

The central nervous system psychology essay



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Neurons are electrical cells that carry and receive information and are the building blocks of our central nervous system. Neurons have two parts to them, the cell body and the process. When many neurons are grouped together they form a neural system which in turn will carry out a function such as motor control. How neurons pass on information with each other is via something called the synapse (Toates, 2007).

Neurons are mainly located in the brain but can be found throughout the body especially the spinal cord; the brain and spinal cord together form the central nervous system and neurons outside the central nervous system form the peripheral nervous system. To explain how the neurons communicate between the peripheral nerves, spinal cord and brain an example would be if a foot was put in a hot bath the neurons located on the foot's skin (peripheral nerves) would serve as a detector which would set off an electrochemical reaction, this change in electrical activity is called an action potential. These neurons are biologically designed to quickly pass an electrical signal towards the spinal cord, through a communication network with other neurons, and to the leg muscle which causes the reflex to take the foot out of the hot water. The group of neurons that do this are called the motor neurons; meanwhile within the spinal cord neurons are communicating with each other up towards the brain to alert that this should be painful hence the scolding feeling (Toates, 2007).

In the brain a neuron is connected to between 10,000 and 20,000 others, communicating through a gap called the synapse. An action potential travels along the presynaptic neuron (the sending neuron) until it reaches the access terminal (the end of the neuron) which in turn causes a chemical

release called neurotransmitter, these chemicals travel across the synapse to the receptors on the postsynaptic neuron (the receiving neuron). The neurotransmitter on the presynaptic neuron must be a match for the postsynaptic neuron receptor or inhibition could occur. Inhibition is the loss of the action potential from one neuron to the other and would lead to reuptake which is when the presynaptic neuron takes back the neurotransmitter that it had released (The Open University c2007).

The biological psychology of behaviour is deterministic and states that neurons in the brain are the map of our mental life. This includes that hormones have an impact on the nervous system and affect behaviour and mood; it also states that there is a two way relationship between neuron activity and behaviour. To look at the effect that the neurons in the brain have on behaviour this essay will now look at the three main neurotransmitters, and put an argument against a pure biological psychology standpoint.

The three main neurotransmitters are serotonin, acetylcholine, and dopamine. Serotonin affects mood; a lack can lead to depression which is believed to be due to a chemical imbalance of the serotonin in the brain, and also to obsessive-compulsive disorder, anxiety and other anxiety disorders, panic, and can cause angry or violent outbursts. This is because the neurons which are serotonergic (the neurons that release the neurotransmitter serotonin) would need the postsynaptic neuron to have receptors for serotonin or reuptake from the presynaptic neuron could occur (Toates, 2007).

According to Gov. uk (2012) depression is often treated by antidepressants called selective serotonin reuptake inhibitors (SSRIs) such as Citalopram (Celexa), Escitalopram (Lexapro), Fluoxetine (Prozac, Prozac Weekly, Sarafem), Paroxetine (Paxil, Paxil CR, Pexeva) and Sertraline (Zoloft) they are selective as they mainly affect serotonin neurotransmitters. Toates (2007) suggested that SSRIs stop the reuptake of serotonin which contributes to the postsynaptic neuron receiving the serotonin thus helping rebalance the uptake and increasing general well-being.

Acetylcholine is thought to be responsible for memory and muscle movement; people who suffer from illnesses like dementia and Alzheimer's could have a deficiency in acetylcholine or the postsynaptic neurons efficacy to uptake. Dopamine is partly responsible for movement, attention and learning; people who suffer from Parkinson's disease are thought to have depleted levels of dopamine which cause the symptoms of the disease such as physical movement (motor symptoms) mood, thinking and behaviour (neuropsychiatric symptoms) and the autonomic nervous system (which controls breathing and urination). Too much dopamine is common in schizophrenics and this is treated by a group of drugs called phenothiazine antipsychotic which blocks the excess dopamine (Benson, 2007).

This highlights behaviours from a biological standpoint but does not take into account other external factors to, for example for depression. It could be argued that behaviour is somewhat inherited, meaning that if two parents that suffered from depression there may be a higher chance the child would. So you could look at it from a nature versus nurture view point, although it is now more common (through research) to see that if you were genetically

disposed to depression but your environment or life situations did not trigger the depression then you cannot say this is nature (because it has not happened), and vice versa; a more agreeable argument is that it is nature via nurture (Jarrett, 2011).

The biopsychosocial model (BPS) takes into account all aspects of the possible depression as the biology could quite possibly be the effect and not the cause. For an extreme example if a person was a victim of domestic violence, lived in a bedsit in a undesirable part of town after having their home repossessed and was depressed then medication would not stop their partner hitting them or get them rehomed; cognitive behavioural therapy (CBT) which often people get referred to alongside antidepressants will not help either (although other talking therapies could help them address issues and explore choices that they have). So only by looking at the biological, psychological and the social situation can you really fully identify where the behaviour is stemming from and work from there. (Toates, 2010)

To conclude, biological psychology, especially how neurons communicate with each other within the nervous system, has contributed greatly to our understanding of human behaviour but the deterministic standpoint does not take into account several other factors which could affect behaviour and without viewing the person holistically within their social setting, then the way neurons function may have little impact on the presenting issue of a person's behaviour.