Brain, Mind, and Consciousness

Is our mind just our brain?

Can consciousness be physical?

Con computers think and understand?

The Brain and the Mind

Brain Activity Consists of Electrochemical Signals Traveling From One Neuron to Another

Electrochemical Signals Traveling Across Neurons Control our Perceptions (see *Sensory Neurons*) and Movements (see *Motor Neurons*)

Do Electrochemical Signals Traveling Across Neurons Control Our Feelings and Emotions?

https://www.youtube.com/watch?v=haNoq8UbSyc

Certain molecules are associated with feelings of pain or pleasure, sadness or happiness

Do Electrochemical Signals Control Even our Moral Judgments?

http://thecolbertreport.cc.com/videos/fykny6/patricia-churchland

The Philosophical Question

- Neuroscientists are telling us that our feelings, thoughts, experiences, moral judgments etc. are associated with brain activities and electrochemical signals.

- *Does this mean that the mind is nothing else than what goes on in the brain?* **Is the mind nothing else than the electrochemical activities of the brain**?

Terminology

Physical/brain state:

the activation of certain neurons in a certain area of the brain

Mental state:

the subjective experience of, for example, *seeing red*, *feeling pain*, *awareness of ourselves*

Physicalism *versus* Non-Physicalism

Some philosophers—called **physicalists**—believe that mental states can be entirely *reduced to* brain states. In other words, they believe that mental states are entirely physical.

Other philosophers—called **non-physicalists**—think that it is *impossible to reduce* mental states to brain or physical states.

Whether mental states can be reduced to physical states or not is one of the central questions in philosophy of mind today.

An Example of "Reduction"

Consider **heat** or **temperature**.

The more rapid the movement of the particles, the higher the temperature.

Since the movement of the particles can be entirely described in physical terms, we have a *reduction* of the notion of heat or temperature to physics.

The Goal of Physicalism (also called, Materialism)

The goal of physicalism is to provide an ***entirely physical*** description or explanation of ***mental phenomena***, such as our subjective feeling of pain, our conscious experience of being here, etc.

An ***entirely physical*** description or explanation is one that uses knowledge from the sciences, such as physics, chemistry and biology, and does not appeal to any non-physical entity.

The Peculiarity of Mental States

Mental states are often called **qualia** by philosophers. The word "qualia" refers to the **subjective state** we are in while having experiences (e.g. seeing colors, feeling pain)

No one else except you knows what your mental states (=**qualia**) are really like. By contrast, physical or brain states can be studied and known by more than one person.

Why *Qualia* are Subjective

Imagine someone who sees colors according to a *color inverted spectrum*.

What Do You See When You Look at Bananas, Strawberries, Etc.?

Suppose you answer that what you see when you look at bananas and strawberries is what's on the left.

Does your answer show that your color spectrum is not inverted?

I Cannot Know How You See Colors

If your color spectrum is inverted, what you see on the left is what one without the inverted spectrum would see on the right. One with the inverted spectrum and one without the inverted spectrum would both say that bananas and strawberries look like what's on the left.

Yet, the two people would have ***different subjective experiences*** *when they see bananas and strawberries. The subjective experience of what it feels like to see a color is called* ***qualia.***

The Challenge for the Physicalist

Based on just electrochemical activities in the brain, how can the physicalist give a completely physical explanation of **qualia,** for example, of the subjective experience of what it feels like to see the color red?

Frank Jackson's Argument Against Physicalism

This is an argument that there *cannot possibly* be an explanation of **qualia** based on just electrochemical activities in the brain.

Jackson's *Knowledge Argument* (1)

Mary is a brilliant scientist . . . forced to investigate the world from a black and white room via a black and white television monitor. She . . . acquires . . . all the physical information there is to obtain about what goes on when we see ripe tomatoes, or the sky …

She discovers, for example, just which wavelength combinations from the sky stimulate the retina, and exactly how this produces via the central nervous system the contraction of the vocal chords and expulsion of air from the lungs that results in the uttering of the sentence 'The sky is blue'.

Jackson's *Knowledge Argument* (2)

What will happen when Mary is released from her black and white room or is given a color television monitor? Will she learn anything or not?

It seems just obvious that she will learn something about the world and our visual experience of it. But then . . . her previous knowledge was incomplete. But she had all the physical information. Ergo . . . physicalism is false.

Summarizing the Argument

1. Mary has all the physical knowledge concerning human color vision while in the black-and-white room.
2. But there is some knowledge about human color vision that she does not have in the black-and-white room, namely the knowledge about the subjective experience (**=qualia**) of what it feels like to see, say, red.
3. So, some knowledge is not physical knowledge.
4. If some knowledge is not physical, the claim that there is nothing beyond physical facts (physicalism) is false.

Qualia *versus* Self-Awareness

(1) The Problem of Qualia

(2) The Problem of Consciousness as Self-Awareness

One challenge for the physicalist is to give a completely physical description of **qualia** (=*the subjective state we are in when, for example, we see colors or experience pain*)

Another challenge for the physicalist is to give a physical description of the fact that we are **self-aware** when we experience ***qualia*** in the sense that we are **aware that <u>it is us</u> having the experience**.

Ramachandran on the Two Problems (1) Qualia and (2) Self-Awarenes

https://www.youtube.com/watch?v=jTWmTJALe1w&list=PLBF0905C888051EB7

For Ramachandran, the two problems are closely connected, two sides of the same coin.

Another Argument against Physicalism: the **Easy/Hard Problem of Consciousness**

David Chalmers, one of the leading philosophers of mind today

The Easy Problem of Consciousness

We perform many tasks, such as walk, run, jump, take decisions, recognize people, etc.

A completely physical entity, such as a robot, can be trained to walk, run, jump, take decisions, recognize people, etc.

If consciousness consisted in simply performing those tasks, a physical machine could be easily said to have consciousness. This is the **easy problem of consciousness.**

But Consciousness is not Just About Performing Tasks, Actions or Functions

The Hard Problem of Consciousness

Besides performing tasks, such as walking, jumping, recognizing people, etc. **we are also conscious of them as we perform them**. As we walk, we are conscious that we are walking. As we run, we are conscious that we are running. Etc.

The hard problem of consciousness is to explain how it is that we have such conscious experiences.

This is a hard problem for physicalists because ***there seems to be nothing in the physical structure of the world that accounts for why we are conscious of our actions as we perform them***.

Chairs aren't conscious of sitting in a room? How come we are conscious if we are just made of matter as the physicalists think?

David Chalmers' Answer to the Hard Problem of Consciousness

There are **four** fundamental **physical forces** which physics admit: (1) gravity; (2) electromagnetism; (3) strong; (4) weak.

We can add another basic force in nature, namely (5) consciousness.

This addition to the fundamental forces makes consciousness **present everywhere in nature**.

This is called **panpsychism** (*psyche* and *pan* are the Greek words for *soul* and *everything)*

Though consciousness would be everywhere, we humans would have **more consciousness** than, say, rocks or tables.

Turning to Our Next Topic: Can Computers Think and Understand Just like Us?

How A Chess Computer Works

Beginning of the game: there 20 possible moves.

Second step: there are 20*20 moves.

Third step: there are 20*20*20 moves.

Etc.

The computer computes in advance as many moves as possible. For example, it can compute 8 or 9 steps in the game ahead. In this way a computer can beat most people at chess.

But Would We Say that The Computer Thinks Or Understands?

All the Information in a Computer Consist of String of Zeros and Ones

Computers are Good at Processing Information According to Rules

The AND and OR "Rules"

AND gate

OR gate

The AND gate returns 1 as output whenever **both** inputs are 1's.

The OR gate returns 1 as output whenever **at least one** of the inputs is 1.

Addition by a Computer

After receiving as an input a string of O's and 1's — corresponding to, say, the numbers 2 and 3 — the computer can perform the mathematical operation of addition and giving as output the result, again in the form of 0's and 1's.

Computers receive symbols as **input** and they return new symbols as **output**.

Computer as *Input/Output* Manipulators of Symbols

Will Computers Ever Be Intelligent?

Alan Turing's Imitation Game

Suppose that we have a person, a machine, and an interrogator.

The interrogator knows the other person and the machine by the labels 'A' and 'B.'

The interrogator is allowed to put questions to the person and the machine of the following kind: "Will A please tell me whether A plays chess?" Whichever of the machine and the other person is A must answer questions that are addressed to A.

The object of the game is for the interrogator to determine which of the other two is the person, and which is the machine.

Passing the Turing Test

A machine is said to have passed the Turing Test if during the imitation game it can fool a sufficiently large number of interrogators and make them believe that it is a real human being and not a machine.

Imagine that One Day Computers Will be So Good They Could Pass The Turing Test

Would passing the Turing Test show that a computer is intelligent and able to understand what it is saying?

Passing the Turing the Test Might Not Be Enough

Searle's Chinese Room Argument

Imagine that a "box" can have a conversation in Chinese by receiving questions (*inputs*) and by providing answers (*outputs*) in Chinese.

Inside the box, however, there is a man who does not understand Chinese at all. The man blindly follows a rule book.

The box is like a computer that can pass the Turing Test, yet we cannot say that the box understands Chinese.

What the Rule Book Looks Like

If you see this shape,
"什 麼 "
followed by this shape,
"帶 來 "
followed by this shape,
"快 樂 "

then produce this shape,
"爲 天 "
followed by this shape,
"下 式 ".

An Important Distinction

Syntax. Putting together strings of symbols, letters, series of 1's and 0's, etc.

Semantics. Assigning a meaning to the symbols.

The Chinese Room Argument underscores the difference between manipulating symbols correctly (*syntax*) and understanding what the symbols mean (*semantics*).

Even if computers could pass the Turing Test, they would still lack the ability to understand meaning (*semantics*).