“- What is Mind?
- No matter.
- What is Matter?
- Never mind”
- Homer Simpson

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Overview

- Philosophical Framework
- Defining Consciousness
  - The easy problem
    - Consciousness vs Awareness
  - The hard problem
    - Qualia
- Solving the Hard Problem

- Major Positions on Consciousness
  - Symbolic Processing
  - Not Information Processing
  - Neurological Processing
  - Quantum Processing
  - Religious Dualism
  - Material Dualism
Philosophical Framework

**Reductionism**
- All complex phenomenon can be explained by understanding the underlying parts

**Emergence**
- The phenomenon is dependant on, but cannot be explained by the underlying parts
Philosophical Framework

Ontology
- What is “real”?  
  - Some things are easier to agree on than others…  
    - Dreams?  
    - Emotions?  
    - Ideas?

Epistemology
- What can we know?  
  - Even if something is real we may never understand it  
    - We have limited intellect and perception abilities
Philosophical Framework

**Materialism**
- Everything is physical
- Things that don’t appear physical are still manifestations of the physical

**Idealism**
- Everything is mental
- Solipsism

I'm walking outside in the sun!!
Three Souls
(Aristotle)

- **Vegetative soul**: responsible for growth (respiration, metabolism, and cellular division) and germination (production of seed and generation of offspring).

- **Animal soul**: responsible for perception, appetite (emotions), and locomotion.

- **Rational soul** (intellect): responsible for thought.
Three Souls

- Plants
  - Vegetative Soul: Reproduction, Growth

- Animals
  - Sensitive Soul: Mobility, Sensation

- Humans
  - Rational Soul: Thought, Reflection
Philosophical Framework

**Mechanistic**
- Materialistic explanation for the difference between observation and explanation

**Dualism**
- The material and the mental are of two separate worlds
  - Both are real, but neither can be explained in terms of the other
  - Cartesian Dualism
Mind in the Seventeenth Century

- Réné Descartes’ answer determined the parameters of the philosophy of mind and popular culture ever since.

- Prior to Descartes, philosophers believed that all entities with an internal source of motion had a soul (animism)

  - Psychologically speaking, animism arises from our natural tendency for anthropomorphism
Philosophical Framework

DUALISM vs MONISM

Cartesian Duality: MATTER-MIND

Physicalism: MATTER > Mind
Idealism: Matter < MIND
Neutral Monism: 3rd SUBSTANCE > Matter & Mind

KEY:
Physical and Mental substance is either fundamental or derivative.
(solid line) (dashed line)
Problem with Cartesian Dualism

“We do not need that hypothesis”
- Contrary to Descartes, purely physical mechanisms can exhibit the kind of complex, flexible behavior, including learning (or “learning”) characteristic of humans.

All physical events have sufficient causes that are themselves physical events
- Claims to the effect that non-physical events cause physical events introduces an even bigger mystery: what is the mechanism?
Positions on the Mind-Body Problem

Monism
  - Materialism
  - Idealism

Dualism
  - Interactionist Dualism
    - Cartesian Dualism
    - Classical Dualism
  - Non-Interactionist Dualism
    - Epiphenomenalism

→ : causal relationship
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Consciousness

• One of the central problems is that of definition.
• We have direct access to it, but cannot describe it
  • Similar to other subjective experiences
Consciousness vs Mind

- MIND is more *psychological* notion in cognitive or neuroscientific meaning;
  - Cognition = Information processing by the brain
  - Mind = Higher order processes built up from cognition
- CONCIOUSNESS is more *phenomenological* notion;
  - A qualitative experience, or something that allows for qualitative experience
Consciousness vs Mind

• This distinction is captured by the differentiation between “the easy and the hard problem”
  • Distinction proposed by David Chalmers
  • He may have at one point over-indulged in our newly legalized substance….
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The “Easy” Problem

- In essence: explaining how the mind works
  - The underlying principle is information processing, and Information Theory

The easy problems:
- Finding the neural correlate of consciousness
- Explaining the ability to apply information to thinking and behavior
- Explaining the ability to focus attention, recall items from memory, integrate perceptions, etc.
The “Easy” Problem

- Examples:
  - Awareness
  - Introspection
  - Self-Awareness
  - Voluntary Control
  - Knowledge

- None of these require you to be conscious!
• Awareness vs Consciousness

- Awareness
  - Having access to information and using it in some way.
    - Ex. Your computer is “aware”
  - Awareness is necessary, but not sufficient to be conscious of something.
    - Ex. Blindsight; Gut Feeling
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The “Hard” Problem

- In essence: explaining our subjective experience
  - Unless we take a reductionist approach, this problem does not seem to fall into the domain of science.

The hard problem:
- Why does consciousness feel the way it does? Why does it feel like anything?
The “Hard” Problem

“You can look into your mind until you burst, and you will not discover neurons and synapses and all the rest; and you can stare at someone’s brain from dawn till dusk and you will not perceive the consciousness that is so apparent to the person whose brain you are so rudely eye-balling.”

Examples of the Hard Problem

- Qualia
  - We can see, smell, taste, and feel a banana
  - ...But there is no banana in our brain
Examples of the Hard Problem

- Qualia
  - There appears to be some amount of unique information that is contained in qualia
Examples of the Hard Problem

- The Evolution Problem
  - We only need awareness to evolve

- The Zombie Problem
  - How do we know others are conscious the way we are?
Examples of the Hard Problem

- The Homunculus Problem
  - Who or what is it that is experiencing our experiences

- The Binding Problem
  - Our experiences are fluid and integrated
    - This experience is contradicted by neuroscience
Examples of the Hard Problem

- The Label Problem
  - Is my red your blue?
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Approaches to the hard problem

1) **Declare that it is unsolvable**, because
   a) dualism is true; or
   b) we don’t have the mental capacity to understand it

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If the human brain were so simple
That we could understand it,
We would be so simple
That we couldn’t.

Emerson M. Pugh *

* Author’s note: Quote from my father around 1938.
2) **Concentrate on the “easy” problems** and believe that the answers to the hard problem will come eventually

- The typical cognitive science approach.

Francis Crick, in a work about visual awareness:

“I have said almost nothing about qualia – the redness of red – except to brush it to one side and hope for the best” (Crick 1994)
3) **Claim there is no “hard problem”** we just confuse ourselves into thinking we’re special

- The reductionist approach
- Consciousness, and subjective experiences are *epiphenomenal*
Epiphenomenalism

Motivation for Epiphenomenalism
- All physical events have sufficient causes that are themselves physical events
- But some mental events—qualitative states, the what-it-is-like experience—seem to be irreducibly nonphysical: it seems implausible to identify them with brain events.

Problem: some mental states cause behavior
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Symbolic Processing

• Views the cognitive system as a “logic machine”, similar to a calculator or a Turing Machine.

• One of the best laid out theories was Language of Thought.
  • This was widely bastardized in the lay-person imagination as "you think with words".
Symbolic Processing
(Deniel Dennett)

- Multiple Drafts Theory
- Functionalist approach
  - Agnostic
  - Multiple realizability
    - Explained below

Multiple Drafts Theory
- Brain activity is parallel
  - Information is continually revisable and accessible
- ‘Qualia’ don’t really exist
Symbolic Processing

• Some drawbacks:
  • The **homunculi** problem
  • Doesn’t explain consciousness, only cognition
    • The Chinese Room
Multiple realizability

- A single mental kind (property, state, event) can be "realized" by many distinct physical kinds.

- Avoids *species chauvinism*

- The same type of mental state could, in principle, be “realized” by different physical (or non-physical) states.
Philosophical Framework (again…)

Multiple realizability
Strong vs Weak AI

- Proponents of **Strong AI** believe we are literally creating a conscious life.
  - Based on this view, it will eventually be criminal to destroy computers
- Alternatively, proponents of **Weak AI** believe that we are creating intelligent tools, but they have no potential for consciousness.
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Not Information Processing
(John Searle)

- Consciousness as the emergent property of biological brains.
- Consciousness is 'realised in the structure of the brain'
  - Consciousness is an evolutionary advantage
    - But he never specifies how...
  - Believes that if we build an artificial brain, it may too be conscious.
- Searle disagrees with both dualists, materialists, and reductionists...
  - But never offers any alternatives...
Not Information Processing
(John Searle)

- Biggest drawback to Searle’s argument is that it is very vague.
  - Because he tries to side-step many of the major issues, his theory leaves a lot to be desired.

- May also get a bit handsy with his female students…
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Neurological Processing
(Crick & Koch)

- Functionalist
  - If a machine can reproduce underlying neuronal function, it can also be conscious
  - Synchronous neural oscillations at 40-70Hz in the claustrum produce an emergent property of the brain
Neurological Processing
(Crick & Koch)

- Difficult to replicate experimental findings
  - Some experiments either failed to find oscillatory activity in the primate visual system
  - Or this activity was not stimulus dependent
- Also, findings are interpreted differently among scientists
  - Does not necessitate consciousness
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Quantum Processing
(Penrose & Hameroff)

According to Penrose the (computational) brain itself cannot be the basis for what we think of as our minds.

Argue that consciousness and some forms of problem solving (related to analogy making and creating the problem space) cannot be solved using a normal information processing approach. But a quantum one might work.
According to Hameroff and Penrose, the recent discovery of quantum vibrations in microtubules inside neurons corroborates their theory.
Quantum Processing
(Penrose & Hameroff)

Problems?
- Not many...
- However, the interaction between quantum mechanisms and biology are still unknown.
  - The theory feels a bit like kicking a can down the road to “the next big thing”
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Religious Dualism
(Buddhism, Abrahamic religions)

- Conscious is its own thing that exists independent of matter.
  - After the body dies consciousness is released back “into the universe”
- Dualist position.
- Does not give many explanations for why consciousness embodies us to begin with.
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Material “Dualism”  
(David Chalmers)

- Agrees with Searle that qualia cannot come from information processing.
- Agrees with Dennett that the brain is an information processing device.
- Believes conscious is its own thing that exists but is an undiscovered element in physics which “attaches” itself to information processing systems.
Material “Dualism”  
(David Chalmers)

- Is this a dualist idea?  
  - Consciousness is a material substance  
  - It needs the brain... But isn’t made by it.

- What does physics say?
Physics and the Role of Information

- There is a relationship between matter, energy and information
  - Maxwell's demon problem
  - John Wheeler - It from Bit
- It appears that information is a fundamental component of reality
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Thank You!
Suggested Reading

- Bertrand Russell - A History of Western Philosophy
- Charles Guignon - On Being Authentic
- David Chalmers - The Conscious Mind
- Daniel Dennett - Mind, Body, World
- Irving Yalom - Staring at the Sun