

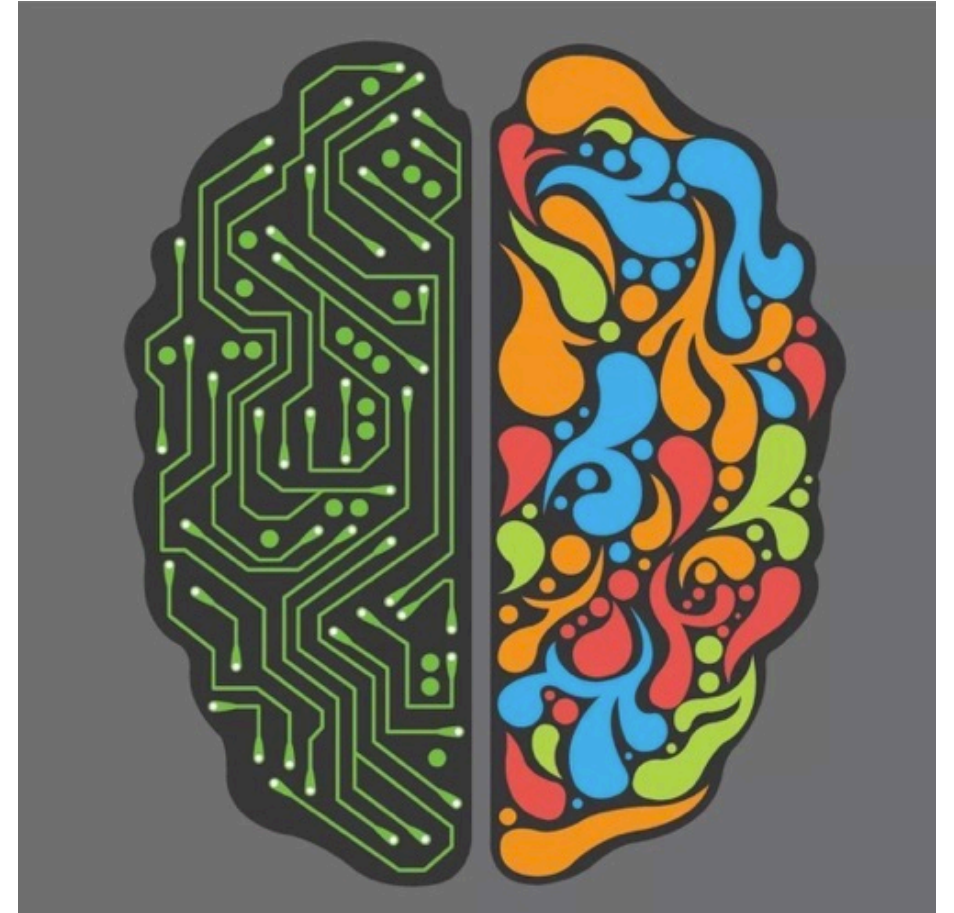
# Lecture 9

# Kandel

GFN1000 In Dialogue with Nature

# Content

- The Body-Mind Problem
  - Monism vs. Dualism
- The Reductionist Approach
  - Memory (Eric Kandel)
  - Mental Illnesses
- Non-Reductionist Approaches
  - History and Social Theory
  - Psychoanalysis
- Debates
  - Unity of Consciousness and Subjectivity
  - Free Will



# The Mind-Body Problem

## Monism

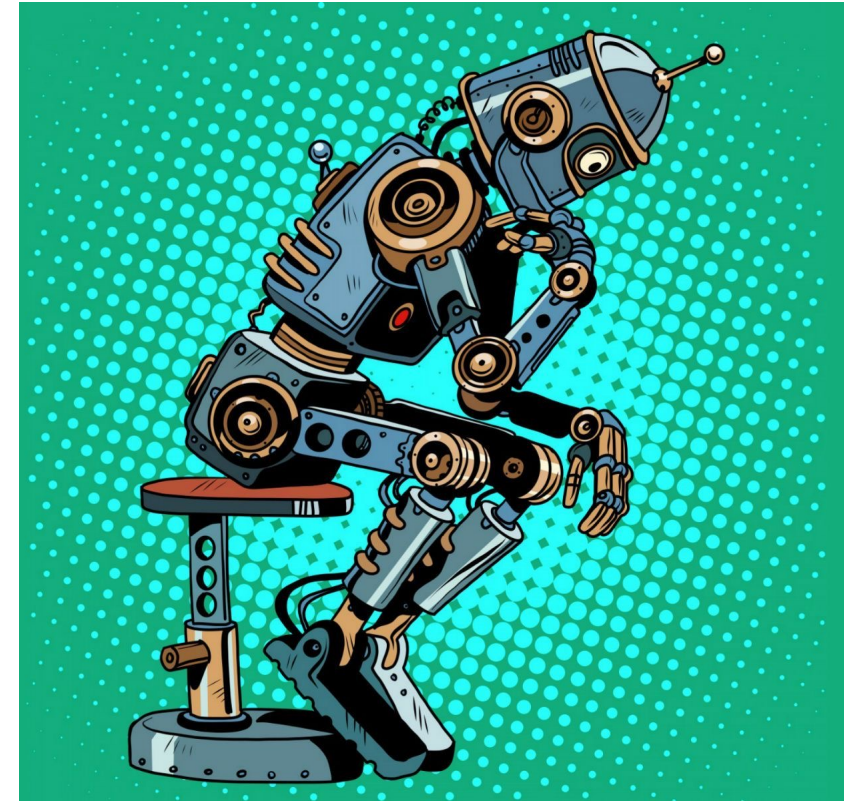
- Mind and body cannot be decoupled.
- Materialistic and idealistic views
- Materialist monism has become the dominant idea since the 20th century.
- Mental events can be explained entirely in terms of physical ones, usually events in the brain.

## Dualism

- Mind and body are two separate and fundamentally distinct substances
- From Plato to Descartes
- Minds are immaterial and exist independently of the body.
- Consciousness and Intentionality cannot be explained solely by science.

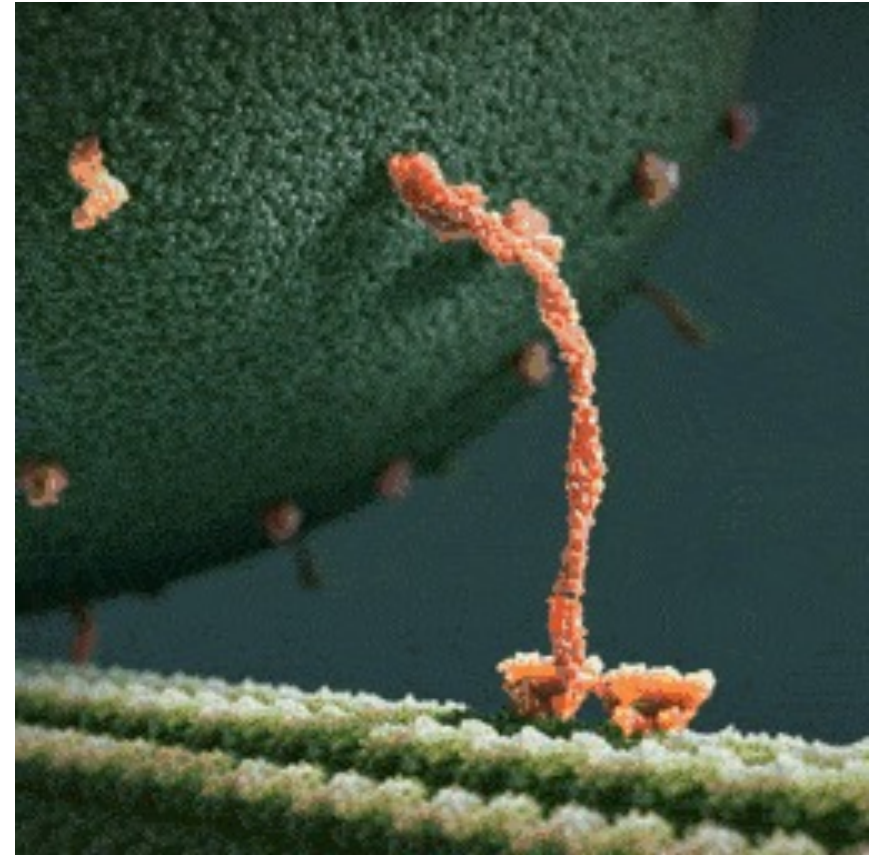
# Dualism in the History of Philosophy

- Plato's *Phaedo*: immortality of the soul
  - The soul's imprisonment in the body
- Aristotle: the union of body and soul
- Modern version: Descartes' *Meditation*
  - Mechanistic explanation
  - *Cogito, ergo sum.*
- How do bodies and minds interact?
  - Direct Intervention of God
  - Pre-established harmony (Leibniz)



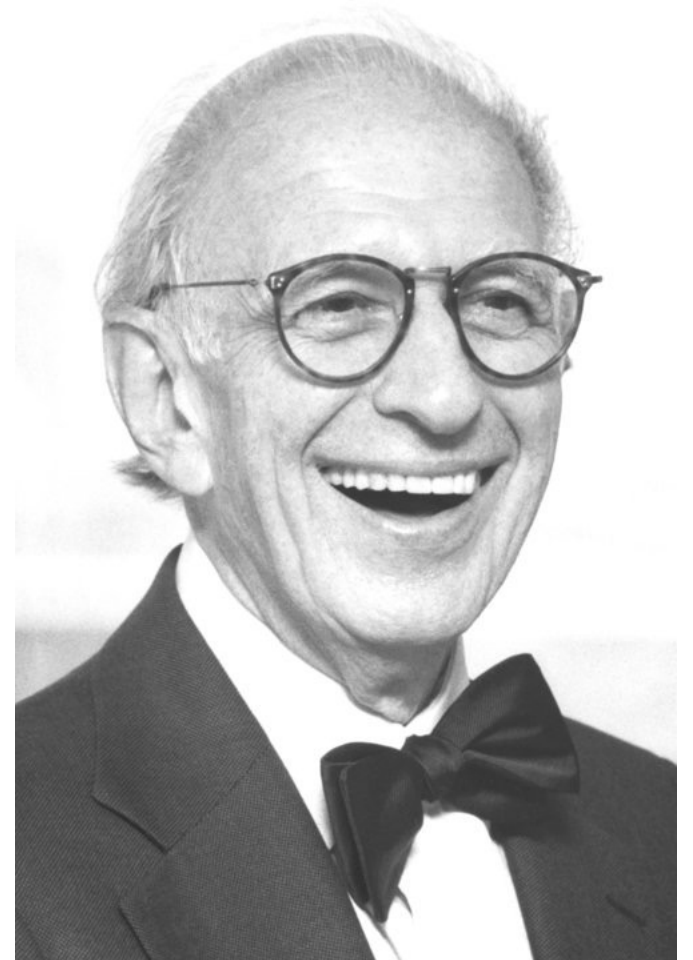
# The Reductionistic Approach

- Reductionism: investigate a complex system (e.g. biological entities) by studying lower-level activities and properties (e.g. physical-chemical entities like atoms and molecules)
- E.g., Kandel's research - a reductionistic approach to understand the mechanism of memory at the molecular level
- Critics: reduction or elimination?



# Eric Kandel (1929 - )

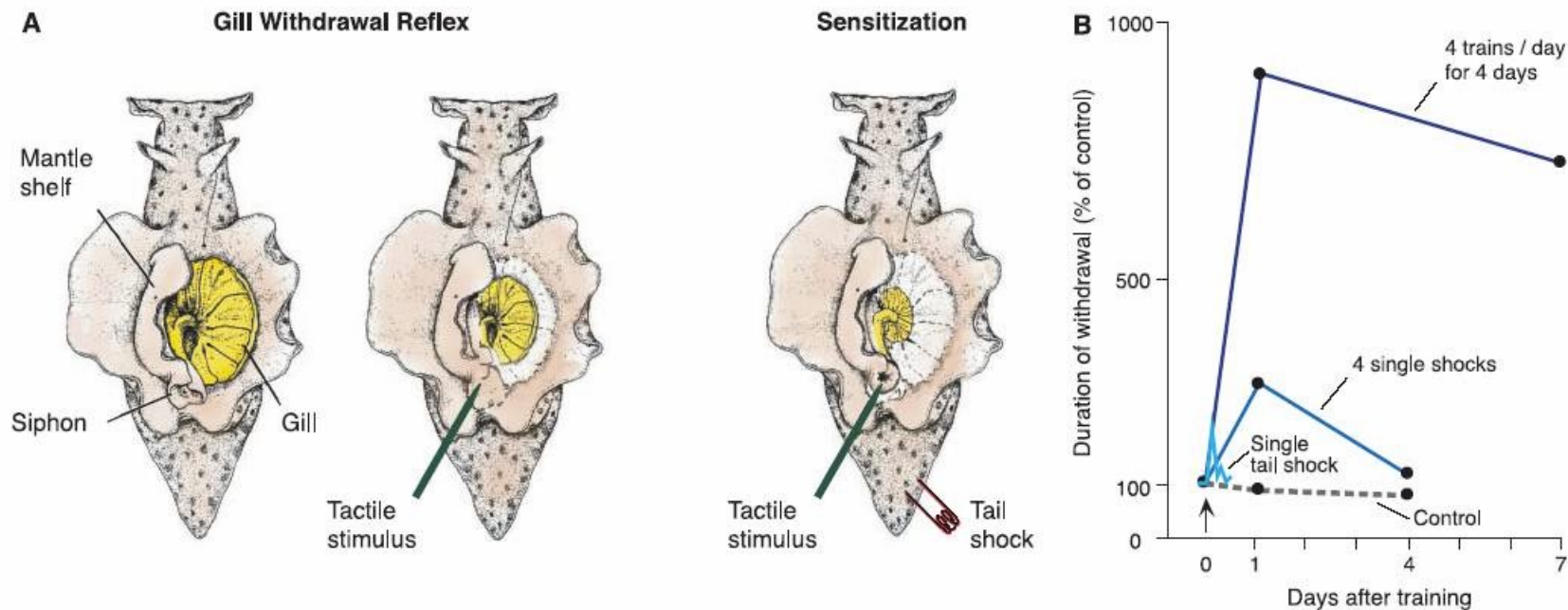
- Born in 1929 in Vienna, Austria; fled to the U.S. in 1939, one year after Hitler came to power
- Majored in modern European history and literature at Harvard University
- Fascinated by psychoanalysis; attended the medical school at New York University
- Won the 2000 Nobel Prize in Physiology for his contribution to the physiological basis of memory storage in neurons





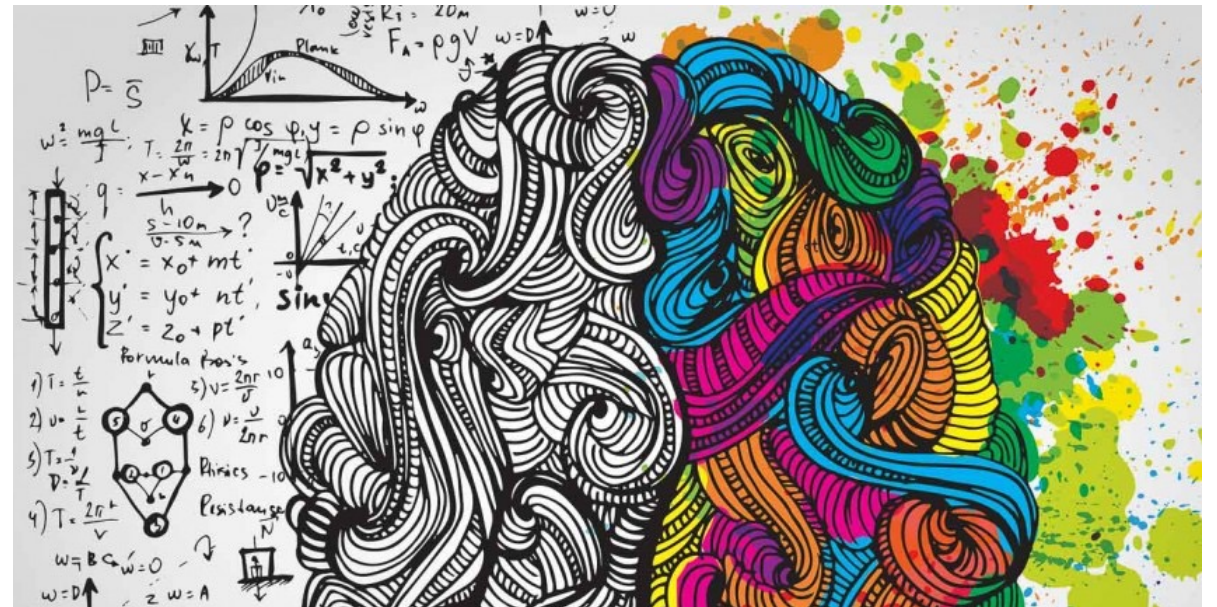
# One Cell at A Time

- The Gill-Withdrawal Reflex in Aplysia
- Chemical signals change the structure of the connections between cells, known as synapses, where the signals are sent and received.
- Kandel proved the existence of the Freudian unconscious mind.



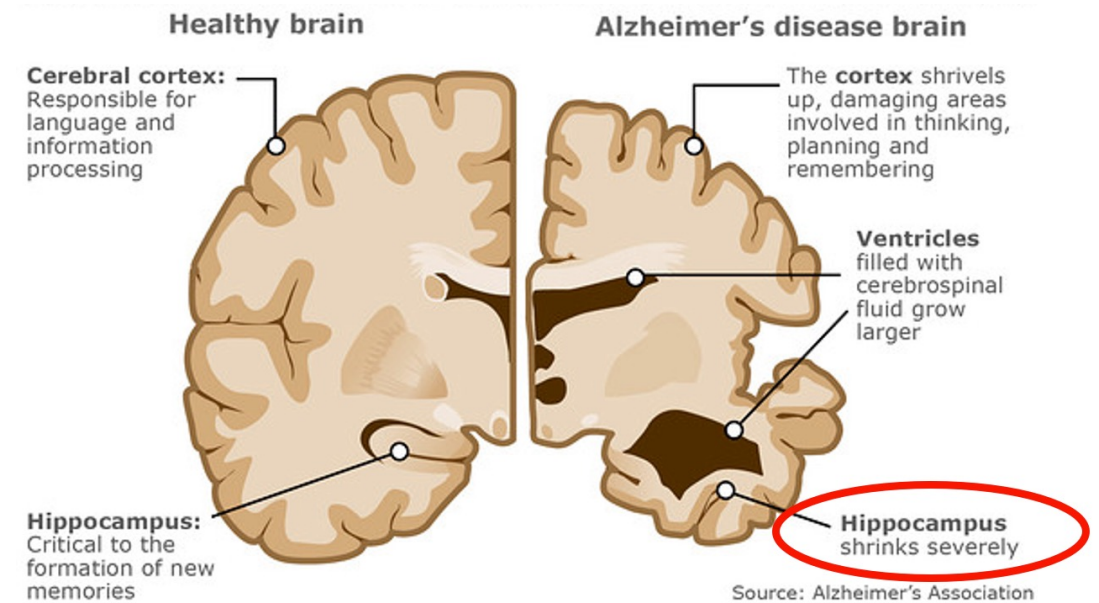
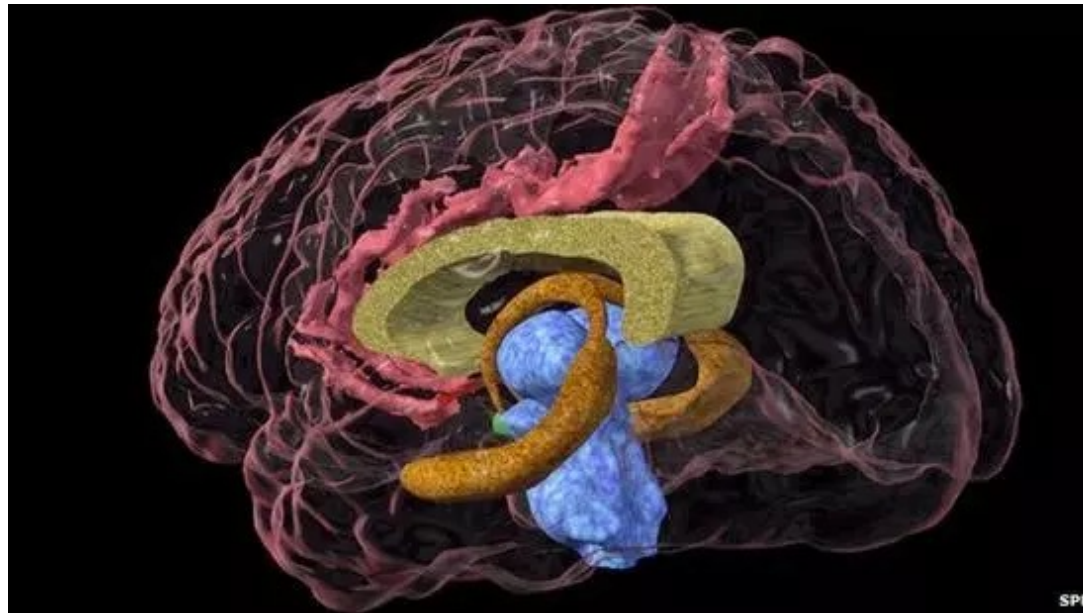
# Human Mind

- Mind properties involve consciousness (including perceptual and emotional experience) and intentionality (including beliefs, desires, etc.)
- A topic in philosophy, religion, psychology, cognitive science, genetics, behavior science, neuroscience, linguistics, and computer science.



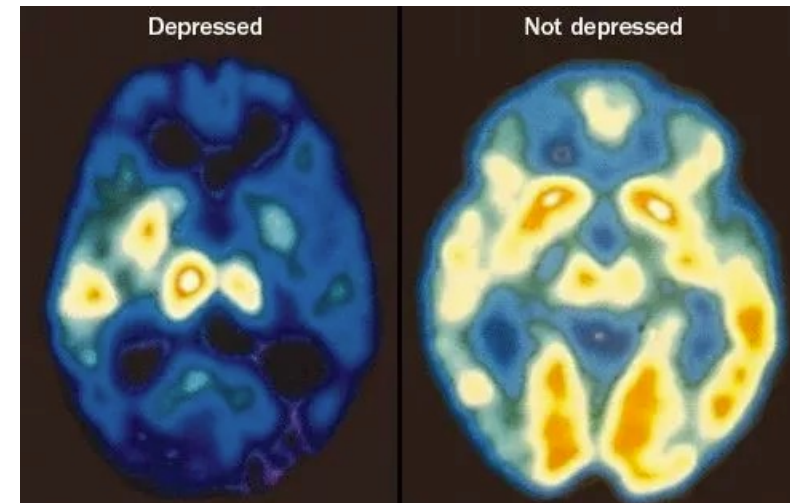
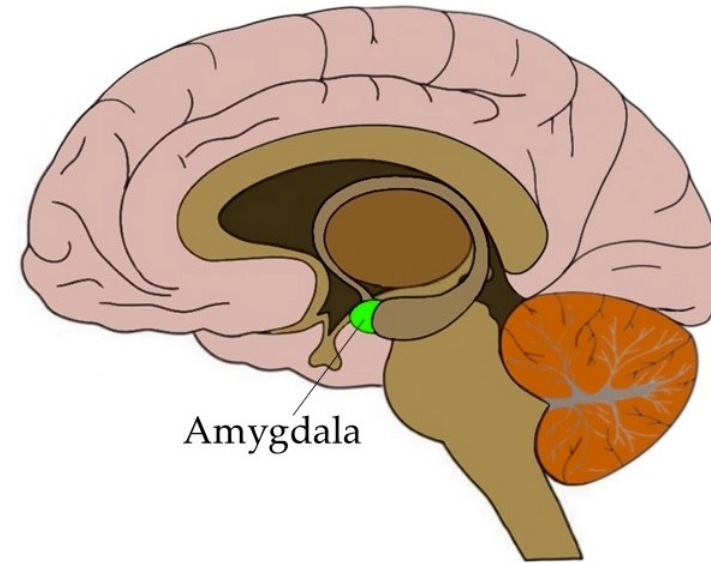


# Hippocampus and Alzheimer's Disease (AD)



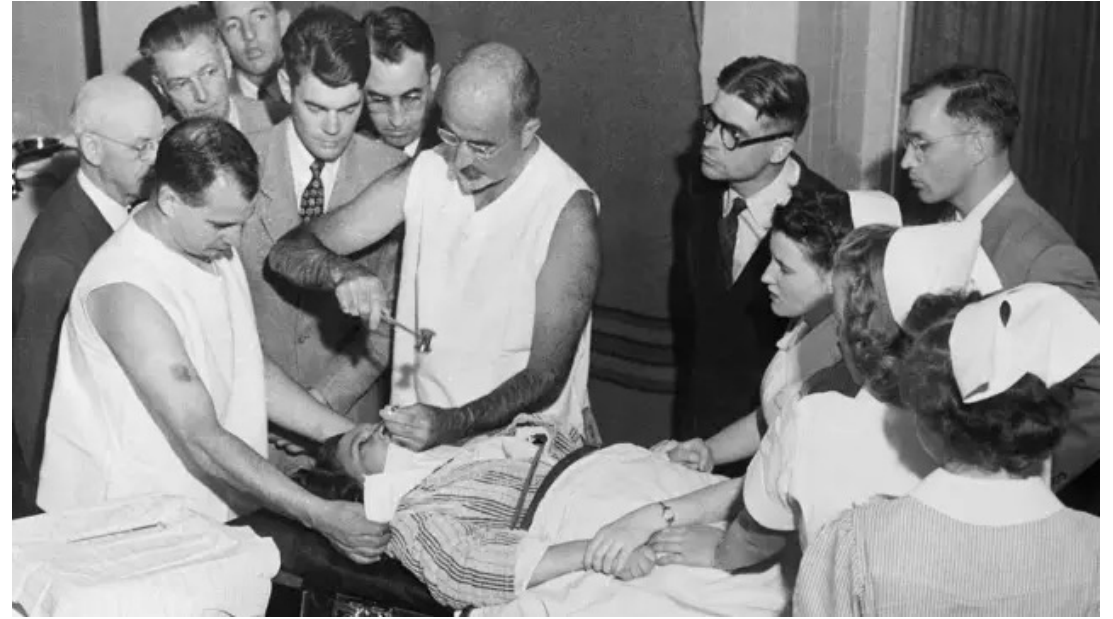
# Amygdala and Fear

- The amygdala (杏仁核) represents a core fear system in the human body, which is involved in the expression of conditioned fear.
- Amygdala dysfunction: anxiety, autism, depression, post-traumatic stress disorder (PTSD), bipolar, and phobias



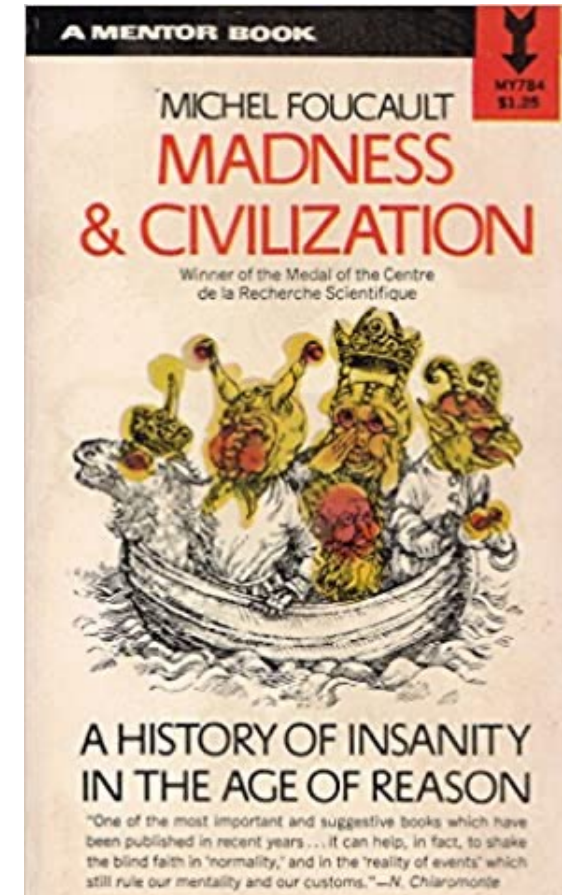
# Lobotomy

- The procedure is to cut the connections to and from, or simply destroy, the prefrontal cortex (前额叶). It often results in major personality changes.
  - First performed by Dr. Moniz (winner of the Nobel Prize in Physiology or Medicine, 1949)
- “It reflected very bad medicine, bad science.” Henry Marsh (a leading English neurosurgeon)



# Madness from A Foucauldian Perspective

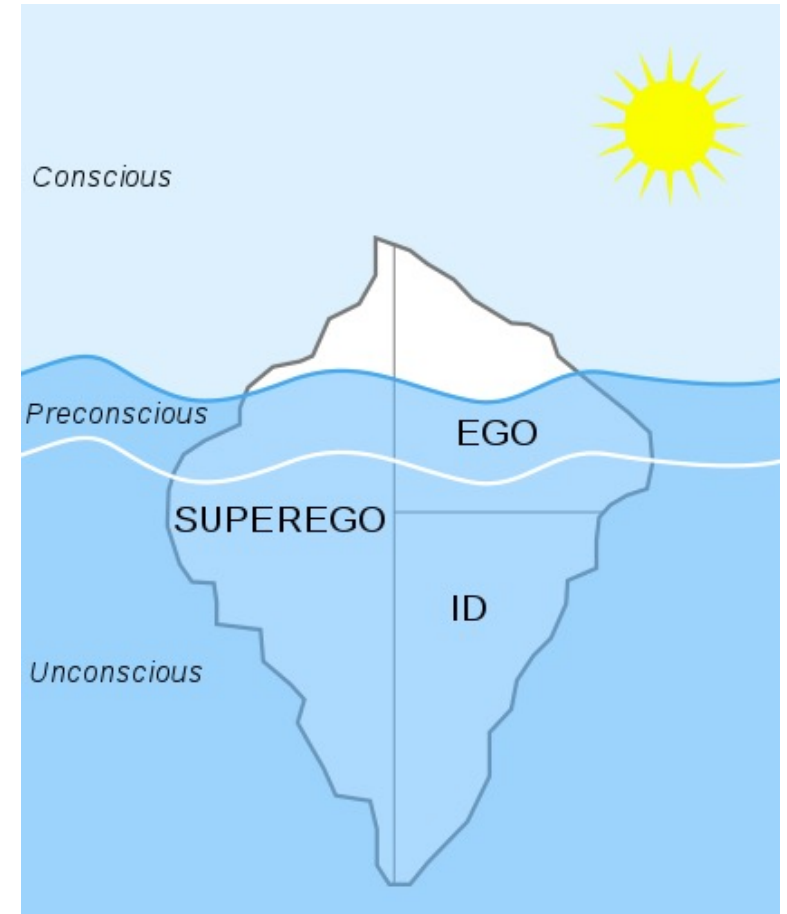
- The medicalization, moralization, and management of madness
  - Image of human subjectivity as an immaterial, fixed, unitary thing that stays with us throughout our lives
- Modern rational subjectivity
  - A new class of urban surplus labor against the backdrop of industrialization and capitalism
- Normal-abnormal: how the medical gaze judges the normality of individuals





# Psychoanalysis

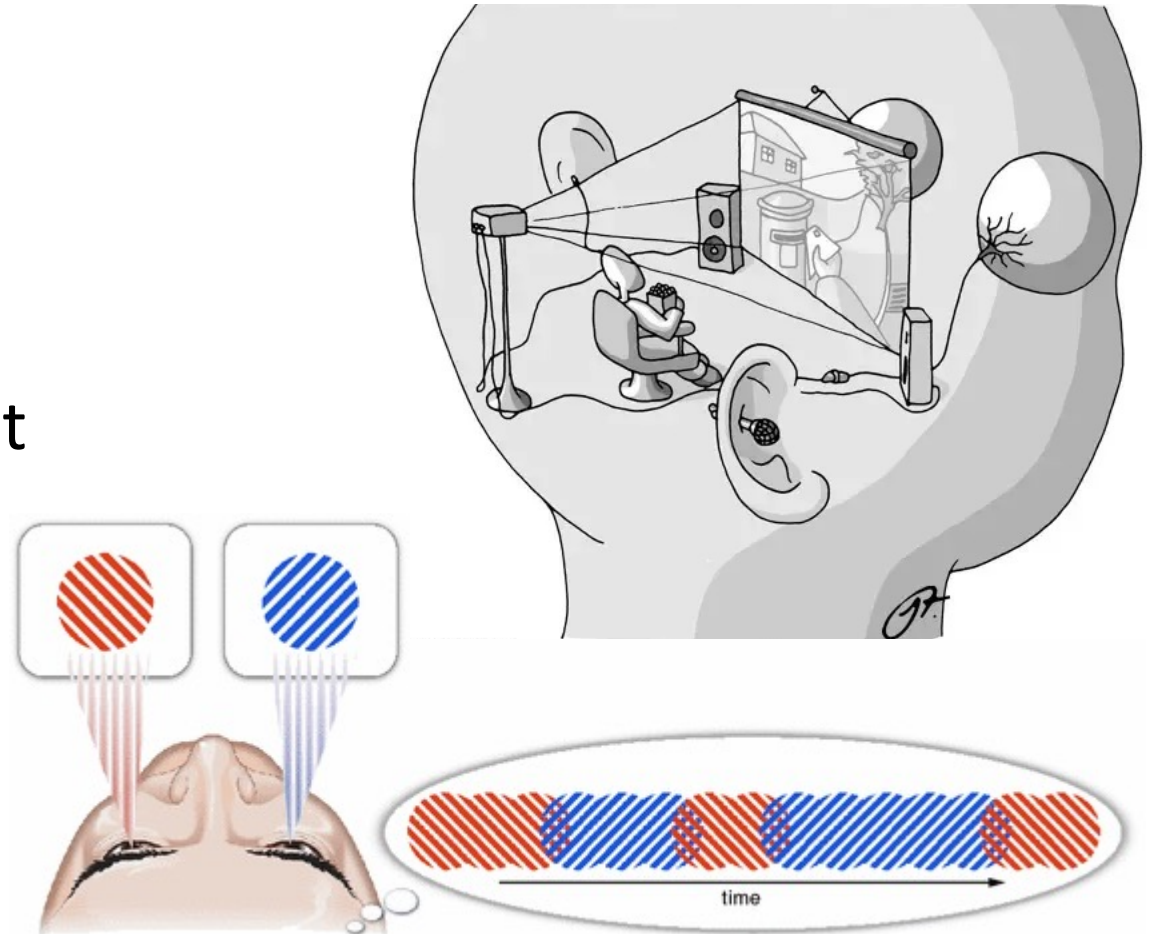
- Sigmund Freud (1856-1939)
- A person's behavior is influenced by their unconscious drives.
- Psychological problems like depression and anxiety are often rooted in conflicts between the conscious and unconscious mind.
- Personality development is heavily influenced by the events of early childhood.
- The Oedipus complex





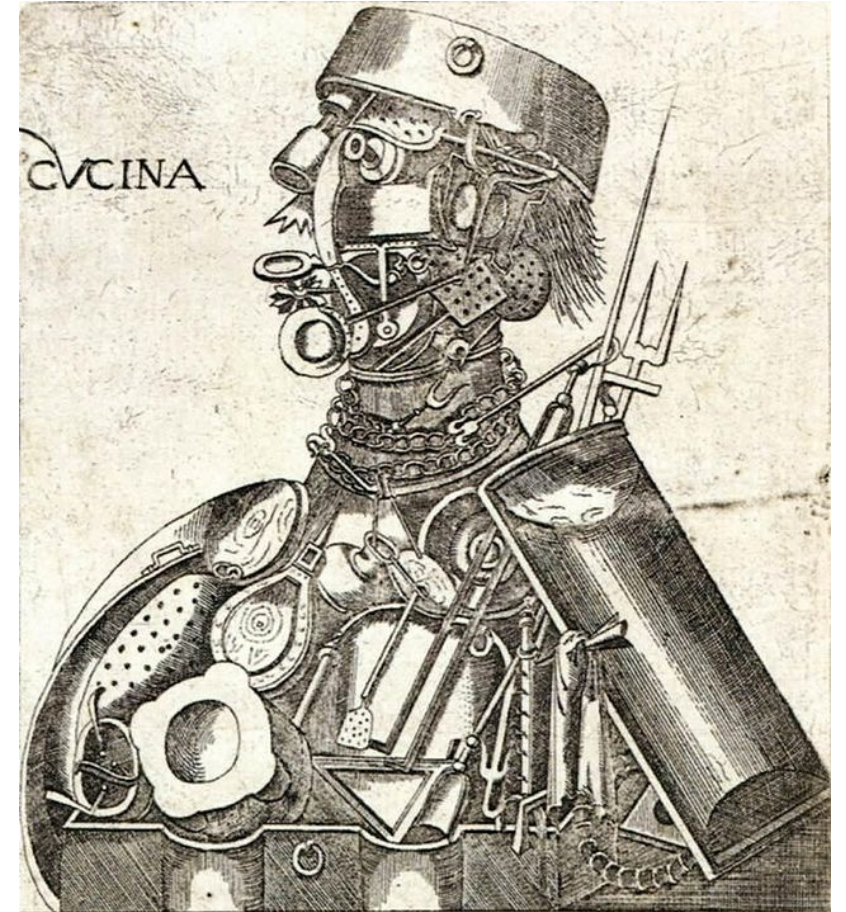
# The Unity of Consciousness

- Kandel: “Understanding consciousness is by far the most challenging task confronting science.”
- Brains are parallel processors, but we experience consciousness as unified.
  - What gives unity to the consciousness of self?
- Binocular rivalry



# Subjectivity

- How does electrical activity in neurons give rise to subjective feelings?
- Philosophical zombies
  - A physical duplicate of a human being that lacks consciousness
- Intersubjectivity
  - We experience our own ideas, feelings, and sensations individually; We cannot really appreciate another person's experience directly.



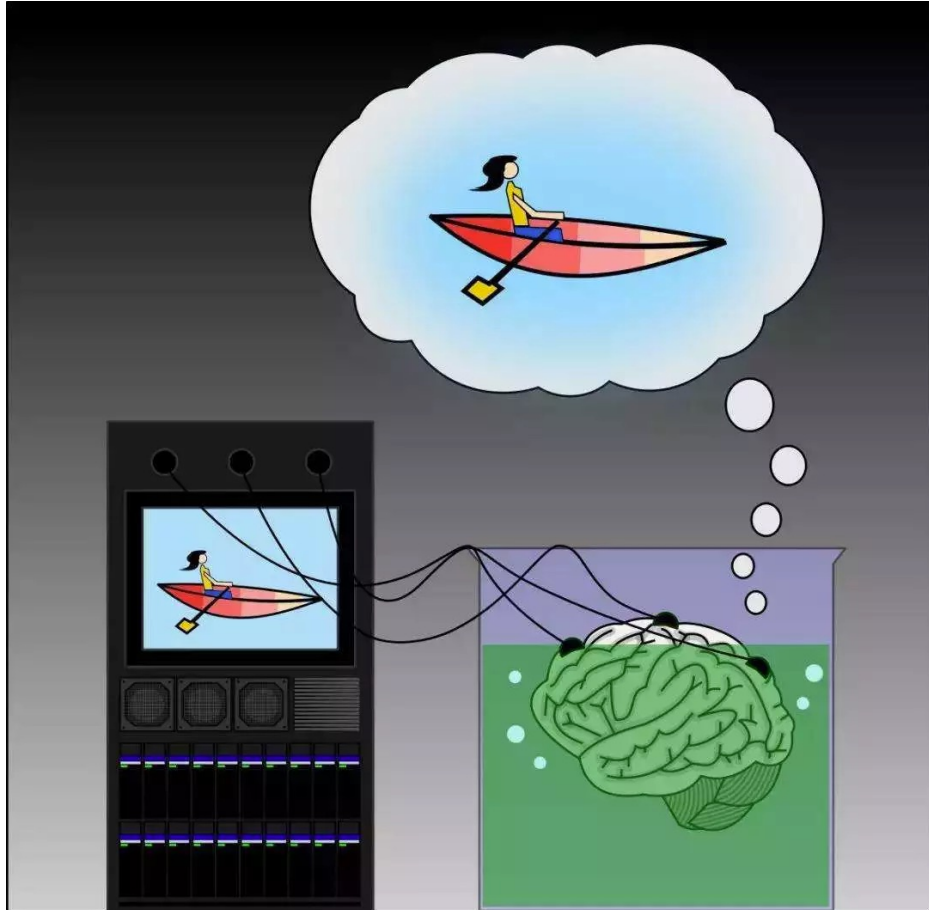
# Free Will

- Augustine: misuse of freedom is the source of evil in the world
- How do contingency and freedom fit into a world where every event must have a reason or cause?
  - “God does not play dice with the universe.” (Einstein)
- Without belief in free will, there would be no reason for morality.
- Libet Experiment (1973)





# Brain in A Jar



The Matrix (1999)