Neurology and aphasia assignment

The study of brain impairments and the behaviors that accompany them began in the late sass with European neurologists and physicians observing that certain behavioral traits were consistently found in conjunction with focal brain lesions (Galilean, 2011: 107). The early works of noted physicians such as Paul Brock and Carl Wrinkle aimed to associate specific brain lesions with abnormal behavior amongst individuals in society, mainly through the use of post-mortem analysis of patients exhibiting certain shared characteristics.

An example being Phonies Gage, a an who while at his Job working as a construction foreman and preparing a site for demolition, was involved in a tragic accident resulting in a 3-foot iron rod penetrating his neck carrying on through his brain and out the top of his head (Galilean, 2011: 107). This incident although tragic for Gage, gave opportunity for researchers to gain insights as to the role and function of the human brain.

The following will firstly identify the elements of the brain, continuing with analysis of two case studies covering aphasia and discuss the points regarding brain damage, continuing with the advancements these studies have provided to neurophysiology’s concerning the composition of the human brain. The human brain contains around 100 billion neurons, linked to as many as 10, 000 synaptic connections (each), all housed in two hemispheres approximately 3 mm thick and with an average weight of 3 pounds.

These neurons communicate with each other through signal pulses (action potentials), carried by fibers called axons that transmit these signals to parts

of the brain or body and target them to specific recipient cells. The main areas of the brain are the Corpus Callous, Thalamus, Hypothalamus, Hippopotamus, Cerebellum, Magical, Brain Stem, Cerebral cortex and the four main lobes, frontal, temporal, occipital and parietal (Galilean 2011 : 114). Aphasia is categorized as any number of linguistic disorders caused by injury to or malformation of the brain (Galilean 2011: 123).

The causes of these injuries are most commonly found to be stroke's, brain tumors and conditions which become more aggressive over time, for example Alchemist's. Aphasia types include Expressive Aphasia (Brooch's Aphasia), Receptive [Sensory Aphasia (Wrinkle's Aphasia), global aphasia, primary progressive aphasia and aphasia in Alchemist's. Expressive and Receptive aphasia, were in turn named after two famed neurologists whose findings described two areas in the brain where lesions caused language deficits.

Pierre Paul Brock is renowned for his discovery of the speech production centre of the brain found in the ventriloquist region of the frontal lobes, now known as Brooch's area (Galilean 2011: 123). Brock came to these findings through studying patients suffering from aphasia. He found evidence to support his theories through his first patient Laboring, nicknamed ' Tan'. This nickname came to fruition due to Laboring answering all questions by use of only the monosyllable ' tan', repeated two times in sequence, and accompanied by a gesture of his left hand.

In 1861, through post- mortem examination Brock determined that Tan had a lesion caused by syphilis in the left cerebral hemisphere, the area of the

brain important for speech production, affecting syntactic skills of patients (Brock, 1861: 330-357). Lobe of the brain. Patients with this condition may be able to understand spoken language to some degree, but have difficulties understanding grammar. Symptoms of this condition result in speech becoming telegraphic, resulting in missing words and crucial context being omitted.

They may struggle to find words for objects, places or people. The content of their speech tends to be limited to basic nouns or verbs and more often than not writing ability becomes affected in the same context (MacAfee 2006: 7). Patients can also show symptoms of praxis, or from selected paralysis of the right side of the body, there is evidence to support the hypothesis that this could be connected with the conclusion that Brooch's area is found in recommit to other areas of the brain responsible for motor functions in the posterior portion of the frontal lobe.

Brooch's aphasia is a more common non-fluent type of the disorder, and as such may be hard to differentiate between this and praxis (MacAfee 2006: 7). Franz Gall had many theories regarding the importance of certain areas of the brain, theorizing that intellect was mediated by the two cerebral hemispheres, Gall found his hypotheses supported by Brock, who described eight patients who were right-handed and who had lost their speech from damage to the aft hemisphere thus supporting Gall's proposal of localized function.

As stipulated in controversial physicist Thomas Skunk's book ' The Structure of Scientific Revolutions', Kuhn goes so far as to call these discoveries a '

paradigm shift' and the start of a new science. Fields such as neurophysiology, behavioral neurology, behavioral and cognitive neuroscience were all influenced by these findings (Hellman, 2002: 4). Brooch's work on language deficits in association with brain lesions influenced other investigators to search for further links between language and the brain.

As mentioned, one of these discoveries was Receptive Aphasia, discovered by German neurologist Carl Wrinkle's, hence the naming of Wrinkle's area. Wrinkle's research followed suit with Brooch's, however he found dissimilarities with regard to Brooch's patient, ' Tan'. Wrinkle's 1874 publication, ' Aphasia Symptom-complex' discussed a patient who had suffered from a stroke and was entirely capable of speaking, but unable to understand spoken or written language.

During post- mortem analysis of the patient's brain, Wrinkle found a lesion located in the left mesosphere; however in the temporal region (Gertrude 1977) Wrinkle went on to identify Receptive aphasia, more commonly known as Wrinkle's aphasia. Wrinkle's aphasia categorized as the inability to understand spoken language due to injury to the area of the brain known as Wrinkle's area (Galilean 2011 : 123). Additionally, individuals with receptive aphasia speak incoherently due to the loss of understanding their own words.

Lesions responsible for this form of aphasia occur in the posterior portion of the superior temporal lobe in the dominant cerebral mesosphere. This trauma curtails understanding of written and spoken language due to the

fundamental role this area of the brain plays with the recognition of words and there meaning. Wrinkle found a contrast with Brooch’s aphasia, as when his patients were given simple requests such as placing objects onto one another, unlike Brooch’s aphasia, Wrinkle’s patients were unable to comprehend the request (Gertrude 1977).

When Wrinkle’s aphasics speak, their language contained Following on from previous discussion, so far most of these studies on how the brain recesses language has relied heavily on post mortem data obtained long after the behavioral data was collected, with the more common studies focusing on those who have suffered from strokes or accidental damage to the brain, e. G. Laboring and Phonies Gage.

Structural nonrecurring via computed tomography (CT) and Magnetic Resonance Imaging (MR.) allows the investigator a view of the specific area of the brain required to collect behavioral data synchronously. Functional nonrecurring with Positron Emission Tomography (PET) and functional magnetic resonance imaging FEM.) have been used with studying patients with healthy brains, and in cohesion with the findings in those with brain damage, has allowed vast progression of understanding the mechanics involved in the brain with regard to language (Chem. & Bates: 1998).

Studies in differing languages have demonstrated that the ‘ same’ aphasic syndromes differentiate from one language to another. These studies demonstrated that non-fluent Brooch’s aphasics found it far more complicated to produce verbs than nouns in contrast with fluent patients,

some suffering from Wrinkle’s aphasia, showing the opposite profile (Chem. & Bates: 1998).

Phonies Gage, a tragic event for himself, however Gage gave physicians an opportunity to be able to identify the specific disruption to his brain and in time identify the affected brain regions, Brooch’s area & Wrinkle’s area, two examples of parts of our brains we now know are fundamental with language. Bronco and Wrinkle’s findings are examples of the types of insights required for neuroscience to develop further. Neurophysiology’s have grown further into the field and rather Han focusing on clinical observation, they look at what a brain-damaged individual is still able to do.

With the technology and knowledge possessed today, physicians are able to use non-invasive investigation as well as neurophysiology assessments to study the brain, as mentioned CT, MR. and PET for example replaced the limited findings and function of the early days of post-mortem analysis. This progression highlights the importance of Brooch’s and Wrinkle’s work and supports the conclusion that this field of science developed into a more sophisticated and advanced field with regards to diagnosis and treatment.