Introducing neuroendocrinology to bridge health sciences and social sciences for positive social cohesion outcomes

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Abstract

The history of the term, social cohesion, involves the research fields of social science, political science, and health science. Social science is the study of human society and social relationships. Political science is the analysis of political behavior and the study of politics at the state and national levels of government. Health science is the study of the human body itself and the human body's response to its environment, also known as human science and includes the study of psychology. Public Health focuses on communities rather than individuals. Community is researched for data on health behaviors, physical environment, social economics, clinical care. Health behaviors includes data on tobacco, diet, exercise, alcohol, drug, and sexual activity. Physical environment data includes air and water quality, housing, and transportation. Social economics includes data on education, employment, income, family and social support, and community safety. Clinical care is data on access to and quality of healthcare. The Healthy People initiative of the US Department of Health and Human Services (https://www.healthypeople.gov/), views the practice of public health to involve partnerships within community, health and social services, industry and business, academia, and the media.

Keywords: cognitive function, estradiol, neurology, neuroendocrine, neuroplasticity

Introduction

During chronic high periods of stress, the Corticotropin Releasing Factor (CRF) from the hypothalamus stimulates increased release of glucocorticoids. The CRF levels in the hypothalamic periventricular nucleus decrease while levels of CRF increase in the amygdala producing negative emotional states and cravings for conditioned memories associated with stimulus use [1,2]. A stimulus can be any of the various forms of physical or behavioral addiction. Any stimulus used to an extreme for persistent phasic periods of time can result in addiction to that stimulus [3]. Neuroscience has been able to identify key focal areas of the brain involved in rewarding neurocircuitry of dopamine in the nucleus acumens of the brain. The location of dopamine action along with the rate of dopamine increase determines whether a drug will produce a rewarding effect with the dopamine receptors in the brain. D1 and D2 receptors in the prefrontal cortex are affected by both the drugs affinity to the receptors and rate at which the drug flows to the receptors D1 and D2. D2 receptors have a 10-100-fold greater affinity for dopamine than D1 receptors and are activated at lower flow or concentration rates [3]. Universal agreement is rare in health and social sciences, but one universal agreement is that there are six basic, instinctual emotions that arise from the human survival response: fear, anger, disgust, sadness, surprise, and happiness [1]. The human survival response initiation, the six instinctual emotions, an extraordinary reward or very unexpected adverse event; dopamine neurons in the Ventral Tegmental Area (VTA) to the cortex fire quickly in a phasic pattern resulting in an abrupt but transient increase in Dopamine 1 (D1) receptors necessary for dopamine's full rewarding affects. Psychostimulants mimic this phasic dopamine firing and activate both D1 and D2 receptors. D1 receptors stimulate reward via striatum and cortex and conditioning and memory via amygdala, medial orbitofrontal cortex, and hippocampus allowing for the stimulus with a reward or punishment automatic association [3].

At first the drug itself is the stimulus to initiate

dopamine release, but when the drug is associated with other conditioning like people, places, or things in the brain's memory; the condition memories associated with the drug now become the stimulus to the dopamine phasic firing leading to stimulus cravings and compulsive use to the brains conditioned memories associated with the stimulus or drug. This leads to decreased Dopamine 2 (D2) receptors. D2 receptors Orbitofrontal Cortex (OFC), anterior cingulate gyrus, and dorsolateral prefrontal cortex areas of the brain involved in emotion regulation and decision-making. Structural impairments or chemical imbalances in the Orbitofrontal Cortex (OFC) and the anterior cingulate gyri are correlated with compulsive and impulsive behaviors [3].

Neuroplasticity is the process the nervous system uses to repair axons, neurons, receptors, dendrites, synapses, and nervous system pathways throughout the nervous systems from amino acids, proteins, essential vitamins and minerals and other necessary elements. Neuroplasticity is built with learning or experiencing new knowledge and activity in a new environment because the sensory information can build new psych-endocrine-neuro-immunity pathways to interfere with the craving and addiction pathways building memories associated with the six basics instinctual emotions fear, sadness, disgust, anger, surprise, and happiness that will not be related to the stimulus of craving and addiction [4]. Equine and canine therapies have been shown to be success full of PTSD survivors.

Discussion

Psychological science has researched emotions as the core of human experiences. Health sciences describe awareness as the ability of the human survival response to take in sight, smell, sound, touch, and taste from our environment as sensory information to be analyzed by the amygdala [1].

The amygdala is part of the limbic system in the hypothalamus that determines if the sensory information is dangerous or harmful to the self or others in the same environment [4]. The social sciences describe the Higher Order Theory (HOT) that states emotions are a cognitive process involving cortical or conscious thinking that involves memory, sensory environment information, and each of the six universal emotions of fear, anger, sound, touch, taste, and disgust are less intense as a cognitive process. The HOT theory suggests that the affect emotions of each universal emotion are a subcortical or unconscious autonomic process that humans feel not think. The affect process of universal emotions states that emotions feel more intense to the self and bring along ambivalence, the ability to feel both a positive and negative for the same emotion in any circumstance [1].

Neuroscience research suggests that the six universal emotions trigger the amygdala, the limbic system and then the autonomic nervous system to initiate survival of necessary organs. The kidneys use renin, angiotensin, erythropoietin, iron, and antidiuretic hormone to maintain fluid and temperature balance in the blood vessels, heart, respiratory system, and lymph system. The pancreas uses glucagon and insulin to regulate glucose as the main source of energy for fight or flight as well as growth and development. The pineal gland uses melatonin and serotonin for regulation of sleep and cognition as well as alertness and awareness. The thyroid and parathyroid regulate all organ systems required for homeostasis of bodily functions at rest and during activity [4]. The hypothalamic-hypophyseal portal circulation system, splenic immunity and circulatory pathways, inflammatory neural and humoral pathways, reproductive organs vasculogenic and angiogenesis, neurotransmitters & neuroplasticity for cognitive emotions and affect emotion responses to sensory environmental input of our five senses from the environment in everyday living, traveling, new physical and interactive experiences, or meeting new people [4].

Estrogen and testosterone especially have an affinity for serotonin and dopamine, both essential neurotransmitters for neuroplasticity of cognitive and affective emotional regulation and dysregulation [3]. Understanding the self, the human body's reaction to its environment is a vital skill every human should learn, which would benefit any group, neighborhood, town, city, state, or country in the top aspects of social cohesion.

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