Phantoms in the Brain and their Vanquishment by the Human Spirit

Amanda Allred
Department of Biology
Lake Forest College
Lake Forest, Illinois 60045

The human brain is a complex and magnificent organ, and throughout history, countless philosophers and scientists have devoted their lives to exploring its secrets. Weighing only about three pounds and consuming twenty percent of the body's energy, the brain determines so much of who we are—our personality, intelligence, and behavior. Even more interesting, some of the slightest changes in neuroanatomy lead to major and perplexing consequences in behavior. V.S. Ramachandran, M.D., Ph.D, and science writer Sandra Blakeslee explore some of the strangest neurological cases of all time—a woman who literally died of laughter, a man convinced his parents have been replaced by imposters, a woman whose left hand seems to have a mind of its own in its attempts to strangle her—in the fascinating book Phantoms in the Brain: Probing the Mysteries of the Human Mind. As much philosophical as neurological, Ramachandran's analysis of neurological ailments provides a functional and evolutionary explanation for how a normal brain works. This book allowed me to reevaluate my encounters with neurologically abnormal individuals.

Ramachandran's research offers countless examples of how the study of neurological abnormalities allows scientists to gain insights into the inner workings of a neurotypical brain. For example, his work with phantom limb patients led to an explanation for why some normal individuals have foot fetishes. Phantom limb victims have lost a body part—a leg, arm, uterus—but still feel that it is present. This phenomenon can be extremely painful; some patients feel their phantom limb is frozen in an uncomfortable position and others perceive an itching sensation they cannot relief. One of Ramachandran's patients, Tom, experienced pain in his phantom limb after losing most of his left arm. In an experiment, Ramachandran discovered that when he stroked Tom's cheek with a Q-tip, Tom felt sensation in his face and his phantom thumb.

Ramachandran realized that this incident could be explained by the Penfield map. Neuroscientist Wilder Penfield discovered that in a small strip on the surface of the brain, different regions corresponded to different surfaces of the body. If part of the strip is stimulated, the individual would feel sensation in the corresponding body surface. As it turns out, the face and hand area are next to each other on the Penfield map. Although this map was believed to be fixed at birth, Ramachandran found that Tom could feel sensation in his face and hand area simultaneously due to the rewiring of his map. The sensory fibers in the face region had taken over the hand area since it was no longer being used. This discovery applies to normal individuals as well. On the Penfield map, the foot and genitalia region lie next to each other. If a person was born with some cross-wiring between these two brain regions, then that could explain why he receives sexual pleasure by having his foot touched.

By studying Anosognosia patients, Ramachandran demonstrates the biological need for psychological defense mechanisms in neurotypical individuals. Individuals with this neurological ailment suffer from damage to the right side of the brain leading to paralysis on the left side of the body; however, the patients believe there is nothing wrong with them. They go to great lengths to maintain their deep denial. For example, Ramachandran's patients will either lie about completing a task, such as clapping their hands, although their arm remains immobile, or they will make up an elaborate excuse in order to explain their lack of movement. Ramachandran's study of Anosognosia leads to a question: why would normal people develop similar self-delusion defense mechanisms, such as denial, repression, and confabulations? Ramachandran suggests that in small doses these mechanisms are beneficial to neurotypicals and is due to hemisphere asymmetry. According to his hypothesis, the left hemisphere is responsible for sorting through the mass amount of sensory information received each day and creating one consistent, coherent version of world; this version can be the same or different from reality. When the left hemisphere comes across information that contradicts its version of the world, rather than creating a new one, it will instead alter or disregard the information all together. However, if an individual is confronted with a very important change in reality, then the right hemisphere must overrule the left hemisphere. This mechanism prevents the brain from becoming overwhelmed by opposing trivial data, resulting in normal behavior such as denial, while still accepting major life changes. However, if individuals suffer right hemisphere damage, like Anosognosia patients, they will inappropriately use psychological defense mechanisms. In Ramachandran's book, he not only explains the biological function of these defense mechanisms in normal people but why these mechanisms are more severe in brain damaged individual.

Through his case studies, Ramachandran demonstrates that brain function can be understood from an evolutionary perspective. Phantoms in the Brain discusses an exciting new field called evolutionary psychology or sociobiology; as described by Ramachandran, sociobiologists believe "many human traits and propensities, even ones we might ordinarily be tempted to attribute to 'culture,' may in fact have been specifically chosen by the guiding hand of natural selection because of their adaptive value" (183). For example, the tendency for men to be polygamous and women monogamous may be best explained through evolution rather than culture. Fitness, a central tenet to natural selection, means the most successful individual will reproduce more frequently and pass on its genes. For men, polygamy and promiscuity is advantageous because he can pass on his genes widely and quickly with little investment. Women, on the other hand, must be more selective about whom to mate with before beginning a nine month pregnancy.

By using an evolutionary psychologists' perspective, Ramachandran offers an explanation for the evolution and biological purpose of laughter. He stumbles across some very rare cases in which individuals have died from uncontrollable laughter. Upon examining the deceased brains, scientists found damage to the limbic system, responsible for emotions, suggesting there may be a "laughter circuit," leading Ramachandran to believe laughter serves a biological function. He notes that all jokes normally follow the same pattern: there is a twist in expectations causing the previous information to be now interpreted in a trivial manner. Ramachandran hypothesizes that laughter used to serves as a method of communication, a way to alert everyone in the group that no one is in danger because the problem is trivial; he calls this idea the "false alarm theory." Although this theory accounts for the origins of the laughter circuit, modern-day humor is more complex. For example, some people make jokes about somber topics such as death. These jokes could be a defense mechanism, a way of convincing your body that something serious is actually trivial. By studying normal and abnormal brains from an evolutionary vantage point, scientists move closer to understanding the biological function of complex human behavior.

Phantom in the Brain reveals that the difference between a normal and abnormal brain is a thin and blurred line. History offers countless examples of individuals whose neurological ailment was offset by some form of genius: Virginia Wolfe and Sylvia Plath suffered from Depression, Albert Einstein may have suffered from Asperger syndrome, etcetera. I have been lucky that neither I nor anyone in my family suffers from any debilitating neurological illnesses. However, some of my friends have neurological abnormalities, and their struggles and talents further demonstrate to me the complexity of the brain. My friend Nate has Asperger syndrome, which lies on the Autism spectrum. Nate has an extremely high IQ and is particularly good at science; he loves building robots and programming computers in his spare time. However, he has extreme difficulty with social interaction. Following rules of social etiquette makes little sense to Nate: he invades my personal space, asks inappropriate questions, and has difficulty maintaining eye contact. Sadly, due to bullying and insufficient academic resources, Nate moved to attend a different high school that has a science program for the gifted. Although he has faced and will continue to face great adversity, if Nate had the choice, he would not get rid of his Asperger's because he likes the way he sees the world.

One of my childhood friends Kenneth suffers from a neurological illness called dysgraphia, which means he has difficulty writing. His handwriting is nearly illegible, and he has trouble placing words in a coherent order. Although Kenneth was an exceptionally bright kid, he was placed in special needs classes and treated like he was stupid. Due to his stigmatization, Kenneth felt depressed. Now in college, Kenneth has learned how to manage his dysgraphia and believes it has made him a better, stronger person. My experiences with Nate and Kenneth and reading Phantoms in the Brain have taught me an important lesson: there is no perfect brain. We are all fighting phantoms. The human spirit is strong enough to overcome them.

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