2012

Aphasia: when communication doesn’t come easily

APHASIA:

When Communication Doesn't Come Easily

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To many, the ability to understand and speak a language seems to be an innate human ability. The vast majority of the population utilizes some shape or form of communication, whether through writing, speaking, or hand gestures. Our society is built upon the assumption that individuals are capable of understanding signs on the street and following spoken commands. Language is an essential part of humanity, and has been since ancient times. There are, however, individuals for whom language does not come with ease. Those who suffer from communication disorders are not always gifted with the ability to speak. One communication disorder, aphasia, is particularly destructive to one's ability to communicate. Aphasia is generally defined as a disruption in understanding or creating speech, usually as a result of brain damage.[1] Within the past few centuries, the understanding and efficacy of treatments of aphasia have drastically increased; this has ultimately led to promising results for future aphasic patients.

Aphasia is usually brought about by brain trauma, be it a head injury, stroke, or brain tumor.[2] Generally, aphasia is associated with the occurrence of a stroke; in fact an estimated 25-40% of stroke victims suffer from aphasia as a result.[3] A common misconception regarding aphasia is that only the elderly can be aphasic. Due to the wide range of sources of aphasia, an individual of any age can be diagnosed with the disorder. For example, David Dow of Ohio had a stroke at age ten and has struggled with aphasia since.[4]

Paul Broca diagnosed the first case of aphasia in 1861. Broca performed an autopsy on 51-year-old Mr. "Tan" Leborgne, who suffered from a communication disorder. Autopsy results revealed the presence of brain lesions in the left frontal lobe of Mr. Leborgne's brain.[5] Those studying communication disorders now know this area as Broca's area; its destruction leads to the inability to create speech. Aphasic patients, like Mr. Leborgne, are often found to utter phrases that make little sense to the average listener; Mr. Leborgne earned the name "Tan" because he would say "Tan tan" repeatedly, no matter what question was asked of him.[6] Another famous case of aphasia is founder of Communist party, Vladimir Lenin. Lenin suffered numerous strokes, yet was able to participate in conversations; he was able to communicate with his wife using alphabet cards.[7] It is obvious that Lenin did not fail to understand the language spoken around him; only his ability to create speech was impaired. Not all aphasic patients are completely hindered in terms of language comprehension and execution. Cases vary greatly by situation and by person.

Aphasia is also linked to damage in Wernicke's area, the locale in the temporal lobe where language is comprehended. Damage to Wernicke's area leads to an inability to comprehend spoken language. Although individuals with this type of aphasia do not understand language, they are often still capable of producing it. People with this diagnosis often produce sentences with little to no meaning. The myriad of aphasic cases shows that aphasia can affect many types of individuals – aphasia does not discriminate.

Patients are diagnosed with aphasia through various types of evaluations. Some diagnostic tools used are magnetic resonance imaging (MRI) and computed tomography (CT) scans, which determine what area of the brain is damaged.[8] Once the area of interest has been determined, scientists can confirm whether critical speech processing regions, such as Broca's or Wernicke's area, have been damaged. Standardized tests such as the Boston Diagnostic Aphasia Examination and Western Aphasia Battery are also used in the diagnosis process. The Boston Diagnostic Aphasia Examination is administered by a speech-language pathologist, and uses stimuli such as term cards to test the scope of aphasic abilities.[9] The Western Aphasia battery, on the other hand, determines which skills have been affected, for example, content, fluency, auditory comprehension, etc, through tests that don't involve phonetic skills.[10] These are merely two examples of the many tests that act as neuropsychological aphasia measurements.[11] Neuropsychological testing utilizes diverse sets of verbal and nonverbal responses to evaluate the connection between the brain and the extent of a communication disorder. An example of such a test would be a "Trail Making Test," which involves drawing lines between various letters and numbers as fast as possible. The results from this test help link particular areas of brain damage to lack of memory.[12] Great strides have been made in the area of testing for communication disorders and many are yet to come.

For those diagnosed with aphasia, treatment is often suggested. It is impossible, however, for the disorder to be cured. Current aphasia research is not entirely conclusive in terms of efficacy of treatment, but speech-language pathologists generally suggest some form of treatment or therapy based on positive experience with patients.[13] Patients who participate in treatment also add valuable data to ongoing aphasia research. Data indicates positive associations between frequency and number of stimuli used in therapy and the effectiveness of the treatment.[14] One treatment that appears to be especially promising is Constrained Induced Language Therapy, which is an extremely intensive therapy based entirely on verbal responses to re-teach certain communication skills.[15] Another popular treatment method is Stimulation-Facilitation Therapy; this deficit-based therapy uses auditory repetition to build understanding of certain words or phrases and other language aspects.[16] Many other methods are used in the attempt to rebuild comprehension abilities, with the intent of normalizing the patient's lifestyle.

Boston University houses its own aphasia research at the Harold Goodglass Aphasia Research Center and BU Aphasia Research Laboratory. Many professors and graduate students from Boston University and surrounding schools are participating in various projects, such as how changes in cognitive language relate to age and identifying how different parts of the brain are involved in speech mechanisms.[17] One such study is "Neural Networks and Language Recovery in Aphasia from Stroke FMRI Studies," conducted by the Goodglass Research Center. The study plans on utilizing fMRI to detect reorganization of the brain in aphasic stroke victims.[18] The BU Aphasia Research Laboratory is also working on relating fMRI studies to monolingual and bilingual aphasic individuals, as well as computer simulations to predict which treatments will be successful with each patient.[19,20]

Aphasia is an important disorder to target because as life expectancy increases, it's logical to assume that more individuals will suffer from the disease. Language disorders are very common in society today, and the improvement of knowledge and research in the field will help to improve the lifestyles of those who suffer from these disorders. The potential of aphasia to impact the lives of individuals suffering from it makes it a key disorder in the study of speech and language neuroscience.

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