Effects of stress

Psychology

Effects of Stress Stress results from an individual’s inability to cope with stressors, which can either be physical or physiological. It can be beneficial or adversely affect an individual. Through the fight-or-flight response triggered by elevated levels of cortisol hormone, which is released in heightened stressful situations, an individual is able to safeguard themselves from life threatening situations. However, when the individual experiences prolonged stress, the heightened cortisol levels adversely affect metabolic, immune and ion transportation functioning. Impaired physiological functioning in turn affects an individual’s emotion and cognition. It is apparent that gender plays a pivotal role in the perception of stress; whereby females are more prone to experiencing stress compared to men. However, their resilience levels are higher, as females overtly express their emotions. Stress is unavoidable; therefore, it is important for individuals to adopt adequate coping mechanisms such as adopting behavioral coping strategies designed to mitigate the adverse effects of stress.

Stress results from an organism’s inability to cope with changes in its environment (stressors). Stress triggers cognitive, emotional and physiological changes in the organism. At optimum functioning, all systems in the body function without disruptions, as a state of homeostasis is maintained. However, stressors encountered on a daily basis threaten the body’s state of equilibrium, which results in stress. Stress can either result in positive or negative effects depending on how one deals with it. The ability to cope with stressors functions to build resilience, which is crucial in dealing with preceding stressors. Explored in this essay are the effects of stress and examples of behavioral strategies that are likely to help one cope with stressors.

Presently, the main stressor in my life is struggling to balance my academic and part-time work schedule. Both are integral to my maintaining the scholarship awarded to me by the school; therefore, I cannot afford to neglect one.

The physiological changes occurring in the brain because of stress includes the release of Arginine- vasopressin (AVP) and Corticotropin-releasing hormone (CRH) by the neurons in the hypothalamus. These peptide hormones activate the hypothalamic-pituitary-adrenal axis (HPA), which comprises of the feedback system between the adrenal glands, pituitary and hypothalamus. CRH, which is a peptide hormone, then stimulates the anterior pituitary gland to discharge corticotropin. After travelling through the bloodstream towards the adrenal cortex, corticotropin ups cortisol production. Cortisol is the primary stress hormone with the main function of restoring homeostasis after an organism’s exposure to stress. When released in high amounts, cortisol impairs memory by disrupting the hippocampus’s functioning, which in turn causes atrophy. In addition, high cortisol levels disrupt metabolism, ion transportation and an organism’s immune response. On the other hand, AVP adversely affects the kidneys functioning by increasing their reuptake of water (Randall, 2011).

The hippocampus, amygdala and the prefrontal cortex are the main brain structures equipped to process stress. Through the process of hormone reception, the corticosteroid receptors in these structures process the intensity of stressors (physiological and physical). There are two types of corticosteroids; mineralocorticoid receptors (MR) and glucocorticoid receptors (GR). MR account for majority of corticosteroid receptors and have a high affinity for cortisol whereas, GR has a low affinity for cortisol and are

only activated when stress is at its highest. The Blood Brain Barrier (BBB) blocks the transfer of pathogens and chemicals such as hormones from the bloodstream into the brain; a function that is dramatically impaired by stress. Therefore, the released corticosteroids find their way to the brain whereby they first bind to the MR and later to the GR. The activation of the GR results in the overstimulation of the neurons in the amygdala, hippocampus, and prefrontal cortex, a process that triggers the fight-or-flight response enabling an individual to respond to situations. At this point, stress plays a pivotal role in safeguarding an individual. However, when stress becomes chronic, it results in adverse effects. The neurons become hyperactive releasing calcium through channels located in their cell membranes. The elevated calcium levels cause over firing of neuron signals. The brain perceives this as malfunctioning; therefore, it triggers cells to shut down.

Stress also adversely affects emotion and cognition. The amygdala, located deep within the brain’s medial temporal lobes, plays a pivotal role in the regulation of emotions. Roozendaal et al. (2009) posit that the amygdala modulates stress response mechanisms, especially when stress triggers feelings of anxiety and fear. Stress increases impulsivity and reactivity in an individual, which might predispose them to behaviors that appear maladaptive. In addition, mood fluctuations are concomitant with stress. Stressed individuals are highly irritable, as their tolerance threshold is low. Memory is an integral element of cognition. Chronic stress affects memory by impairing the hippocampus’ functioning. Cortisol, which is released during stress adversely affects the metabolic system. This in turn leads to the accumulation of toxins and overstimulation of neurons in the hippocampus. As a result, the hippocampus is unable to perform its primary task of storing

memory. A stressed individual, therefore, faces difficulty remembering new information; however, they are able to recall previously stored information. Conversely, a stressed individual's performance of overlearned tasks (frequently repeated tasks) is heightened by stress. However, stress impairs higher cognitive functioning such as problem solving; for example, performing complex activities becomes difficult. Stress also causes a decline in long term potentiation (LPT) and neuroplasticity. The formation of new neural connections by the brain is pivotal in maintaining homeostasis. Therefore, when it senses the over firing of neuron signals due to elevated levels of calcium (released by neurons that have been overstimulated by corticosteroids due to chronic stress), it shuts down.

Prolonged stress affects an individual's general health. As mentioned, high cortisol levels adversely affect the immune system and ion transportation in the body (Randall, 2011). In children, stress impairs the pituitary gland's functioning whereby, it hinders the production of growth hormones. As a result, a stressed child develops at a slower rate compared to his age mates. Conversely, in adults, chronic stress triggers coronary diseases such as high blood pressure, heart attacks, which might prove fatal. In addition, cortisol hormone affects metabolic functioning; for example, it affects glucose levels in the body predisposing individuals to diabetes.

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Behavioral coping mechanisms help to build resilience an individual's resilience to stress. Muscle tension heightens stress levels; therefore, it is

important to engage in progressive muscle relaxation techniques, which entail engaging in activities that help to minimize muscle tension. Dietary intake also affects stress levels; therefore, it is important to avoid consumption of foods and beverages that increase cortisol production in the body; for example, caffeinated drinks and alcohol. In addition, sleep deprivation also heightens stress levels; therefore, it is important to adopt proper sleeping patterns (Pinel, 2010).

Encouraging people to adopt such behavioral coping strategies requires one to be mindful of ethical considerations. For example, one should only recommend muscle relaxation techniques that will not pose any harm to the individual. In addition, one should not restrict an individual’s dietary intake, as they should only make recommendations to the individual (Pinel, 2010).

References

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