

The concept of homeostasis psychology essay



**ASSIGN
BUSTER**

Walter Bradford Cannon an American physiologist was the first person to come up with the concept of homeostasis. He also did research on the emergency function of the sympathetic nervous system and sympathin which certain neurons release and is an epinephrine like substance. Stress is a condition that can affect the both the biological system and the psychological, in the biological system what's important is homeostasis which is the bodies attempt to maintain it's internal environment regardless of the outside environment. An example of this would be body temperature or blood pressure, a lot of the biochemical systems try to maintain a state of equilibrium between themselves. External or internal stimuli are continually try to break up this homeostasis, such as a life threatening situation or even starvation. But then even trying to restore the equilibrium of the body using natural resources and using up energy in itself can cause stress. One of the problems is that body responses and environment are both seen as stress, one way around this is to refer to body response as the stress response and the environment as the stressor. In the stress response there are long and short term consequences for the body and brain, disease can be seen as a stressor as it can cause a negative outcome from the environment another outcome is to view any attack on homeostasis as a stressor. Homeostasis is a central concept when talking about stress as a biochemical process. Trying to maintain equilibrium a balanced state which is a very hard achievable condition and is actually more of an ideal, External or internal stimuli are constantly disrupting homeostasis and it is this factor that can lead to stress. A persons attempt to try and achieve homeostasis consuming natural resources and energy can also be seen as stress. It is very hard to accurately define stress as it is a vey subjective condition and every bodies experiences

stress differently. Yet it still plays a very prominent part in our every day lives.

In biological terms stress is explained in a stimulus-response measure similar to a psychobiological sensory system. The central nervous system plays a pivotal role in the body's stress related processes. Pinpointing exactly which parts of the brain are involved in the stress response processes can be difficult. By operating in a network like fashion carrying information may help explain how stress and the negative effects are rooted in the dysfunction of the neural communication system. Situated below the thalamus and above the brainstem is the hypothalamus which links together the endocrine system and the body's nervous system. There are numerous bidirectional neural outputs and inputs to and from different brain regions, through these systems the hypothalamus can regulate the hormones that it secretes into the blood stream. Which can have long lasting and far reaching effects on physiological systems like metabolism. The hypothalamus also secretes a corticotrophin releasing hormone which in turn triggers the pituitary gland and starts the stress response pathway. The amygdala which is part of the limbic system and has projections into and from the hippocampus and hypothalamus and locus coeruleus and seems to play a part in emotion processing. Also has been implicated when fear or anxiety is experienced in modifying the stress response process. The hippocampus also part of the limbic system and thought to play a part in the memory formation which can generate a stress response through prior memories and is also susceptible to chronic stress damage. In the Pons of the brainstem is where the locus coeruleus is located, this is where the neurotransmitter norepinephrine is

synthesised. Norepinephrine has an important part to play in the sympathetic nervous system and it's response to a fight or flight stress situation. Also located in the Pons of the brainstem is the raphe nucleus where serotonin is synthesised which is involved in mood regulation. Especially when stress is related to anxiety or depression. Then from the brain the stress response neural impulses are transferred down the spinal cord. This then activates the peripheral nervous system, and with the neuroendocrine blood hormone signals engage the body's major muscles and organs in a fight or flight response. The endocrine system contains the adrenal gland a major organ which is situated on top of the kidneys. The adrenal gland is responsible for the production of cortisol a major stress hormone which it releases into the blood stream. Cortisol is a steroid hormone and it's main function is to distribute glucose to the main muscles and the brain in a fight or flight situation. Cortisol can also suppress the immune system.

Then there is the General Adaptive Syndrome response theory, this theory is in three stages. The first is the alarm stage, which is actually divided into two phases, the first phase being the shock phase. In this phase a person's body may experience such conditions as hypoglycemia, an increase in hormone levels, enlargement of adrenal cortex, epinephrine releases associated with high levels of physiological arousal and negative impact. During this phase a person's resistance temporarily drops below their normal resistance range and some circulatory shock may be experienced. Then comes the antishock phase in this phase the stressor has been identified and the body enters a state of shock. This is when the locus coeruleus and the sympathetic nervous

system kicks in. Adrenaline is produced in preparation for the fight or flight response. This leads to increased blood pressure and more glucose enters the blood, More cortisol is produced by the H P A axis(Hypothalamus, Anterior Pituitary, Adrenal cortex) in the neuroendocrine system. Resistance is the second stage and glucocorticoids are secreted activating the systemic response, these have a catabolic , lipolytic and antianabolic effect such as increased fat, glucose and protein and amino acids concentrations in the blood. In high doses cortisol starts to act as a aldosterone which can increase blood pressure. There is a heightened sensitivity to stress. If the stressor persists the body has to try and cope with it, as the body cannot cope with the stressor indefinitely as resources are being depleted, the body enters the next stage either exhaustion or recovery. In recovery the body's compensation mechanisms overcome the stressor effect. The high fat, glucose and amino acids blood levels help with the anabolic reactions and the regeneration of cells and the restoration of homeostasis. In exhaustion the body's resources are depleted and normal functions cannot be maintained. The first autonomic nervous systems symptoms such as raised heart rate sweating etc may reappear. If the exhaustion phase is prolonged there may be long term damage such as ischemia, which can affect any area of body tissue and the brain. Causing dementia ischemic heart disease as ischemia prevents blood from reaching tissues of the body and the brain. Cholesterol also plays an important part in producing ischemia. The body's immune system also becomes depleted and decompensation sets can result as the body functions become impaired. This can result in illness such as trouble with the digestive system, diabetes and peptic ulcers and

cardiovascular problems depression along with other mental problems and even death.

This stereotypical response pattern has influenced a lot of stress researchers, weaknesses soon became apparent. Firstly by Selye's concept that stress is a reaction to a number of different events. This had the danger of combining all of the stress concepts as an explanation for all conditions such as threat anxiety conflict or emotional arousal. Because of this stress was losing its scientific value (Engel, 1985). Another criticism was that the theories core assumption was that there was no actual causation of GAS. (Mason, 1971, 1975) seemed to show that the stressor Selye observed as effective were actually strange novel and unfamiliar to the animal and carried an emotional meaning. And that the animals state could be described as lack of control uncertainty and helplessness. When the uncertainty was removed there was no GAS was observed (Mason, 1975). this then led to a more profound argument that instead of physiological stress, cognitive mediation is almost always the cause of stress in humans (Arnold, 1960; Jan, 1958; Lazarus 1966, 1974). Selye also seemed to fail to explain the cognitive transformation from objective toxic events to being distressed which is an subjective experience. Also Selye didn't take into account how people cope with stress. Both of these concepts are central to the Lazarus group psychological stress theories. According to the Lazarus theory there are two central concepts , Appraisal this is an individuals evaluation of what is happening to them and coping their thoughts and actions and in how they manage specific demands Lazarus, 1993). Since first presented as a comprehensive theory (Lazarus, 1966) the Lazarus stress theory has been

revised several times (Lazarus, 1991: Lazarus and Folkman, 1984: Lazarus and Launier 1978). In (Lazarus, 1991) stress is seen more as a conceptual concept, not as a specific pattern of behaviour, physiological or subjective reactions. Instead stress is more of a transaction or a relationship between the environment and the individual.