Neurobiological Approach

Neural correlates of consciousness

PhilPapers, 2025. Koch, Christof (2004). The quest for consciousness: a neurobiological approach. Englewood, US-CO: Roberts & Company Publishers. ISBN 978-0-9747077-0-9

The neural correlates of consciousness (NCC) are the minimal set of neuronal events and mechanisms sufficient for the occurrence of the mental states to which they are related. Neuroscientists use empirical approaches to discover neural correlates of subjective phenomena; that is, neural changes which necessarily and regularly correlate with a specific experience.

Mind–body problem

Neuronal correlates of consciousness". The Quest for Consciousness: A Neurobiological Approach. Englewood, Colorado: Roberts & Company Publishers. p. 16. ISBN 978-0974707709

The mind–body problem is a philosophical problem concerning the relationship between thought and consciousness in the human mind and body. It addresses the nature of consciousness, mental states, and their relation to the physical brain and nervous system. The problem centers on understanding how immaterial thoughts and feelings can interact with the material world, or whether they are ultimately physical phenomena.

This problem has been a central issue in philosophy of mind since the 17th century, particularly following René Descartes' formulation of dualism, which proposes that mind and body are fundamentally distinct substances. Other major philosophical positions include monism, which encompasses physicalism (everything is ultimately physical) and idealism (everything is ultimately mental). More recent approaches include functionalism, property dualism, and various non-reductive theories.

The mind-body problem raises fundamental questions about causation between mental and physical events, the nature of consciousness, personal identity, and free will. It remains significant in both philosophy and science, influencing fields such as cognitive science, neuroscience, psychology, and artificial intelligence.

In general, the existence of these mind–body connections seems unproblematic. Issues arise, however, when attempting to interpret these relations from a metaphysical or scientific perspective. Such reflections raise a number of questions, including:

Are the mind and body two distinct entities, or a single entity?

If the mind and body are two distinct entities, do the two of them causally interact?

Is it possible for these two distinct entities to causally interact?

What is the nature of this interaction?

Can this interaction ever be an object of empirical study?

If the mind and body are a single entity, then are mental events explicable in terms of physical events, or vice versa?

Is the relation between mental and physical events something that arises de novo at a certain point in development?

These and other questions that discuss the relation between mind and body are questions that all fall under the banner of the 'mind–body problem'.

Memento (film)

13, 2017. Koch, Christof (2004). The Quest for Consciousness: A Neurobiological Approach. Roberts and Company Publishers. p. 196. ISBN 0-9747077-0-8. Sternberg

Memento is a 2000 American psychological thriller film written and directed by Christopher Nolan, based on the short story "Memento Mori" by his brother Jonathan Nolan, which was later published in 2001. The film stars Guy Pearce, Carrie-Anne Moss, and Joe Pantoliano. It follows Leonard Shelby (Pearce), a man who suffers from anterograde amnesia—resulting in short-term memory loss and the inability to form new memories—who uses an elaborate system of photographs, handwritten notes, and tattoos in an attempt to uncover the perpetrator who killed his wife and caused him to sustain the condition.

The film's non-linear narrative is presented as two different sequences of scenes interspersed during the film: a series in black-and-white that is shown chronologically, and a series of color sequences shown in reverse order (simulating for the audience the mental state of the protagonist). The two sequences meet at the end of the film, producing one complete and cohesive narrative.

Memento premiered at the Venice Film Festival on September 5, 2000, and was theatrically released in the United States on March 16, 2001. It was acclaimed by critics, who praised its nonlinear structure and themes of memory, perception, grief, and self-deception. It was also a commercial success, earning $40 million over its $9 million budget and gained a cult following. Memento received many accolades, including the Waldo Salt Screenwriting Award at the Sundance Film Festival, and Academy Award nominations for Best Original Screenplay and Best Film Editing. In 2017, the United States Library of Congress deemed the film "culturally, historically, or aesthetically significant" and selected it for preservation in the National Film Registry.

The Quest for Consciousness

The Quest for Consciousness: A Neurobiological Approach is a 2004 book on consciousness written by Christof Koch. Searle, John R. (13 January 2005). "Consciousness:

The Quest for Consciousness: A Neurobiological Approach is a 2004 book on consciousness written by Christof Koch.

Catatonic depression

medicalnewstoday.com. 2018-06-20. Retrieved 2024-03-26. P, Ellul (2015). "Neurobiological Approach of Catatonia and Treatment Perspectives". Frontiers in Psychiatry

Catatonic depression is characterized as a spectrum of mood disorders and is distinguished by the co-occurrence of catatonia and major depressive disorder (MDD). Catatonic symptoms involve a variety of motor abnormalities and behavioral disturbances, such as stupor, immobility, mutism, negativism, posturing, rigidity, and repetitive or purposeless movements. Individuals suffering from catatonic depression frequently demonstrate a significant decline in their capacity to engage in voluntary behaviors and communicate effectively. These symptoms can significantly impair daily functioning and pose challenges in their personal and professional lives.

The exact cause of catatonic depression is not fully understood. However, it is believed to arise from a complex interplay of genetic, biochemical, and environmental factors. Some research suggests that disturbances in neurotransmitters like dopamine and gamma-aminobutyric acid (GABA) may contribute to the development of catatonic symptoms. Furthermore, stressful life events, trauma, and certain medical

disorders can raise the risk of developing this condition. Diagnosing catatonic depression requires a comprehensive evaluation by a qualified mental health professional. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has specific criteria for diagnosing catatonic symptoms associated with depression.

Catatonic depression is often treated using a multimodal approach. Antidepressants, mood stabilizers, and antipsychotics may be prescribed to manage depression symptoms and underlying neurotransmitter imbalances. Electroconvulsive therapy (ECT) has also shown effectiveness in treating catatonic depression, particularly in cases where immediate intervention is required if other therapies have been unsuccessful. Individuals can benefit from supportive psychotherapy, cognitive-behavioral therapy (CBT), and psychosocial therapies to cope with symptoms and create management strategies for their illness. Catatonic depression is a debilitating and chronic condition that requires early intervention for optimal treatment. Individuals suffering from catatonic depression can benefit from appropriate treatment and support, resulting in symptom reduction and an improved overall quality of life. Seeking expert help and support is critical to ensuring the patient's accurate diagnosis and treatment.

Christof Koch

Press (1999), ISBN 0-19-518199-9 The Quest for Consciousness: A Neurobiological Approach, Roberts and Co., (2004), ISBN 0-9747077-0-8 Consciousness: Confessions

Christof Koch (KOKH; born November 13, 1956) is an American cognitive scientist, neurophysiologist and computational neuroscientist best known for his work on the neural basis of consciousness. He was the president and chief scientist of the Allen Institute for Brain Science in Seattle. He remains at the Institute as a Meritorious Investigator. He is also the Chief Scientist of the Tiny Blue Dot Foundation in Santa Monica, that funds research meant to alleviate suffering, anxiety and other forms of distress in all people.

From 1986 until 2013, he was a professor at the California Institute of Technology.

Artificial consciousness

ISBN 978-981-120-504-0 Koch, Christof (2004), The Quest for Consciousness: A Neurobiological Approach, Pasadena, CA: Roberts & Company Publishers, ISBN 978-0-9747077-0-9

Artificial consciousness, also known as machine consciousness, synthetic consciousness, or digital consciousness, is the consciousness hypothesized to be possible in artificial intelligence. It is also the corresponding field of study, which draws insights from philosophy of mind, philosophy of artificial intelligence, cognitive science and neuroscience.

The same terminology can be used with the term "sentience" instead of "consciousness" when specifically designating phenomenal consciousness (the ability to feel qualia). Since sentience involves the ability to experience ethically positive or negative (i.e., valenced) mental states, it may justify welfare concerns and legal protection, as with animals.

Some scholars believe that consciousness is generated by the interoperation of various parts of the brain; these mechanisms are labeled the neural correlates of consciousness or NCC. Some further believe that constructing a system (e.g., a computer system) that can emulate this NCC interoperation would result in a system that is conscious.

Neurobiological effects of physical exercise

The neurobiological effects of physical exercise involve possible interrelated effects on brain structure, brain function, and cognition. Research in

The neurobiological effects of physical exercise involve possible interrelated effects on brain structure, brain function, and cognition. Research in humans has demonstrated that consistent aerobic exercise (e.g., 30 minutes every day) may induce improvements in certain cognitive functions, neuroplasticity and behavioral plasticity; some of these long-term effects may include increased neuron growth, increased neurological activity (e.g., c-Fos and BDNF signaling), improved stress coping, enhanced cognitive control of behavior, improved declarative, spatial, and working memory, and structural and functional improvements in brain structures and pathways associated with cognitive control and memory. The effects of exercise on cognition may affect academic performance in children and college students, improve adult productivity, preserve cognitive function in old age, prevent or treat certain neurological disorders, and improve overall quality of life.

In healthy adults, aerobic exercise has been shown to induce transient effects on cognition after a single exercise session and persistent effects on cognition following consistent exercise over the course of several months. People who regularly perform an aerobic exercise (e.g., running, jogging, brisk walking, swimming, and cycling) have greater scores on neuropsychological function and performance tests that measure certain cognitive functions, such as attentional control, inhibitory control, cognitive flexibility, working memory updating and capacity, declarative memory, spatial memory, and information processing speed.

Aerobic exercise has both short and long term effects on mood and emotional states by promoting positive affect, inhibiting negative affect, and decreasing the biological response to acute psychological stress. Aerobic exercise may affect both self-esteem and overall well-being (including sleep patterns) with consistent, long term participation. Regular aerobic exercise may improve symptoms associated with central nervous system disorders and may be used as adjunct therapy for these disorders. There is some evidence of exercise treatment efficacy for major depressive disorder and attention deficit hyperactivity disorder. The American Academy of Neurology's clinical practice guideline for mild cognitive impairment indicates that clinicians should recommend regular exercise (two times per week) to individuals who have been diagnosed with these conditions.

Some preclinical evidence and emerging clinical evidence supports the use of exercise as an adjunct therapy for the treatment and prevention of drug addictions.

Reviews of clinical evidence also support the use of exercise as an adjunct therapy for certain neurodegenerative disorders, particularly Alzheimer's disease and Parkinson's disease. Regular exercise may be associated with a lower risk of developing neurodegenerative disorders.

Stress in early childhood

serious health effects. When stress builds up in early childhood, neurobiological factors are affected. In turn, levels of the stress hormone cortisol

Early childhood is a critical period in a child's life that includes ages from birth to five years old. Psychological stress is an inevitable part of life. Human beings can experience stress from an early age. Although stress is a factor for the average human being, it can be a positive or negative molding aspect in a young child's life.

A certain amount of stress is normal and necessary for survival. A few stressors can be manageable for young children; stress can be beneficial by helping children develop skills needed to adapt to a new set of circumstances and deal with dangerous and intimidating situations. Some experts have theorized that there is a point where prolonged or excessive stress becomes harmful and can lead to serious health effects. When stress builds up in early childhood, neurobiological factors are affected. In turn, levels of the stress hormone cortisol exceed normal ranges. This theory however is based on animal studies and cross-sectional studies in humans, and the proposed impacts on brain centers have not been found in a landmark twin study and studies where neurobiological factors were measured in humans prior to stress or trauma exposure.

Researchers have proposed three distinct types of responses to stress in young children: positive, tolerable, and toxic. These labels are based on theorized differences in lasting physiological changes occurring as a result of the intensity and duration of the stress response.

Stress is caused by internal or external influences that disrupt an individual's normal state of well-being. These influences are capable of affecting health by causing emotional distress and leading to a variety of physiological changes. Internal stressors include physiological conditions such as hunger, pain, illness or fatigue. Other internal sources of stress consist of shyness in a child, emotions, gender, age and intellectual capacity. Childhood trauma has lifelong impact.

Exposure to adverse childhood experiences can include separation from family, home violence, racial/ethnic disparities, income disparities, neighborhood violence, mental illness or substance use disorder of caregiver, physical/sexual abuse, neglect, divorce, a new home or school, illness and hospitalization, death of a loved one, poverty, natural disasters, and adults' negative discipline techniques (e.g. spanking). Additional external stressors include prenatal drug exposure, such as maternal methamphetamine use, other maternal and paternal substance abuse, maternal depression, posttraumatic stress and psychosis.

Models of consciousness

263–275. Koch, Christof (2004). The quest for consciousness: a neurobiological approach. Englewood, US-CO: Roberts & Company Publishers. ISBN 0-9747077-0-8

Models of consciousness are used to illustrate and aid in understanding and explaining distinctive aspects of consciousness. Sometimes the models are labeled theories of consciousness. Anil Seth defines such models as those that relate brain phenomena such as fast irregular electrical activity and widespread brain activation to properties of consciousness such as qualia. Seth allows for different types of models including mathematical, logical, verbal and conceptual models.