The Simplicity Of The Human Brain

The human brain is one of the most vital and fascinating structures in the human body. It is responsible for the production of all our thoughts, actions, and experiences. Over the years, our world has advanced in many different aspects, such as technologically and politically. With how much our world has changed, life has lost its simplicity in a way, and this can have an effect on how we think and see things. Due to the busy nature of today's society, life can be very chaotic and complicated, making it difficult for some of us to understand why we make certain decisions or act certain ways. However, by understanding the hidden simplicity of how our brains function, we could make more sound decisions and have a better understanding of our feelings and emotions, therefore allowing us to have more control over our behavior.

The cerebral cortex is the most highly developed part of the human brain. It is responsible for important tasks such as thinking, perceiving, producing and understanding language. R.P. Behrendt, a neuroscience researcher at St. Elizabeth Hospital, describes the cerebral cortex as paired oscillators, or structures that swing back and forth. It maintains the synchronization of the entire brain and enhances the distribution of activity of its elements (323). The production of behavior is a straightforward process of cortical self-optimization, or the automatic functioning of the brain, being disrupted by nervous activity. Once disrupted, the cortex, or the outer layer of the brain, then reorganizes the state of the soma, the nerve cell body. Its simplicity is shown by how each part only controls one function; the cortex lines up somatic state and the peripheral soma controls mind and behavior.

The evolution of brain functions is discussed by C. Robert Cloninger, a psychiatrist with well-known work on mental health and research on illnesses. The way that consciousness operates in human beings today is based on the evolution of human brain functions. The development of neocortical functions, or auditory and visual functions, in mammals occurs in five major transitions: from early reptiles to early mammals, early primates, simians, early Homo, and modern Homo sapiens, commonly known as humans. The foundation for human self-awareness in relation to sexuality, materiality, emotionality, intellectuality, and spirituality was created from the transitions of neocortical development. In addition, neocortical functions also maintain the 5 basic motives of emotion: fear, anger, disgust, surprise, and happiness/sadness. While it may seem complicated, this whole process is related to simplicity because it follows a chronological order of development and all of the characteristics are in groups of 5. This order of development is also the same for every person.

Since there is simplicity in how brain functions develop, this also suggests that there is simplicity in the structure of the brain. William Heisel is an author for the Center for Health Journalism Digital, a news site used by journalists to investigate health challenges and solutions for these issues. He begins with simply stating that brains are simpler than most of us think. After examining samples from six different human brains, researchers found that across these samples, the genes were only expressed in 32 different patterns. Michael Hawrylycz, one of the researchers, commented, "The number of combinatorial possibilities for these genes should be enormous." This opens up the possibilities for new approaches to diseases old and emerging. These researchers' findings suggest that there is some simplicity in the structure of the human brain, because there are only a certain number of patterns for gene expression.

Not only is there simplicity to the structure of the human brain, but there is also simplicity in methods of studying the human brain. Suzana Herculano-Houzel is a Brazilian neuroscientist who works with comparative neuroanatomy, a field that studies the similarities and differences of the anatomies of different species. In June of 2013, she participated in a TED Talk, where she discusses her method of determining the number of brain cells in a mouse brain. Herculano-Houzel explains how she would take a brain, or part of it, and dissolve it in detergent, This destroys the cell membranes but maintain the shape of the nuclei. Because these nuclei are suspended in a clear fluid after the cells have been dissolved, the liquid can be easily agitated or manipulated and observed under a microscope. Counting the number of nuclei under the microscope will tell the number of cells in the original sample. She states that this process is so simple yet straightforward, and this method could provide insight to how different amounts of brain cells affect the brain's behavior.

With so much knowledge and research of how the anatomy of the human brain provides insight to its physiology, a major goal for scientists is to be able to educate the public on their research and findings in a simple way for everyone to understand. John Cunningham and Byron Yu, authors of ScienceDaily (an online website for the latest news on scientific research), discuss the approaches being made to achieve this. Neuroscientists have investigated how to study and explain the simplicity within individual neurons, which are the basic functional units of the brain. This task has proven to be incredibly difficult to achieve, because the activity of neurons have been shown to be extremely varied and inconsistent. Therefore, scientists have been able to come up with dimensionality reduction, a new type of algorithm that has given an understanding of different brain functions. These include distinguishing between different odors, making decisions in the face of uncertainty, and not needing to think about involuntary actions. It also provides a way to be able to accept single-neuron diversity and come up with simplified explanations of neuron interaction. While complicated, this new method ultimately strives to achieve the goal of explaining the simplicity behind how a neuron affects one's actions and behaviors.

The simplicity of how the brain and its inner parts are structured not only explain how one acts and behaves, but it also justifies the fact that humans like to think simply. LeRoy Lane, an author for the RegisterGuard news website and a communication and logic professor at Northwest Christian University, begins his argument by claiming that most of us are simplists, meaning we like to be given information in the simplest ways possible. For example, some people supposedly voted during the 2012 presidential elections based on name recognition and the simplicity of certain presidential campaigns. It is also discovered by researchers that most voters will often select the first candidate on the ballot. Some voters figured that the first name on the ballot was first for a reason, so they just chose that. Based on this evidence, it is suggested that the way humans think and the way our brains function is very simple.

In addition to human brains being structured to think and function simply, they are also structured in a way that we prefer to learn in simple manners, Sarah Young, an author for a news site called The Independent, discusses the simplicity of the human brain in terms of how we learn languages. Young explains how the human brain prefers to communicate in a simple matter, because there are so many similarities between languages. A study was conducted by a researcher at the University of Arizona who believes that the brain likes to process information quickly and accurately. In this case, they hypothesized that this prediction is due to the fact that languages share many similarities. In this study, two groups of participants, who only spoke English, were each taught a new artificial language designed by researchers over a course of 3

days. All the participants preferred using phrases that had a short “dependency length,” which is the distance between syntactically-related (related to the rules of a language) words in a sentence, because they are easier to process in comprehension. This study successfully supported the researcher’s hypothesis of how humans like to process information quickly and accurately. It demonstrated that because the participants preferred using words and phrases that are easier to comprehend, there is some simplicity to how the human brain functions.

Not only is there simplicity in how our brains are structured and how we think and function, there is also simplicity in how other factors can affect how our brains work. Elan Jeremitsky, a general surgeon who has many affiliations with hospitals around the U.S., discusses a study that was conducted to determine the correlation between hyperglycemia (a glucose excess in the human body) and severe traumatic brain injury. The test subjects were determined using the Glasgow Coma Scale (GCS), which measures the consciousness of someone in a coma. Patients with a score of 8 or lower are considered to be in a coma, and anyone who had this reading were considered for this study. The results were determined using the Injury Severity Score (ISS) and the Abbreviated Injury Score (AIS). The ISS measures the severity of brain trauma, and a score of 15 or higher usually defines a trauma as severe. The AIS determines how life-threatening an injury could be to an individual, with a reading of 1 being the least life-threatening, and a reading of 6 being the most life-threatening. It was determined that there is a strong correlation between mortality, age and ISS. A higher level of glucose was also a result of factors such as age, diabetes, and lower GCSs (higher chance a person is in a coma). Based on this study, it can be concluded that patients with severe traumatic brain injury can have early hyperglycemia, and this study, in a way, demonstrates the simplicity of the human brain. Traumatic brain injuries can damage the brain, and therefore, alter its functions. Hormone regulation is an important function of the brain, so traumatic brain injuries can have a negative impact on that, justifying the results of early hyperglycemia in the study.

While there are instances where an impairment of brain function is caused by other activity in the human body, outside factors can also have a huge impact on the efficiency of brain function. José Carlos Bouso, a psychologist with a Ph.D in pharmacology, discusses how the use of psychedelics (drugs that cause hallucinations) affects how the human brain functions. Psychedelics contain certain chemicals called agonists. These are able to alter the structures of brain tissues. For example, psychedelics have the ability to alter brain plasticity, or the brain’s flexibility to perform daily tasks and make decisions. When brain plasticity is altered, it can have a major impact on how an individual acts. This data suggests the regular use of psychedelic drugs could result in structural changes in brain areas that have many important functions, such as attentional process support, self-referential thought, and internal mentation. The process of how psychedelics affect brain functions is simple in a way that the chemicals in these drugs can alter the shape and functioning of the brain. It is important to know that these types of factors can have very harmful effects on such vital organs in the human body.

The brain is one of the most vital organs in the human body, and it is clear that its simple structure and methods of functioning can easily be affected by certain factors. Therefore, this can have an effect on how we think and see things. Due to the busy nature of today’s society, life can be very chaotic and complicated, making it difficult for some of us to understand why we make certain decisions or act certain ways. However, by understanding the hidden simplicity of how our brains function, we could make more sound decisions and have a better understanding of our feelings and emotions, therefore allowing us to have more control over our behavior. By having more control over our behavior and how we act, this would allow us to be able to make

better sound decisions in the future, which could make life seem simpler for us.