

None provided essay



**ASSIGN
BUSTER**

When we discuss our brain, we usually focus on the brain's ability to think. That task alone is extremely complex and involved, but the brain also has many other tasks. Most of the time the brain is on autopilot, meaning that most of the activities performed are just automatic.

Our five senses; sight, sound, touch, taste, and smell, are automatically performed in our brains. We don't have to think about how something sounds, we just hear it and we then interpret that sound. The largest area of our brain is the area that is set aside for vision, it is located in the occipital lobe. Dr. Gerard Guarniero has been blind since birth, a defect in which he has never been able to fix.

Recently, he has signed up for an experiment to test whether our eyes actually do the seeing, or is it the brain which puts the images in our head. He was hooked up to a machine that had a type of pad on the back of the chair in which you sit in.

That pad contains tiny little bumps that move to trace the way an object would look. A type of camera is also connected to this chair, and that captures the images that are then transferred onto the bumps. When the camera processes an item, it will then trigger the bumps, thus putting pressure on the person sitting on the chair. The whole point of the experiment was to try to find the answer if we can visualize objects through touch.

The experiment was a success. Not only was Dr. Guarniero able to visualize an item, he was able to tell exactly what it was and the details of it. The most amazing thing that he noted was a flame. He stated that he has never

imagined that a flame would have a definite shape, because of the fact that he wasn't able to really touch a flame, the heat always got to him first. Dr.

Gerard Guarniero is living proof that our vision and our brain is flexible and can be trained. From this experiment we are able to conclude that the brain is able to substitute different sensations for sight.

So what is the real purpose of our eyes? Eyes are simply sensors that send information to our brains. The eye itself is quite interesting.

The way that we process sight is this: first, the eyes' lens turns everything we view upside down. Then all the impulses are crisscrossed in the optic chiasm. After that, the information is passed down the optic nerve where it finally reaches the primary visual cortex, or striate cortex, where all of the transformations take place. Dr. Russell DeValois held experiments in which he took a few monkeys as his subjects, he then showed them pictures, and as he was showing the pictures to the monkeys, he tried to see what the monkeys actually saw in their visual cortex.

He has pointed out that there is precision on what our eyes see and what we perceive we see.

Dr. David Hubel and Dr. Torsten Wiesel both received awards for their outstanding accomplishments in their study of the primary visual cortex. The primary visual cortex is about the size of a credit card, it lays on the posterior part of the brain.

When cut out, we see that it is a layering structure that has certain loose ends and certain tight ends to it. In the late 1950's, many experiments were

tried to see what sort of pictures had an effect on the visual cortex. They were for the most part unsuccessful, until one day, accidentally, they move a glass slid over the projector, and a line appeared on the screen. That line was just what they were looking for.

So they classified the visual cortex to be associated with lines, edges, and bars. However, reducing the visual field to bars and lines isn't enough, there are many more different and more complicated tasks to be performed and to be seen.

DeValois stated that some of our visual neurons deal with light rays and the strength of the light rays; however, Hubel disagrees with DeValois on this subject. In the 19th century we see different shades and different dots being used by impressionist artists for their paintings. They would put together a mixture of different colors in the forms of dots.

When these paintings are viewed up close, they seem to be a blur, a person really isn't able to tell exactly one thing from another. But when the person viewing the picture moves back, the whole painting fits together and we are able to see what the artist wanted us to see. As much as the visual cortex has been studied, laws for this part of the brain are extremely hard to lay down.

Our eyes turn all of the images we see upside down. Now what if we were to reverse that, meaning what if we saw everything upside down.

Susan was a volunteer who agreed to have a certain pair of glasses be put on her that would make her see everything as if it were upside down. The

reason of this experiment was to see if our brain truly is able to change for our surroundings. At first everything was hard for her, she had difficulty walking, sitting down, even pouring a liquid became a complicated task. After 3 days, she was able to write her name perfectly while looking. Then after several days, she could draw a picture and sign her name on the bottom right-side-up. When the day came to take the glasses off, her brain now had to go back to normal so to say.

At first everything felt weird, but the transformation process back to normal took only about an hour. From this experiment it is safe to state that our vision and even our brain is very adaptable to our surroundings. But we must keep in mind that seeing is a very small part of perception.

Dr.

Mortimer Mishkin says that the visual cortex sends information through two parts of our body: one is the parietal lobe, the other is the ventricle part of the temporal lobe. The parietal lobe has the role of telling use where things are, in other words, how far away we have to move our arms to reach a glass. The temporal lobe helps use explain what objects really are. The most stimulating objects would have to be faces.

One theory exists that our grandmothers light up certain neurons, which in turn are called “ Grandmother cells”. These grandmother cells are commutative cells, meaning that they need other cells in order to preform a task. We truly have no real explanation to how this works, but damage to this part of the brain will cause difficulty recognizing familiar objects.

Now the process of seeing something and then processing it takes about three tenths of a second.

Movement of the impulse first starts at the back of the brain, then it moves its way forward to the frontal lobe, and when it gets there, that is where it is decided on what we exactly saw and how to act towards it. Now normal everyday movements occur vertically, unlike vision, which occurs horizontally. We must master both in order to survive in this world, therefore cooperation between the two senses is very necessary. Things like walking and sneezing have been discovered not to be learned, but inherited through genes.

They are both reflexes, and we don't learn them, we just inherit them and execute them on almost a daily basis.

Dr. Rodolfo Llinas has been visiting Cape Cod for quite some time now in order to study the sea squid. The sea squid contains three neurons, but the two main neurons that we are going to be explaining are huge. They are so large in fact, that you can see the synapses between the two with your naked eye.

A synapses lasts for just about one thousandth of a second.

Neurons pass information through three parts of the brain: 1)primitive brain stem, 2) cerebellum (fundamental for movement) 3) visual cortex. If a disease is acquired in the cerebellum, the person will have difficulty with the depth perception of an object for the rest of their life. The Phazel Ganglia is

the unthinking and automatic response area. If this fails, a person has now gotten Parkinson's disease.

The main reason for getting Parkinson's disease is that the chemical Dopamine isn't being produced anymore in the Substantia Nigra. Terry Thomas has received Parkinson's disease. His life has drastically changed right before his eyes. He doesn't sleep well at night, and when he does he has a yearning for chocolate. A person with Parkinson's also has difficulty crossing streets or even walking through a doorway, they have to be given small goals in order for them to do such a big task as doing through a door. In 1970, a new miracle drug came on the scene, L-Dopa.

The way that this drug works is that it produces Dopamine in excess, now allowing the brain to function somewhat normally. The drug gives a gradual relief of the difficulty, but it isn't a cure for Parkinson's. Another type of medication that has been considered is brain cell implants. The first brain cell implant was in 1982. It was given to a patient with Parkinson's, and he survived the operation with a visible improvement. One positive idea to note about brain cell implants is that the brain doesn't reject tissue as easily as the rest of our body does.

But the critics started writing that taking brain tissue from one person and inserting it into a stranger is completely unethical and immoral. So an alternative had to be found. The alternative would come from our adrenal gland, which lies next to our kidneys.

The makeup of the adrenal gland neurons is very similar to that of the original brain cell, and there weren't any rejections either when the

experiment was performed on mice. This procedure offers hope for the future. The doctors in charge of the operations have already completed two such operations, the first on in a male, didn't help much, because not too long after the operation he had gone back to the same stage of Parkinson's as he was before the operation.

One thing is that he says that if he would be offered another operation, he wouldn't hesitate. The other patient was a female, and her changes stayed with her. She has slightly improved, and now she is leading a better life because of it. What the future awaits us, no body knows, but the doctors are already planning patient number 3, 4, even 18.

What does it mean to be human? The answer to this question can have many meanings. One answer might be that our whole existence as human beings is based on our animal instincts. We are of course animals, and we have evolved over the hundreds of years to be what we are today. The foundation of our basic human life would probably have to be the cerebral cortex. It basically does everything we need done to survive on a daily basis: governs body temperature, heart beat, respiration, when we have to eat, sleep, our sexual drive, and it also triggers our aggression.

If we were to remove it, or even damage the cerebral cortex, we would be in fact killing our very existence. One very interesting thing about the cerebral cortex is that it is an automatic system, meaning it functions without us knowing it. There are three parts of the brain: first is the Brain Stem, then the Hypothalamus, and the Pituitary System. The brain stem is basically an extension of the spinal cord. The hypothalamus contains both the very

important Limbic System and the chemical Melatonin, which is most usually released at night.

The pituitary gland releases a variety of hormones, it controls many aspects of body function.

Pat Moore is a female that suffers from severe winter depression. During the winter time, she is very depressed, she is thoroughly disgusted of herself, she cry frequently, she tends to stay away from people, sleeps a great deal, and just basically stops all normal activity. She has difficulty starting different tasks, and if she ever does start them, she never finishes. She doesn't see a future at all for herself.

The handicap she has completely interferes with her ability to function as a normal human. She also explained that she felt like a bear, she went to sleep all winter, but then when summer hit, she was like a butterfly, she had all this energy, the will to go out and do things. So one day Pat went and participated in an experiment. The object was to try to rid the depression from her. So they set up huge flourescent lights in her living room, and for 3 hours a day she sat in front of the lights. After a short while of this, there was a drastic change.

Pat Moore almost seemed like a completely new person. She had lots of energy, she started writing, reading, painting, and lots of other things she loved to do. She is very grateful of this, and we are too. Now we understand that the lack of light will make us depressed and it will make the world seem to drag on forever. Another way to get rid of depression would be also sleep.

The less sleep you get, you usually lose your depression. One thing is though that sleep is only a temporary changer. There are some drugs that you can take to get rid of depression, but they may take as long as several weeks before the effects are seen, but when it does kick in, the change is for good.

Our brains are closely linked to nature. The beat of the earth is almost like the beat of our brain, we do everything hand in hand. One of the best times the see changes taking place in our brain would be at night time when we are sleeping.

We sleep almost at ninety minute intervals. One of these intervals is realm, or the time when we dream. During this time, we can notice rapid eye movements, the brain is at its peak with activity. Most of this activity is experienced in the frontal lobe. Then the other interval is deep sleep, or the time when we get the most rest.

Michel Siffre is a French scientist who lived in a cave in Texas for several months.

He took part in an experiment to see that when you change your environment in order to see the way the brain would react. His quarters were simple, but he had some of the best equipment available to him. His behavior and data was monitored; such as, blood pressure, heart rate, brain waves. The whole cave was absolutely clear of any natural light. Which meant that he decided what time to get up, what time to sleep. He also decided when it was daytime, and when it was night time.

We have an internal alarm clock so to say that decides for us when we are supposed to do all those things, including eating and many others. Michel found out that our body doesn't really live off the normal Circadian Rhythms that it's supposed to, but that we have a twenty five hour clock that we should be living by.

This experiment has helped many business decide on shift work. About one forth of men and one sixth of women work shift jobs, but working a shifting job causes temporal chaos in our bodies. If, for example, we try to sleep during the day and work during the night, we completely rearrange our bodies and our body's internal clock.

It is so bad that our body doesn't exactly know what to anticipate and when. Rotating shifts also cause a number of other problems, such as: sleep disorders and eating disorders. So Michel was called in to Utah to a processing factory to create an alternation to the normal one week shift changes. He proposed that shifts be changed every 3 weeks in a clockwise rotation; so that if you worked the night shift one rotation, the next you'll work the morning, and so on. He also held classes on how to use your free time to the best way you can and he also taught the workers about their bodies.

At the end of the three weeks, there was a drastic and positive improvement. The workers' health got better, workers felt better about themselves in general, and also productivity rose. So we learned that you can not ignore the part of the brain that controls when we sleep and when we wake. The Hypothalamus controls all this, and we have to keep that in mind when we

are making work schedules. Another question we can ask ourselves is this: aggression and violence, where does it originate?

Does it also control rage? One experiment that has given us some answers was that preformed on a bull in the 1960's.

A typical fighting bull was taken and electrodes were placed in the frontal lobe next to the hypothalamus. It worked, the animal was completely cooled down when the electrodes were charged. Mark Larribus was a male that was convicted of hurting and almost killing his girlfriends 2 year old child. All he recollects for that day was that the child was crying, and he walked over to it and started beating it. He didn't even think about checking it, maybe wondering if it needed food, he went straight to beating. When he was taken in, he became depressed, even suicidal at times.

He had a diagnostic study taken on him to see what was wrong. It was also noted that he had been having more and more outbursts, and it was very hard to control them. When he had a CAT scan preformed on him, it was concluded that he had a tumor that was pressing on his hypothalamus. It was a cyst, it had filled with fluid and it was a very big threat on Mark.

When he had it removed, the positive changes had occurred, he was much calmer, he had very few outbursts anymore, and he was basically a changed man.

Before and during the urges of sex, many different things happen. First off, the hypothalamus sends a hormone to the Pituitary Gland, then that sends testosterone; and the testosterone in turn sends it back to the hypothalamus

and the cycle starts over. There may be other types of the brain also working. The hippocampus is a horn shaped part of the limbic system that is believed to be used in emotion, also the amygdala is a part of the brain that is found in the temporal lobe that also is believed to be involved in emotion. In the year 1978, Mitch Heller was involved in an automobile accident that has changed his life completely.

Mitch was a typical red blooded man, he loved to play various sports, and he led a healthy life. But he realized that about a month after his accident he didn't have the urge to have sexual intercourse, he couldn't perform as well in bed, his voice was getting noticeably higher, and he lost facial hair. He became horrified with all this as well as confused. One funny thing was that a month before the accident he and his wife had planned to have a baby, but now there was this setback.

He only suffered a bump to the head, but he had damaged his hypothalamus. With that damage done, his brain couldn't perform the necessary steps in order to secrete the hormone to the pituitary gland to have the urges for sex. So they tried to fix it. Dr. Crowley was called in, he had performed magnificent work on the 3 way system involving the hypothalamus.

The doctor designed for Mitch a sort of portable hypothalamus. It was a small box that can be carried around your waist that contained a syringe with the hormone that is normally secreted by the hypothalamus. Then an injection is made into the abdomen, and at regular two hour intervals the hormone is injected. At first, Mitch couldn't stand the thing.

He felt each injection as it went in and it was uncomfortable to carry around. But it did help. Almost right after the first injection, he had a change in his libido, and after about 5 days, he was completely used to the device. When he got home, he had the sudden urge to go and have sexual intercourse with his wife and he felt great altogether. The two main reasons for him having this done to him were these: one, he wanted to have children; and second he wanted to live like a normal male. He was happy to note that after having this happen to him, he and his wife have had a healthy baby girl, and it was all thanks to modern science.

So what have we learned, well, the human brain has changed and has been enriched throughout the years of our existence. We also have learned that we carry the baggage of animal behavior, and it affects the way we think, feel, act, and love. Everything that we feel in our bodies is produced by the brain. Our emotions, personality, love, and hate, they are all mediated by the brain. Since emotions do not have their own separate parts in our brain, it has been very difficult to pinpoint where emotions come from. There is only one emotion so far that we know of that we can locate where it originates from, and that's anxiety.

One of anxiety's chief byproduct is nervousness. Nervousness is the imbalance between the frontal cortex and the limbic system. The way that we found this emotion in our brain was completely accidental.

Phineas Gage was an intelligent, well balanced man.

He was a modest and good, hard worker. He was part of a team that laid out tracks for railroad cars. One day, as he had a fight with another worker over

his girlfriend, he got into a terrible accident. A steel rod had been driven through his cheek and up his skull. He suffered damage to the part of the brain that is between the limbic system and the frontal cortex.

So now, he is unable to have controlled emotions. You see, the brain is like a group of good railroad layers, everyone works together to get one thing accomplished. The limbic system passes information to the frontal cortex, and normally the two systems keep thought and emotions on an equilibrium. But after his accident, Phineas was unable to control any of his thoughts or emotions. His limbic system was free without any restrictions that the frontal cortex might have given. The reason why he might have felt very little pain during his accident was because normally, pain is sent up the central nervous system to the brain, and Substance P is then passed through the synapses of neurons if enough pain has passed through the brain.

There are endorphins that lessen pain in our bodies, they are released as soon as our brain senses any sort of pain. We can also sort of “block out” pain by thinking that something makes it better. For instance, we may think that drinking water eases pain, when in actuality it has no medical purposes what so ever.

There is also a drug called morphine that blocks out the Substance P from ever reacting in our brains. Edward Williams was Phineas’ doctor when he came to town that day.

After examination, Dr. Williams had stated that he had severely severed the frontal cortex from the limbic system. The wound was so bad that the doctor

was able to touch his two hands while they were inside of Phineas' skull. This completely changed his life.

After recovering, he faced many new changes altogether. His words were pathetic, he slurred when he spoke, he was wild and uncontrollable, he cried often and he also screamed intensely. Basically, he let all his feeling out at any given moment. What happened to him? Well, once the connection between the limbic system and the frontal cortex is gone, the limbic system then allows information and emotions to pass through the brain freely, and everything is basically uncensored by the frontal cortex. Beating all the odds he survived, but only physically.

He never recovered intellectually or emotionally. He lost almost all human contacts, but he had developed a certain bond with animals. It was said by his close friends that he was like “ an animals emotions in a mans body”. He died 12 years later, never fully recovering.

Chemical changes in our brain also change our behavior. Different reactions in our brain can be changed by our environment or by emotions, but most of the changes are unknown.

Stressful stimuli and anxiety change the balance of chemicals in our bodies. Stress is quite noticeable in our bodies. Under stress, our central nervous system speeds up, we have a higher heart beat, and our blood pressure rises. Stress isn't a physical event it is critically determined by the environment and by what an organism can or cannot do. We are triggered by the “ fight of flight” system. It is decided wether we will stay and take in the challenge, or if we will leave the situation.

Air traffic controllers live very high stressful lives and have high stressful jobs in general. Bizzoro, a French air traffic controller working in Quebec. Not only does he have to have the all normal jobs that air traffic controller do, he also has to perform in two languages, both English and French, and that only adds to the stress. It was said that the early cave man didn't produce as much as we produce now, so therefore they had less to worry about. We also drive ourselves too hard at work, we try to overcome the competition but in the process we are hurting ourselves.

In the wild, basically all we had to worry about was what to eat and to watch out not to be eaten, all the energy came from our flight of fight system. But no during this day and age, our limbic system messages are overruled by our frontal cortex. One experiment that was performed involved rats. There were two rats, and their tails were charged with an electrical impulse, and if the rat spun a wheel, the impulse would be sent at intervals every 60 seconds. But if the rat failed to spin the wheel, it would receive the impulse at associated time periods.

The rat that did spin the wheel showed that he had control, but the rat that didn't spin the wheel showed that he had no control. Also, the rat that did spin the wheel showed that he had predictability. So in order to survive in this world, we not only need good control, but also good predictability. The more we prolong the stress on our brains, the quicker the terminal ends basically die off.

The locus coeruleus, when active, releases a neurotransmitter called norepinephrine, and that in turn activates our brain and we start to think.

Another experiment was given to the rats, this time they were put into a cup filled with water and they had water wings put on them. This time the object was to see how much activity will be produced in a stressful activity. Bad reactions would be to constantly be trying to swim, trying to stay afloat, constantly moving. But the good reaction that can be produced was that the rat was trying to move as little as possible, spent most of its time just floating. The rat that was had the bad reactions showed sleep changes, feeding changes, and a lack of grooming.

So the same side effects were noted as in a clinically depressed person.

When the limbic system overwhelms the frontal cortex, the link between the two is lost, and we almost in a way fry everything in between. Gaba is a chemical that inhibits cells from firing impulses. When the radar went out in the flight operators screen, he became nervous and stressed out. But gaba lowered the firing of impulses, and his nervousness was kept to a minimum.

Valium is a drug that helps many stress patients recover. It is a member of the class of drugs that improves gaba production. It also controls emotions from being expressed.

Panic attacks are experienced when all the emotions in our brains are suddenly turned on and go out of control. An injection was given to a patient that has had panic attacks in the past.

This injection forces a stimulated attack on the person, and the physical as well as mental changes are recorded. First off, the patient feels light headed, then you feel weak, and the other symptoms follow. When a person

has a full blown panic attack, the limbic system fires a overload of stimuli on the frontal cortex, causing everything to go hay wire.

Anna Renaud is a panic attack victim.

Her attacks were getting so bad that she was forced to get medical attention at a local hospital. The first attack that she ever remembers having was about three to four years ago during an Easter dinner. She recalls she felt weak, her heart started pounding, she had a tension of muscles, and also she felt as though she had a type of lump in her esophagus that felt like she couldn't swallow. She received drug therapy, and as much as it helped, she still suffered from minor panic attacks.

Soon after she was off the drug therapy, she went into rehabilitation that taught her brain how to resist the attacks. This helped her greatly, but she still had the same stressful job and she was still surrounded by stressful situations. She was also suffering from exacezbated anxiety. This type of anxiety is felt by everyone at all the time, just some of us have it in a more profound level.

People that suffer from this consider everything they do in life to be extremely stressful, they try to avoid most things in life. Valium is most often prescribed for this anxiety, and it does a great job in curing it. Anna also developed a few phobia's, or fears of things. She was afraid to ride the metro or afraid to be in a large crowd. Her panic attacks have greatly shortened, now they last a minuscule one to two minutes.

Her first day off of any medications was a bit shaky. She has just learned new techniques to try to conquer the attacks, and she has also returned to work. She now has stayed drug free, and her chances are constantly improving because of the fact that she does vigorous exercises in order to get rid of unnecessary stress. Different types of things you may also do to get rid of stress are yoga, faith, and even prayer.

Our understanding of the changes that occur in our brain has improved immensely. All advances do have the possibility to be misused in a controlled way, but the positive outcomes outweigh the negative ones.

As for the air traffic controller, his wife had another child. This is another stressful situation that must be dealt with care. During labor, she was given a spinal tap so that she wouldn't feel any pain whatsoever, but there was a problem. She had too much stress, her blood pressure rose, she felt bad altogether, too many messages were getting sent from the limbic system to the frontal cortex. After a few minutes of this, equilibrium was restored, and her vital signs returned to normal.

There was a minor problem with the delivery, and the child had to be surgically removed, but it came out in perfect health. So the question remains "Do we have the knowledge to control all parts of life?" All we really have to remember is that behavior is a simple part of our brains' function, and we will have to find the rest out later. We are just now beginning to understand exactly how the brain works in respect to the way we memorize things. There are two basic approaches that we have developed to learn about the way memory works: 1) we view neurons

through microscopes and then try to determine the way they function; 2) we look at other human beings, the way they act, especially amnesiacs.

We are faced with one of the many questions about memory, and that is “Where are our memories started?” Karl Lashley is a scientist that in the 1920’s preformed experiments to decided where the memories we remember are stored in our brain. He removed different parts of the brain from different lab rats and then studied the rats to decide if the part he took out had any affect on there past memories.

He trained the rats to remember a certain type of maze, and after the rat could walk through the maze without any difficulty, he surgically removed part of that rats brain. After the rat had time to recover from the operation, he put that rat inside of the same maze and tried to see if the rat’s memory was at all altered by the operation.

Through his many experiments, he concluded that our memories were stored in the temporal lobe of the brain. Dr. Donald Hebb helped and also studied with Mr. Lashley. He stated that if more then one fifth of the frontal cortex is removed, that it then starts to have a negative effect on memory; but if less then one fifth of the cortex is removed, the no real loss of memory is experienced. He disagreed with Mr.

Lashley, however, because Lashley stated that memory can be localized into a certain part of the brain. Dr. Hebb stated the complete opposite, that memory cannot be localized in any real part of the brain. Dr.

Hebb also proposed the idea of cell organization. Wilder Peafield, who was also accompanied by Dr. Hebb, was fascinated on how the brain actually remembered what we do. He stated that memories were stored in the temporal lobe, and he concluded experiments to support this. He had a female patient in which he operated on her temporal lobe. Before any operation, he always did stimulating exercises on the part of the brain he was going to work on so that he could exactly know what he was going to work with.

Our memories are stored biologically in our brain, not physically. In just about every action we ever do, there are chemicals involved that either excite or inhibit our neurons to act or not to act accordingly to the stimuli. When we remember things, we usually first remember by sight, then by sound, and last by the pronunciation of the word. There are many cell assemblers in our body. Cell assemblers are basically many cells that are put together to preform a unified task, such as remembering.

When cell assembly is developed, you can perceive an event, and you can also be able to perceive that really aren't there; such as when someone hallucinates something. When a child is growing up and maturing, the first three years or so are extremely important. The important thing to realize that speaking isn't the most important thing, the more important thing is to hear words that are spoken to you.

Dr. Jean-Pierre Changeux participated in an experiment that tried to determine how a cell will grow when it is removed from an egg.

They put the cells in a slide with no sort of other interference what so ever. Some of them grew and became healthy, and the minority of them died. He then added some muscle cells, and since they are long muscle cells, the cells from the embryo started to become elongated as well. He discovered that movement causes links between nerve cells.

Another question that arises during the study of our memory is this: “ Do we ever forget old memories or do we just store them somewhere else so that we can make room for new memories?”

Well, first off, we never lose memories. We just sort of move them over to the side so that room can be made for the new memories, but not all old memories are moved over. There are some memories that stay with us throughout our life, such as smell, skin sensations, and our fears are preserved. We remember very little for our childhood, but what we learn from that period of time is very important to us.

We also try to repress some memories, the ones that we don't like, such as painful experiences. One theory is that when we are young, our brain still isn't completely developed and therefor we can't remember everything that is happening. Our brain develops memory with great precision. First we develop the memory for smell and smell, and the last to get developed would be the complex memory areas, the ones that have to remember complicated tasks.

Memories that involve emotions are usually the best kept.

Memories are first transferred from the hippocampus to the amegdella. If your hippocampus was to get damaged in any way, then you will have amnesia. Amnesia is a type of brain disorder that causes us the disability of remembering new memories. People that have amnesia are still able to remember past things that have happened to them, but things that happen to them at a daily basis, those are not remembered at all. But they can still remember some things, because the brain brakes down our memories to different regions of our brain.

Peter is one victim of amnesia. He was playing a basketball game that night, and a few hours later he states that he was unable to speak, he felt weak; but the unusual thing is that he remembers exactly what happened to him during the time of his attack. Peter was a very smart man, he was top part of his class and everyone looked up to him. After the attack, his old memories are still intact, but he is unable to memorize things in the present. He is also quite shy now, but before the attack he was very outgoing. The hippocampus is equally important in the learning procedure.

When a person learns something new, in their brains, they are destroying non-important synapses. But through the same process, there are new, useful synapses created. Sometimes, the deletion of the unimportant synapses will allow us to learn faster. So, as we can presume, learning anything will involve the stimulating of synapses. One common belief is that as a person ages, they lose brain cells.

That is true, and yet we get smarter and wiser as we get older. How is all this true? Well, as we age, we teach ourselves how to use the knowledge that we gain in better and more efficient ways.

Dr. Gary Lynch believes all learning should leave a biological trail in our brain. He states that every little synapse that acts up makes a lasting physical impression on our brains. On experiment he ran was that he took sections of rat brain.

Then he studied them under a microscope before and after supplying an electrical discharge. The discharge was just like the type of reaction that occurs when a message is sent across a synapse. Therefore, the changes would be seen alongside the synaptic quarantine. During the first ten months there was no concluded evidence that any sort of change had occurred; but during the eleventh month there was a change. There were visual changes alongside the synapse of each sample taken.

So because of this experiment, we can conclude that learning does cause a physical change our brain. There is one downside to this area of study, now we have to deal with the consequences of the misuse of the ability of control of synaptic growth.

Dr. Anders Bjorkland took older rats that have difficulty remembering, which is caused by the loss of hippocampo cells, and he injected them with new, healthy hippocampo cells. Before the injection, he took the rats and placed them in milky colored water.

There was only one very small stand in the water that allowed the rats to not be in the water, and the rats were exposed to that stand. The older rats couldn't remember where the stand was, and were therefore forced to swim around the tub aimlessly. After the injection, however, the rats remembered exactly where the stand was and they returned to it without any visible difficulties. Amnesia in humans is very selective, it attacks only a very small part of the memory system.

We are trying to find some way to remember what to do, but we can't. Probably the only way to know how to do something for these victims is through repetition. Take the case of Karl Lashley. When he was given a test in which he would have to solve the Tower of Hanoi, he wasn't able to do it the first time, even the second time. Only after a few times that he did it was he able to go through the puzzle with little difficulty. If we asked him how he did it, he would answer you quite simply that he doesn't know, it sort of comes to him second nature.

One way to remember things after you are a victim of amnesia is by trying to substitute different words or numbers by giving them corresponding pictures. Radical or bizarre memories actually quite often tend to work. Trevor Emmott was able to remember 36 random numbers using this type of system. A person would be able to give him a six digit number, and he could put two pictures to that number so that he could later on restate that number in order.

Dr. Barbra Wilson was working with a few patients that suffered from amnesia. One of them, Ken, was given several easy steps in a room. Ten

minutes later, he was asked to retrace those steps, and all he could remember was one of the several. He later states that he tries not to look stupid or dumb, even though he knows that people do think that of him.

He said that he is trying to think. He recalls past memories very well, D-Day and his own marriage; but his wife death, which happened a year ago, he cannot recollect. He thinks that seconds have pasted when in reality minutes have, or months passed when years have.

He is unable to carry out a normal conversation for the simple fact that he forgets what the conversation was about, he constantly asks the same questions over and over, and he forgets things that are said to him the day before. For him, life is very frustrating, and the sad thing is that no drugs or any type of therapy will help him.

So as you get older, you really don't forget what happened to you as you were younger, you just move them to part of your brain so that they won't interfere with the new memories. One reason for this is because it is impossible for our brain to hold every type of memory so that it is on a constant retrieval basis. One man, however, did have this capability. He was a Russian that had a photographic memory. He remembered every single little detail of what ever happens to him.

So because of that, his life is also extremely difficult. He is unable to talk to people because any word you would say to him, it would bring a flood of memories to him, and he would be overwhelmed.

The human body is related to many different types of animals. We share the same nerve structure with that of squids, our brains are like that of alligators, and our emotions are like that of a cat. We are the closest in similarities to a chimpanzee, in which 98% of our DNA is the same.

Even though through all these similarities we are the only species that can communicate through a language or we can plan things out correctly. The divided brain took about a hundred years to be evolved into what we use today. The brain is divided accordingly to right and left hemispheres, or “the two brains”. Each hemisphere controls the opposite side of the body, or they are asymmetrical; so that the left hemisphere controls the right side of body and the right hemisphere the left side of body respectively. We also are able to shape our environment to our liking. We can alter things that nature intended on happening.

Anna Cole is a sculpture. Because of her line of work, she extensively uses the cortex of her brain, or the message sender. The cortex is the wrinkled, outer layer of the brain, it contains a network of brain cells that are used in transferring messages. Our brains were designed for discovery. We love to search, to find out, to do things that we are forbidden to do.

Language functions are housed in both of the hemispheres equally. We also, under normal circumstances, have a emotional relationship with both sides. The corpus callosum carries impulses to and from each of the two hemispheres. If a person was to damage that link, we would completely alter the mutual relationship that the two hemispheres share. Sometimes it

is recommended to surgically remove the corpus callosum, that usually occurs to people who suffer frequent seizures.

Vieki is a patient who had her corpus callosum damaged by surgeons. Now she is unable to communicate with both of her hemispheres correctly. She has difficulty thinking something and then completing that task. She is subjected to a test; different bits of information was sent to each hemisphere. When she views something on the left side of a screen, the information is then passed to her right hemisphere.

That hemisphere can't express what she sees, but she can express what she sees on the left side by the use of her left hand, in other words she is able to draw what she sees. If she viewed a complicated object, such as a woman on a telephone, all she could do is generalize what she sees; in other words she saw a woman. So through all of this, it was concluded that she had damaged her left visual field, and her right hemisphere. Her left hemisphere, as well as ours, does most of the verbal awareness that we have.

All human brains have the biological making for language. When we experience changes, we then learn something new. The area of the brain concerning the left hemisphere is more dense altogether, it is better constructed then the right side.

Ta was a patient of Dr. Paul Broca. Ta's name was given to him simply all he could say was " ta", in other words, Ta couldn't speak.

The area of the brain that Dr. Broca said that Ta's deformity came from was around the frontal part of the left hemisphere. That area, now called Broca's

Area, is said to control the muscles of speech. Charles Landy had a good legal practice going.

Until one day he had a blood clot, which then caused a stroke. His ability to understand language as well as the ability to express himself basically vanished as the stroke passes. Most of his problems are mechanical, he is slow, hard to get going: all as stated by his doctor, Dr. Norman Geschwind. When given something to read, Charles stuttered, he slurred his speech, but in the end he would finish reading it. When Charles was given the statement: “ The leopard was killed by the lion”.

After that he was given the simple question, “ Which animal died?” Charles was unable to give the answer. Basically what happened was this: all his brain heard were the nouns and verbs of the sentence, or “ Leopard killed lion”. He has no comparison between what is heard and what is meant. In 1874, Carl Verica also contributed to the study of the brain by discovering his own area, or Verica’s area.

Verica’s area is said to control what we hear. The victim might pronounce all his/her words correctly and clearly, but all of these words make no sense. So the way that the brain processes new ideas is this: first, sound travels to Verica’s area. Then, we say what we heard, or Broca’s area is activated. Last on the list is the motor cortex.

The right hemisphere of the brain specializes in shapes and sizes. The left hemisphere mostly thinks pictures, not words. Because of this, the right hemisphere recognizes faces of people and different places. One patient that had suffered from a stroke states that she feels like she is living in a

weird and unknown place. She can't remember where she's been, or she can't remember the people she has talked to.

She gets angry at herself, she hits herself in the head to try to fix everything. She isn't impaired because of all of this. She is still quite able to give excellent descriptions of the people's faces she views, but she is unable to give a name to the face. She is most possibly suffering from Prosopagnosia, or the ability to recognize faces of people. The damage of a person's brain that has this damage was viewed through a PET Scan, and the areas of damage were clearly visible. In the past, we believed that face recognition was housed in the right hemisphere.

Now, however, we know that each hemisphere contributes something different to the recognition.

What controls brain organizations? New clues on how the brain develops are being discovered. One idea is that our culture and our surroundings contribute to our brain development. The island of Japan has been isolated by centuries, and their culture has flourished without any interference for decades. Usually children in Japan learn two scripts.

The first, called Kana, uses symbols as words, and therefore is concentrated on the left hemisphere. The other, called Kanji, concentrates on the use of our visual field, and therefore works on the right hemisphere. One symbol may have up to several meanings. Also, in Japan, when a child is crying, it is considered a sound of nature. The Japanese are very delicate to sounds of nature, and therefore they treat a sound like crying as a language.

All of that mostly concentrates on the left hemisphere. On the Western hemisphere, we treat crying as a noise, and therefore we put it on the right hemisphere of the brain.

In Australia, Aboriginal children perform worse than while Australian children perform when they use verbal memories. Dr.

Kearing was working with them, trying to understand why this is so. There is about a three year difference between the Aboriginal children and the white children. When the Aboriginal children performed a test, they were faced with the dilemma to remember where a few objects were supposed to go on a sheet of paper. The man made objects in theory should be easier to put back in place, and the stones used should be a difficulty.

But for the Aboriginal children, the truth was just the opposite. They remembered almost without any difficulties where the rocks went, and the man made objects gave them a harder time. Culture isn't the only difference in our brain development; the basis if we are male or female must also be taken into account. There are many different effects to take into effect as we study the differences between the sexes, such as: smell, taste, touch, and coordination. Hand preference, for instance, is developed hormonal in our brain.

Males take up 10% of the left handed population while females make up only 4%. Now being a left handed means two things: one, you are most usually better at the arts, but then again you have a greater chance to have learning disabilities. Why the baby child is still a fetus, the baby that received more testosterone will most likely become a male. There was a

woman that had two active testicles in her body. When she was younger, she received hormonal therapy to induce menstruation. Genetically, she started out as a male. She developed testicles, got testosterone pumped into her, but through a weird disorder, she began to develop the physical features of a female. When she was injected with estrogen, the female body hormone, her brain did not respond to it at all.

Dr. Guether Dorner studies stress and the changes it has on the womb inside of a pregnant lab rat. For two hours each day, the rats were confined and exposed to very powerful lights. They produced adrenaline, which in turn decreased the level of testosterone, thus giving the chance that the offspring was going to be female a better chance. Also, there was a study done in Germany that took 500 homosexuals and found out that any child that was born during the war had a two times greater chance of becoming a homosexual because of the stress put on the women at that time. When the homosexuals were then injected with estrogen, their brains were triggered by this. Dr. Marion Diamond took samples of rat brains, then froze them, then studied them. She concluded that females have thicker left hemispheres, and males have thicker right hemispheres. She also took the newborn rats from their mothers and injected them with visuospatial. Also, she took the testicles from the newborns and she found that those rats produced less testosterone. She also stated that rats that were in a healthy, well taken care of environment had larger cortexes than rats that were in a barren environment. The way that we treat our children also has a considerable effect on the way that they will grow up. It was concluded that we encourage boys to be more active, to explore their surroundings more.

When it comes to girls, however, we are more talkative to, we encourage inactivity, we tell them they are pretty. So is the way we grow up and end up from experience, or is it from our brains development. The answer, probably both.

Our brain has the qualities and capabilities that no other animal has. Because of that, we also suffer from diseases that no other animals have. About 1% of the whole human population suffers from Schizophrenia, or about 40 million people. Out of all the diseases that we have discovered in our human race, schizophrenia is almost certainly the darkest one of them all. About 30% of the patients that suffer from it have little or no response to any conventual therapy. Schizophrenia encompasses madness. It is a battle between thought and emotions; it is a global attack on basically everything that we consider human.

Gerry is a schizophrenic patient that is basically a textbook case of what the disease is. He shows every noted feature of a schizophrenic, he is thought-disordered, delusional, paranoid, and he has disturbances in his mood. He had a normal childhood, he later on graduated as a police officer. His mother now recalls that if they would have caught on then that he had schizophrenia, it would of been much better. He has a constant fear of the fact that someone wants to kill him. Gerry feels that most certainly an assassin type person is going to kill him. He stresses that the way he will die is that he will be electrocuted; the cause of his death would be because of the sins that he has committed in the past. These are not new feeling to him at all, he constantly feels this. He has a great fear of most people. He feels that he was raped a few times when he went to kindergarten, and also when

he was trying to raise his hand in class, a black child would stab him in the back of the head with a pencil. All of these statements are false, but because of the fact that he is delusional, he feels that all of these ideas are true and they did happen. When he was asked what he would like to be helped with, he stated that he would “ like to quit smoking, cleaned up, go home and back to the bakery, and go to school to become a doctor. He was faced with the decision to stay at the institution that he was in or to get out of there and to be forced by the state to go into a publicly funded type of institution. He kept on repeating that he will stay only if his mother will also stay with him, but she is only able to go to him once a month.

The reason why the doctors and his parents don't want to release him is because they are afraid he will hurt himself. He has voices in his head, usually male voices. The voices constantly accuse him of the past crimes that he has committed. At times, they tell him to do things, such as to stand up and leave the room. They also say things to him that frighten him or disturb him. His mother states “ there (schizophrenics) mind is like that of a motor, it's constantly racing. His mind is always doing some sort of thought, when he sleeps he even has nightmares because of it.

Abnormalities of thinking, feeling, and perception; these are all affected. The global impairment of our brains, of all of our complex functions has occurred. Very often, a person might go into psychosis, or the withdrawal from everyone and everything that is familiar and known. It can lasts for years, and there is no cure or no real way to help the victims. In order to understand the patients disease, we can break it down into thirds. The first third, the victim might have a schizophrenic attack once or twice, and they

carry on life as if nothing ever happened. The middle third receives the attacks on an off and on basis, and they do benefit from therapy. The last and most serious third are called chronic schizophrenics. They never recover from the disease and no amount of therapy will ever help them. Since their disease will last years and years, brain damage occurs because of the chemicals that cause the disease. The disorder attacks the highest functions of our brain, those are the exact same functions that separate us from animals.

To bear a child that is so different from the others, that is considered such an outcast, that alone is a tremendous difficulty that the parents must live with. Schizophrenia has been considered a disease that is caused by the way that the child is nurtured. For many years, this has been the common belief and thus was accepted. Recently, however, scientists have begun to start to study and to question that old hypothesis. Not too long ago the disease was thought of being psychoanalysis, or caused by trauma inflicted by the family, by the early childhood experiences of the patient. Although that was also believed for quite some time, it was proven to be incorrect. Schizophrenia is not caused during or because of one's childhood. In the last twenty-five or thirty years, we have determined that our genetics have a very strong factor in the development of schizophrenia. Although it is true that if someone in your family has the disease, you will also develop it. Although there are also many cases in which relatives of one individual have the disease, and yet that individual never inherits it or maybe they just don't develop it.

Mrs. Owens had a son that has recently developed schizophrenia. A major part of her family has the disease, and yet she never expected to be personally attacked by it. She says you try to find a person that looks, acts, speaks, and even walks like your son, and then you try to substitute this new son with your old one. One of the first signs of the disease that her son showed was that he drew a type of universe on the back of a mirror. It was quite neatly and nicely drawn, there were many words that accompanied the drawing that had little if any meaning in the human language at all. One day, when the son was alone in the house, his voices in his head told him to amputate one of his own toes. His mother believes that he was in a different place, space, or even universe when he committed this. Stress from the outside environment has a major effect on how the victim will act. If the area in which you live in is stressful, noisy, and such; then the patient will have a much harder time to recover if he or she ever recovers. But if they live in a suburban area, where it is relatively quiet and it has a nice natural setting, then it will be much easier for the victim to recover.

Schizophrenia is mostly considered a disorder that is a grouping of different disorders. We must approach it with different tools. The hippocampal cells relate to the ways that we feel, the way we feel with the area around us. Also, the arrangement of the nerve cells has a lot to deal with the disorder. In a normal human beings brain, the nerve cells are arranged in rows, everything seems that it is in order. However, when you take a sample of a schizophrenics brain, the nerve cells are completely spread out. They seem to be in total chaos, no order is present what so ever.

When Gerry goes on a visit home, he constantly asks the driver and tells the driver that the police are going to kill him. He constantly blows things out of proportion, he states that he can lift two thousand pounds, when in reality he would never be able to lift that physically. When he gets home, he constantly argues and yells at his father. He states that his father wants to kill him, and he even asks the father why is he going to kill him. He later also admits that he is afraid of his father, he says that he is a good father, and even though of his age, he is till able to kick his ass. He also states that a certain doctor told him that he is so sane that he is insane. He constantly is repeating that he has no fun at all, never any fun, and so on. All his father has to say to this is that it is hard to raise this type of child, especially since it is there only child. Ever since he was a young boy, he was given everything that was possible for him. The parents were constantly trying to make life easier for him that they had it themselves.

Heather is also a schizophrenic. She states that she has kryptonite inside of her body, and she has to drink lots of coffee and pop in order to keep it down. She also says that she has a monopoly in the coffee industry. She asks the reporter frequently if he eats raw eggs. She believes that boys are the ones that get pregnant and not girls. She has been put in and out of private hospitals to house her, but now that all the money that was ever saved up has been spent, her parents are faced with the task to take her into a public facility. The difference between the two is tremendous. The public institutions are just like jails, you don't receive the nurturing that you so badly need. She is being almost forced by her parents to go back to the

institutions so that she can be allowed to visit her parents again, but she hates and despises that place.

For a doctor, it is very hard to describe the sadness, the anger, and the pain that you would feel if you had to be faced with the task of heading a ward in a hospital that houses schizophrenics, for the simple reason that there is no cures and there aren't really any ways to treat the patients. One method that is used to ease down a tense and nervous patient is that they are forced into a bath tub full of cool water, then a canvas is put over it so that they will actually stay there. Drugs were brought from France for the victims. Now we are able to see the patients as people with diseases, not as freaks. It is almost like a person that is going to have an operation. Even eight days before the operation the patient is feeling stressful, anxiety, and nervous. But with a certain kind of drug, the patients become mentally relaxed, and thus there must be some sort of physiological link. Any type of drug that had the possibility of being useful was tested.

A number of compounds were given, and their restlessness left them, they began to sleep. This is a great advancement because some of these people haven't slept for two, three, four, even five months on end. Augustine is another schizophrenic. Today he is feeling ok. He has many thoughts going through his head, but none of them make any sense. He states that he would like to be either: war leader, doctor, or priest. Physically, he looks like a mess; his hair is long and uncombed and he has a beard. He was about to change medications, and he was looking forward to that. After the medication change, he looks completely different. He got a hair cut, and his beard is gone. His goals are also more solid, he plans to get a job now, and

his thoughts have cleared up. All the drugs that are being used block nerve cells from exchanging information. All of the drugs ease the chemical in the brain known as dopamine.

Circumstances in our environment can change a person. Emotions can change the biochemistry of our brains, and this can answer at least a few questions that will be brought up in the future. Even though the drugs have great benefits, they aren't perfect. The drugs contain terrible side effects, such as gross movement disorders, impotence, and even apathy. Also, drugs don't cure schizophrenia, they merely control its symptoms. For now, we can use what we have, but we are in a constant mission in order to find the cure for all of this madness that a few of us face on a daily basis.

The study of brain science is explored by the study of many different small bits and pieces of information that we are able to put together from what we have learned so far. Since brain science is a very hard to study area of our human bodies, we still are very uncertain about most parts of that system. When we study our vision, we aren't talking about what we see, but what we perceive. For now, tools that we have developed such as brain tissue transplants or new drugs have just been tools on the mission to try to find an explanation to all of this. The attribute that we consider when we talk about brain science is awareness. Brain science is basically the ability to know who you are at any given time and where you are. When we go to sleep, that is the one time that any animal is most vulnerable. Why then would we risk so much just to sleep? Well, the benefits outweigh the negative effects so much that we can consciously choose to go to sleep without any problems.

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