Case Studies

Directions: Based on the information provided indicate as much as you can about the location of the brain damage experienced by each of the following individuals (Note answers may vary but be sure to explain your proposals). All of the following case studies are based on real patients.

Case Study #1

Jill Bolte Taylor, Pd.D. describes her stroke in *My Stroke of Insight*. She discusses living through a stroke and being very conscious of what is happening to her body because she was a neuroanatomist. Dr. Bolte reports losing control over her right arm as it falls limp at her side. She also loses the ability to perceive where her body ends and where the space around her begins. She tries to call for help and after much effort dials the number to both her workplace and her doctor’s office only to find that she cannot articulate the words she has been practicing in here mind. In addition Dr. Bolte could no longer distinguish writing as writing but rather as a series of squiggles she could not decipher.

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Case Study #2

In His Book, *The Man who Mistook His Wife for a Hat*, Oliver Sacks describes the case study, which becomes the namesake for the book. The individual displays some minor issues with muscle strength, coordination and reflexes on the left side of his body. During a neurological exam, he takes off his left shoe to scratch his foot and then forgets that he has done so. He can describe pictures in magazines by describing their more specific features but cannot describe the picture as a whole. He mistakes Dr. Sacks for a grandfather clock until he speaks and believes that his wife’s hair is his hat. He lacked the ability to recognize facial expressions or people’s faces until they speak. He often sings to himself as he completes tasks. He can easily complete a task uninterrupted but when distracted cannot recall the task on which he was focused.

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Case Study #3

Dr. Ramachandran in his book *Phantoms of the Brain* describes patients who have lost a limb yet experience feeling in this missing appendage. In a talk for the American Psychological Association in 2011 titled *The Human Brain, Illusion and Delusions*, Ramachandran described a patient with a missing hand who felt sensations in his missing hand when touched on the face. In addition, when water was dribbled onto his face, he felt as if it were running down his arm, if he lifted his arm; it felt as if the water were running towards the ceiling.

Case Study #4

In An Anthropologist from Mars, Oliver Sacks describes Greg who had a seizure and experienced amnesia causing him to forget he was blind and that he had broken his leg as a result of a fall from the seizure. He did not experience visual hallucinations or “phantoms”. He lived only in the present and did not recall that his father had passed away until he was reminded on it on occasion. He recalled memories from many years ago as if they had just occurred. When attending a Grateful Dead concert at Madison Square Garden, Greg discussed New York City as it has been in the 60s rather than in the present. However, driving to the concert, Greg was able to recall the smell of pretzels and connect that to similar smells from the past. Greg became confused when more recent songs were played at the concert and the next day had no recollection at all of attending the concert claiming, “he had never been to Madison Square Garden.”

Case Study #5

In the now famous case study of Henry Molaison (H.M.) following a surgery to eliminate epileptic seizures H.M. could no longer form any new memories. He could recall memories from before the surgery but could not establish any new memories after the surgery. H.M. had a normal level of intelligence and vocabulary. While he could not learn any new words or return to a conversation once distracted he could learn to complete new tasks.
Case Study #6

The railroad worker Phineus Gage experienced great trauma to his brain when a tamping iron he was using to move dynamite through bedrock suddenly exploded hurling the Tamping iron through his head and out the other side. The changes that were seen in Phineus were that of a changed personality, form one who was relatively reserved and proper to one who no longer seemed in control of his emotions. Phineus exhibited some motor difficulties with walking and with vision in his left eye near the entry point of the tamping iron.
Analysis of Case Studies

Case Study #1

Dr. Bolte experienced a hemorrhage in her left hemisphere in the posterior region. The left hemisphere holds spoken language specifically Broca’s area in the Frontal lobe and when experiencing significant trauma there is a reduction on the ability to produce spoken language. If the damage extends to Wernicke’s area in the left temporal lobe, written or spoken language becomes difficult to understand. The left hemisphere is also responsible for recognizing serial events and putting things in sequential order as well as to helping one to distinguish one’s own body from it’s immediate surroundings.

Case Study #2

The patient in this case study suffers from visual agnosia, the inability to recognize familiar objects. Specifically, the patient was diagnosed with propagnosia, which is the inability to identify faces. Individuals who suffer from propagnosia often can identify individuals via other sensory inputs such as sound or touch, as was the case with Sack’s patient. Agnosia often occurs because of a traumatic brain injurying which limits oxygen to the brain. With visual agnosia, there is often a neglected field as in the Case study described, the patient neglects to recognize that his left shoe is no longer on his foot. Treatment here can be challenging as there seems to be multiple areas of the brain involved, if individuals are made aware of their deficit they can be trained in other methods of recognizing objects or individuals.

Case Study #3

All sensory inputs are represented on the somatosensory cortex located in the Parietal lobe. A visual representation of this in proportion to the amount of sensory inputs a given area has is known as the Penfield Homunculus. If a given area of the sensory strip is not needed because there is no corresponding body part neural pruning may occur which will eventually cut the networks responsible for that absent area. Because of the plasticity of the brain however, another area of the body may take over more area of the somatosensory cortex. In this case the area, which at one time was devoted to the hand had been “taken over” by the area devoted to the face.

Ramachandran also describes the role of mirror neurons for patients with experiencing “phantom sensations”. While they may observe someone being touched on the arm, even if they lack that appendage just watching someone else being touched activates the sensory cortex in the parietal lobe. If an individual has pain in their phantom and watches someone else get a massage, they will often experience at least temporary relief from their phantoms pain. He has found much success using mirror boxes to alleviate pain or cramping in individuals “phantom” limbs.

Case Study #4

Greg experienced amnesia. Specifically anterograde amnesia in which he had trouble forming new memories after the stroke, often this is created by a problem with the hippocampus, which serves as a
weigh station between short-term and long-term memories. He may have been able to recall smells more specifically than other sensory inputs because smell bypasses the systems in the medial temporal lobe.

**Case Study #5**

H.M. experienced a lesion to his hippocampus (both hemispheres) during the surgery, which resulted in his intergrades amnesia, which prevented him from forming new memories, this is different from retrograde amnesia which inhibits old memories, but allows for the creation of new memories. H.M. could learn some new procedural memories because procedural memories seem to be held in the cerebellum and may bypass the hippocampus as they are encoded.

**Case Study #6**

Phineus Gage experienced severe damage to his frontal lobe, which would propel researchers to investigate the role of the frontal lobe in one’s personality. The over emotional post-damage Phineus seems to be reflective of a severing of the connections between the frontal lobe which controls higher order thinking from his emotional limbic center which operated more or less without regulation after the incident. The trouble Phineus had walking could be attributed to damage to the Motor Cortex held in the rear of the frontal lobe.