Papathanasiou et al., 2013). In short, aphasia is an impairment of language which impacts on not only the ability to produce and comprehend speech but also the ability to read and write language. This is typically caused by brain injuries and normally after a stroke.

This article aims to provide educators with a comprehensive understanding of aphasia, empowering them to better cater to the needs of students affected by this condition and thereby fostering their success within the classroom environment. To fulfill this purpose, the paper will investigate the historical development of aphasia, tracing its origins back to as early as 1,500 BC, and continue its exploration up to the present era. Furthermore, it will analyze the far-reaching impact of these historical studies on the methodologies employed in teaching and learning, offering insights into potential approaches that can be tailored to accommodate students with aphasia.

1. Milestones in the history of aphasia

The research of aphasia in pre-classical period (until 1860)

The study of aphasia has a long and fascinating history, dating back to around 1,500 BC. Over the centuries, researchers have made many observations and developed a variety of theories about this complex communication disorder. Edwin Smith Papyrus regarded as the oldest known reference in which the so-called aphasia first stated (Ardila, 2014). In this material, there were 48 case histories, including at least five cases that mentioned speechlessness associated with brain impairment. However, around 400 BC, Hippocrates, known as the first reference, made significant contributions by emphasizing the importance of the brain in relation to language disturbances (Benton, 2000). The term "aphasia" in Hippocratic writings was later translated by Adams (1939) and Jones (1923-31) as "speechless," "loss of speech," or "loss of power of speech" (Benton, 2000, p. 136). In these references, two main aphasia syndromes, namely aphonos (speechless) and anaudos (deaf), were mentioned (Ardila, 2014).

From the XV to XVII centuries, several papers associated with language impairments were published. On the fifteenth century, Antonio Guainerio described two patients having aphasic due to head injuries. One patient could say a few words and the other had problem with paraphasic naming. From Guainerio's perspective, the impairment of the third cell in the back of brain resulted in the aphasic symptoms or also language disorder (Tesak &Code, 2008).

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Later, Johann Schmitt, in 1676, described several patients with severe problems associated with reading such as naming and repetition (Benton & Joynt, 1960, as cited by Tesak &Code, 2008). Schmidt also described another case of patient which led him to greater success. The patient who he presented was able to "put together letters and attain a level of perfection in reading after therapy" (Bernard, 1889, as cited by Tesak &Code, 2008, p.24). Since then, numerous papers were written about language impairments, such as anomia and jargon (Gesner), agraphia (Linne), singing ability (Dalin), reading's dissociation in different languages (Gesner) (Benton, 2000).

Overall, the research of aphasia during the pre-classical period was marked by valuable insights from ancient civilizations, Hippocrates' foundational contributions, and early clinical observations in the XV to XVII centuries. These pioneering studies paved the way for further advancements in the understanding and treatment of aphasia, which would continue to evolve in the coming centuries.

The research of aphasia in classical period (from 1861 to 1945)

The most pivotal milestone in the history of aphasia is in the XIX century. This is because series of researches on aphasia was started seriously at that time. These studies focused mainly on the relationship between aphasia symptoms and the damageable parts of brain that correspond with the latter researches of Broca, Wernicke and many others. In this period, a French physician - Bouilluad classified language pathologies into two different types which are articulatory basis and amnesic in nature. This finding was consistent with what occurred prior in Hipprocrates (Ardila, 2014). At the beginning of the 19th century, Franz Josef Gall who is well known as a neuroanatomisy and physiologist proposed the so-called organology, which exerts great impacts in the ideas about aphasia, neuroanatomy and neuropsychology (Code, 2013). Gall used to be a skilled anatomist, therefore, he is seen as the first person who indicated the crucial role of the neo-cortex in localization and determined the metal parts, which belong to "specific parts of the brain". Despite the fact that Gall pointed out no particular functions of left or right hemispheres of the brain, he stated that the frontal lobe is the part in which the faculty for language locates. From Gall's perspective, the organs of language was inherent, uncontrolled and "independent and autonomous of reason and intelligence, and its primary purpose was as a means of expression" (Gall, 1970, as cited by Code, 2013, p.7).

During 1861, there was a case of patient named Leborgne who was speechless and able to say only one syllable "Tan", since then he was called Tan Tan. His case was described in the meeting of the Anthrology Society by Broca on April 18th after his dead one day (Ardila, 2014). In Broca studies, he pointed out the faculty for language associated with left and right hemisphere of the Brain. Broca called Leborgne's problem aphemia which means the loss of articulated speech (Ardila, 2014). The case of Tan which presented by Broca is still considered as the most crucial even in the modern development of aphasia (Code, 2013). In the light of the localization of articulated language, Broca then collected more than 12 cases (Ardila, 2014). According to Broca, human use left hemisphere to speak (Broca, 1985, as cited by Code, 2013). Broca stated "Here are 8 cases where the lesion in situated in the posterior portion of the third frontal convolution …and a most remarkable thing, in all of these patients the lesion is on the left" (Broca, 1863, Benson, 1996, p.14). This is because language and speech is situated in the left hemisphere (Code, 2013) so the patient who speechless, the pathology is in left hemisphere. Broca (1865) stated that aphemia is associated with the lesions of the third frontal convolution (as cited by Ardila, 2014). Broca also presented the idea that if the left hemisphere is damaged, the right hemisphere can used for compensation (Broca, 1865, as cited by Code, 2013). Broca might be the first person who put forward the solution for language and brain damage by reorganization of the functions of brain hemispheres. The second crucial finding in the history of aphasia was brought out by Karl Wernicke in 1874. Wernicke suspected that "information processing components underlie the basic operations and pathways involved in the production and reception of speech, at least at the single-word level, from the highest cognitive center to the peripheral input and output levels" (Wernicke, 1874, as cited by Code, 2013). Wernicke classified three types of aphasia including motor, sensory and conduction aphasia (the third one is relied on the diagrammatic descriptions situated in the brain faculties of language). In 1885, Wernicke suggested the classical model of aphasias which is used to interpret and classify aphasia (Ardila, 2014). After that, Lichtheim took and expanded Wernicke model which involves "two major types of aphasia (motor and sensory) each on with three variants (cortical, subcortical and transcortical)" (Ardila, 2014, p.3). Also, in this model, a system of sound image and fiber connections describe the pathologies of speech and language and make a prediction of aphasia types which was yet undiscovered. Since then, this model is known as Lichtheim-Wernicke model (Ardila, 2014).

John Hughlings Jackson was a neurologist who exerted a great influence in the history of aphasia. Being impacted on by Herbert Spencer's perspective, Jackson proposed his important theory of the evolution and organization of the nervous system which he

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gained during observing of aphasia and epilepsy (Code, 2013). Jackson's work became well-known until Henry Head's writing. In 1920, Head wrote a historical review of aphasia related to Jackson's work. Through this writing, Head named types of functional impairment in aphasia in to verbal aphasia, syntactical aphasia, nominal aphasia and semantic aphasia (Head, 1921). In addition, Head was noticed due to his a clinical approach to aphasia. Head was also well-known because of his opposition to rapid reproduction of graphical models of the language represented in the brain and the so-called "the diagram makers" which he launched in 1926.

This is a critical period in the history of aphasia research as the discoveries laid the foundation for the localization of language functions in the brains and it has had a profound impact on the development of modern neuroanatomy and neuropsychology.

The research of aphasia in modern period (until 1970s)

This period saw significant progress in the research on aphasia, thanks to the contributions of renowned neuropsychologists, including Luria, Geschwind, and others from various countries.

In this period, Romanovich Luria - a Soviet neuropsychologist and developmental psychologist- proposed the book "Traumatic Aphasia" in Russian and English after collecting a number of data from the brain-injured soldiers from World War II. Through this book, Luria pointed out specific neuropsychological factors influencing speech. He discussed the injuries of left temporal lobe, post-central and premotor zones of the left hemisphere which lead to sensory aphasia, disturbances of afferent and efferent were also discussed. In addition, Luria described the injuries of the left parietooccipital lobe which caused disturbances of the simultaneous, spatial schemes and resulted in the semantic disturbances of logic-grammatical structures (Luria, 1970). Furthermore, Luria discussed the prior classification and interpretation of aphasia which he supposed that "in each type of aphasia, a specific level of language processing is impaired" (Ardila, 2014, p.21). Luria's development on the work of aphasia was then discussed in the books Higher Cortical Functions in Man (1962), The Working Brain (1973), and Basic Problems of Neurolinguistics (1976). Luria supposed that although each cortical faculty is responsible for a particular process, it joins a specific functional systems (Ardila, 2014). Luria, therefore, stated that mental activity is a complex functional system including the involvement of a groups of jointly working faculty of the cortex (Luria, 1973, as cited by Code, 2013). Hence, Luria concluded that different types of language disorders are related with damage in specific brain areas. In Luria's work, he classified the types of aphasia involving dynamic aphasia, motor aphasia, sensory aphasia, acoustic-amnestic aphasia and semantic aphasia based on injured localization and the connection of specific brain faculty of language processing (Code, 2013).

In 1965, in America, Norman Geschwind discussed again from the approach to the research on the connection of language and aphasia which were initially proposed by Wernicke. Thanks to Geschwind's publications, his work then brought forth new energy of the studies on aphasia syndromes and WernickeLichtheum model. Geschwind (1969 and 1971) proposed two types of aphasia including fluent and non-fluent aphasia. These types can also be called as expressive and receptive aphasia. The Boston also supposed that the major language criteria to classify aphasia based on fluency, repetition and understanding (Murdoch, 2010). These parameters can be used to divide any types of aphasia syndrome (Ardila, 2014). After these years, there were many crucial researches done on aphasia in many other countries. For example, in France, Henri Hécaen and François Lhermitte wrote about aphasia of children, reading and writing disorders and many other aphasia. In Italy, different aphasia issues also studied by De Renzi, Vignolo, and Gainotti. In Germany, the understandings of aphasia was expanded thanks to Poeck. The term of aphasia was developed widely in many other countries with many different classifications and interpretations (Ardila, 2014).

Contemporary Period (since the 1970s)

Since the mid-1970s, the introduction of new techniques including computerized tomography (CT) scanning and position emission tomography (PET) scanning and magnetic resonance imaging (MRI) brought forth the great development in the history of aphasia. These techniques let "the localization of aphasia producing the lesions in the living subject, have better enabled clinic pathological studies of aphasia to be carried out." (Murdoch, 2010, p.54). In addition, the findings of the researches used this new computerized programs enabled to prove Wernicke-Lichtheim model of language (Murdoch, 2010). Besides, this allow the brain organization of cognition and interpreted in a new way which led to the model of brain organization of cognition named "functional model" (Ardila, 2014).

From the early of 1980s, the development of cognitive neuropsychological model enabled "a shift away from grouping and classifying aphasia" (Code, 2013, p.8). In 1997, Graves developed the prior WernickeLichtheim model through the succeeding

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modeling of Dejerine (1982), Liepmann (1920), Geschwin (1965), Marshall and Newcombe (1973), Ellis and Young (1988). The nature cognitive neuropsychological methods aroused interest for not only medical work with aphasia but also many other cognitive aspects. In addition, this model exerted a crucial influence on aphasia therapy (Code, 2013). In this period, there is a significant development including "the progressively extended use of standardized procedures for aphasia assessment" (Ardila, 2014, p.24). Aphasia test and protocol were widely used around the world by speech language pathologists, neurologists, and neuropsychologists.

2. Language teaching strategies for students with aphasia

The study of aphasia has a long and rich history, dating back over a century. Over the years, many researchers have classified and presented different types of aphasia and interpretations. These contributions have had a significant impact on teaching and learning activities in the field of aphasia. Previously, the process of teaching and learning about aphasia was challenging, as it was not based on a clear understanding of the impaired domains of language. However, thanks to the work of these researchers, the process of teaching and learning has become much more accessible, as it is now based on the impaired domains of language that have been identified in numerous studies.

In terms of expressive aphasia, this is also known as Broca's aphasia or also motor aphasias which is considered as non-fluent aphasias. In contrast, receptive aphasias which belong to Wernicke's classification are considered as fluent aphasias. There are various methodologies that can be applied to assess individuals with aphasia. These include describing pictures, asking them to tell history of their condition. Through these activities, many features related to language fluence, articulation, prosody and volume, phonology, lexicon, grammar can be determined (Ardila, 2014). To improve the expressive language skills of people, educator can employ MIT, or Melodic Intonation Therapy (Norton et al., 2009). This technique uses melodic patterns and rhythmic tapping to help people improve their language skills. Specifically, educators can use a repetitive melody to help people produce words or phrases. They can also help people put words in the correct order by providing them with cues, such as rhythmic tapping or visual cues. According to Norton et al. (2009), people who received MIT showed significant improvement in their ability to produce words and phrases, as well as their ability to carry on conversations. Another approach for individuals with aphasia is script training, which aims to enhance their communication in specific scenarios by teaching them to use memorized scripts. These scripts consist of predictable words and phrases commonly used in everyday situations. This method can ultimately assist individuals with aphasia in improving their functional communication and social interactions (Boyle & Coelho, 1995).

When comes to phonology, many different researchers classified a number of aphasia subtypes including phonological paraphasias. Also, in Broca's aphasia, it was also discussed but frequently include phoneme omissions, especially in complex syllables. According to Boyle (1988), "It would reduce the occurrence of phonemic paraphasia and the number of reapproaches per paraphasia by improving the patient's monitoring ability" (p. 380). In addition, to help individuals with aphasia improve their ability to differentiate sounds, teachers can use minimal pair. In this pratice, students have to discriminate pairs of words that differ by one phoneme, such as "pool" and "fool". As a result, they can understand and produce speech sounds According to (Nadeau et al., 2000). Contrastive stress training also helps to assist individuals with aphasia in enhancing their prosody and word stress patterns, thereby facilitating better word comprehension. Furthermore, From Broca's findings, articulation disorders were usually indicated. This comprises of "verbal agility" which is considered as the abilities to native language are neither produced nor produced used correctly. This also involves "oral agility" which means the abilities to move the articulatory organs such as tongue or lips (Ardila, 2014). Therefore, teachers are responsible for helping students to physically produce the sound and practice until they can do it naturally.

Regarding grammar, grammatical abnormalities observed in aphasia. Agrammatism, which was discussed in Broca's work, refers to a reduction in the use of grammatical elements in language. Another types of grammatical abnormalities is paragrammatism which can be seen in Wernicke's aphasia, refers to using too much and incorrectly grammatical components (Ardila, 2014). From this classification, teacher can employ various methods, such as using games or pictures relating to producing well-formed sentences. For students with conduction aphasia who can comprehend both speech and writing normally, but, they have speech repetition and naming (Beaumont, 2008), teachers can provide utterances which can be short or long, meaningful or meaningfulness. For those who have problems with naming, name objects, a number of categories should be applied such as body parts, colors, actions etc. (Ardila, 2014). Moreover, people with anomic aphasia which mainly associates with word selection (also called lexicon) can be taught by giving related verbs, "which may be the same word, to explain how they cannot find the correct noun" (Boyle, 1998, p.144).

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CONCLUSION

In summary, despite the long historical development, aphasia remains a promising field of study for many researchers. However, there are many challenges faced by teachers working in this domain. Basing on the types of aphasia which were indicated in previous studies, it is necessary for teachers to employ effective teaching methodologies and thoroughly understand the state of their students who have problems with language mainly due to brain damage. When students face with difficulties in acquiring or learning language, there is a need for teachers to be patient as well as adapt the curriculum in order to enable them meet the demands successfully. Also, the resources provided must depend on the disabilities of students. In addition, teachers should frequently give positive feedbacks to encourage their students. Last but not least, for success, teaching for people with impairment of language is not only at school but also in community, workplace and especially at home. With the appropriate approach to language learning and teaching, people with aphasia can reach their academic goals, learn grammar, improve their communication skills, and understand language.

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