



Materialist Theories of the Mind

Assimilate the mind, or eliminate it?

Materialist Theories of the Mind

- (Philosophical) Behaviourism
 - A mental state is a disposition to behaviour
- Functionalism
 - A given mental state (e.g. pain) can be physically realised in many different ways. What's important is the functional role that state plays.
- The Identity Theory
 - Each type of mental property is identical to a certain type of physical property. E.g. pain is just stimulation of the C-fibres.
- Eliminative Materialism
 - Mental states like beliefs and desires do not exist.

(Philosophical) Behaviourism

“... philosophical behaviorism is not so much a theory about what mental states are (in their inner nature) as it is a theory about how to analyze or to understand the vocabulary we use to talk about them.

...talk about emotions and sensations and beliefs and desires is not talk about ghostly inner episodes, but is rather a shorthand way of talking about actual and potential patterns of behavior.”

- Churchland, Section 2, p. 1.



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- “... philosophical behaviorism claims that any sentence about a mental state can be paraphrased, without loss of meaning, into a long and complex sentence about what observable behavior *would* result if the person in question were in this, that, or the other observable circumstance.”



E.g.

“To say that *Anne wants a Caribbean holiday* is to say that:

(1) if asked whether that is what she wants, she would answer *yes*, and

(2) if given new holiday brochures for Jamaica and Japan, she would peruse the ones for Jamaica first, and

(3) if given a ticket on this Friday’s flight to Jamaica, she would go,

and so on and so on.”

Problems with behaviourism

- Mental states *cause* behaviour, surely? (But according to behaviourism they can't.)
- We seem to have direct knowledge of our own mental states, via *introspection*. (Not according to behaviourism.)
- Various mental states *work together* to cause behaviour. **There's no distinctive behaviour that defines each single mental state.**
 - E.g. she might not accept a flight to Jamaica, if she also thinks that the plane will be hijacked.

The Identity Theory

- The ordinary mental concepts of “folk psychology” will eventually be reduced to neuroscience. Each type of mental property (belief, pain, etc.) is identical to a certain type of physical property.
- Folk psychology (FP) is our common-sense theory of the mind. It explains peoples’ behaviour in terms of beliefs, desires, etc.

Type-type Reduction

- Many common-sense properties have been “reduced to physics”, i.e. shown to be identical to physical properties. E.g.
 - Water is H_2O
 - Alcohol (ethanol) is $\text{C}_2\text{H}_5\text{OH}$
 - Light is electromagnetic waves, between 400 and 760 nanometres in wavelength.
 - Lightning is a stream of electrons
 - Heat is molecular motion (kinetic energy)

Type-type Reduction

- And so (no doubt) we'll someday discover such things as:
 - Belief that *the earth is round* is neural configuration FS273.4 in the temporal lobe of the left cerebral hemisphere.
 - A sharp toothache is activation state A-D556.13 of the anterior cingulate cortex.

Folk psychology

- A typical example of a folk psychological generalization would be:

“If someone has the desire for X and the belief that the best way to get X is by doing Y , then (barring certain conditions) that person will tend to do Y .”

(Stanford Encyclopedia of Philosophy, entry “Eliminative Materialism”)

The Identity Theory

- “[The identity theory] claims that neuroscience will discover a taxonomy of neural states that stand in one-one correspondence with the mental states of our common-sense taxonomy.” (p. 317)

(Churchland regards this as unlikely)

Martian Pain

- Churchland finds the “martians” argument against the identity theory very persuasive.
- This argument is used by functionalists to attack the identity theory.

“Imagine a being from another planet, says the functionalist, a being with an alien physiological constitution, a constitution based on the element silicon, for example, instead of the element carbon, as ours is.” (p. 321)

“joy-in-a-human = resonances in the lateral
hypothalamus

Whereas

Joy-in-a-Martian = something else entirely” (p. 324)

- This argument against the identity theory assumes that Martians (if they exist) will have mental states analogous to joy, pain, etc.
- These states will have similar *functional roles* to ours. (They produce the same outputs, from the same inputs.) But quite likely they have a different physical basis.
- So mental states like joy, pain etc. are really *functional* states, not physical ones.

- Functionalists thus reject the (type-type) identity theory, that each *type* of mental state is identical to a *type* of physical state.
- However, functionalists generally accept a token-token identity theory, that:
“each *instance* of a given type of mental state is numerically identical with some specific physical state in some physical system or other.” (p. 322)

Functionalism

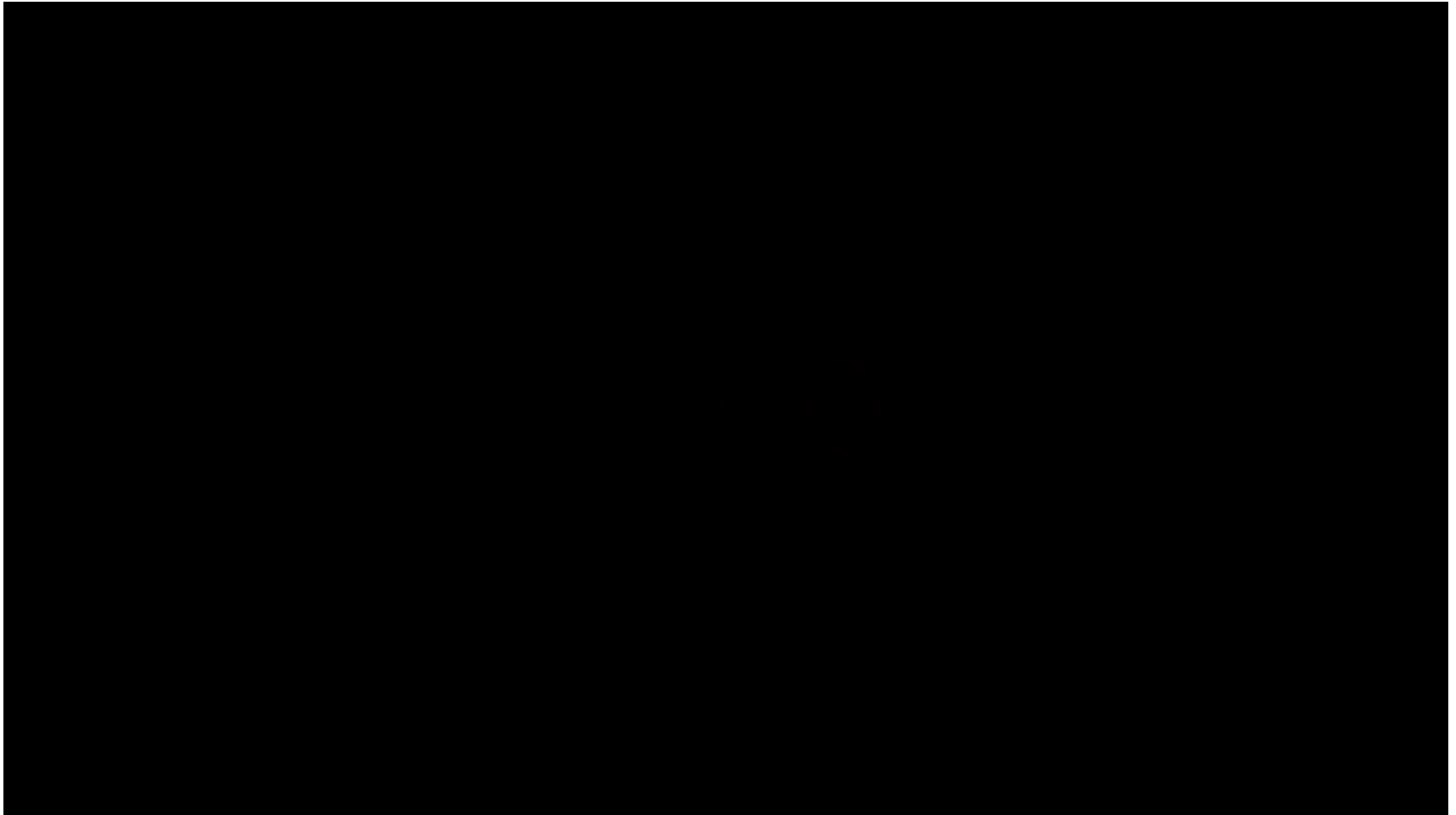
- This brings us to the third (and most popular) materialist theory of the mind: functionalism.
- To define functionalism, we first have to define 'functional role' and 'functionally equivalent'.

“Functionally equivalent”

- Imagine two black boxes (you can't see what's inside).
- Each box has buttons labelled A, B, C, and a red, green and a blue light.
- Suppose you press buttons ABCA on one box, and the green and blue lights turn on. You try the same ABCA on the other box, and the same thing happens.

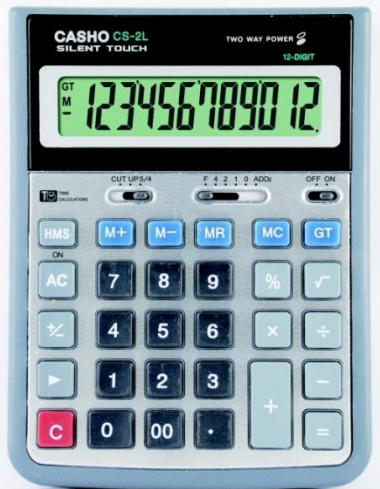
“Functionally equivalent”

- So you try other inputs, and get various outputs. But *the two boxes always react in the same way as each other.*
- When the two boxes are given the same input, they always give the same output.
- In that case they’re **functionally equivalent.**



Functionally equivalent to the original!

- If two black boxes are functionally equivalent, must they be exactly the same inside as well?
- No. E.g. two calculators both give the output '4' for the input '2+2=', and so on, but the calculators might have very different circuitry inside.



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Functionalism:

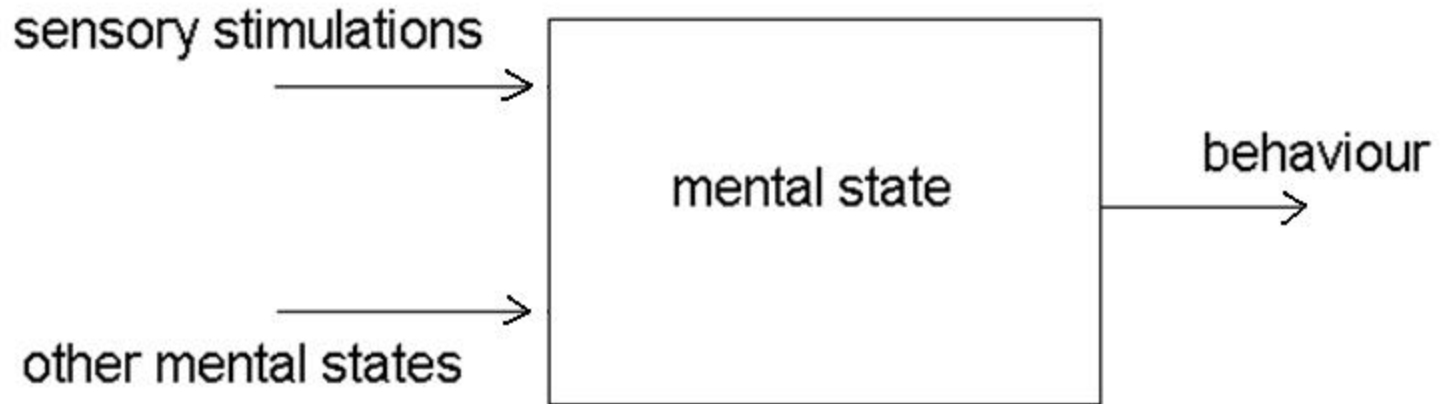
- Functionally equivalent \Rightarrow mentally equivalent
- I.e. if two systems are functionally equivalent (same outputs for the same inputs) then they're mentally equivalent (same consciousness, intentionality, etc.)

The Stanford Encyclopedia of Philosophy:

“Functionalism is the doctrine that what makes something a thought, desire, pain (or any other type of mental state) depends not on its internal constitution, but solely on its function, or the role it plays, in the cognitive system of which it is a part. More precisely, functionalist theories take the identity of a mental state to be determined by its causal relations to sensory stimulations, **other mental states**, and behavior.”

Mental states are “black boxes”

It doesn't matter what's going on inside. The mental state is *whatever it is* that is turning input experiences (and other mental states) into behaviour.



E.g. A Coke machine

	S_1	S_2
nickel input	Emit no output Go to S_2	Emit a Coke Go to S_1
dime input	Emit a Coke Stay in S_1	Emit a Coke & a nickel Go to S_1

S_1 = "dime desire"

S_2 = "nickel desire"

"Of course, no functionalist should claim that a Coke machine desires anything. Rather, the simple version of machine functionalism described in the table makes an analogous claim with respect to a much more complex machine table." Ned Block

Programs and functional equivalence

- Two computers with different architecture can run the same program. (E.g. Mac can run Windows.)
- Computers running the same program are functionally equivalent. (Why is this?)
- If functionalism is true, then *mental states are just a matter of the “program” that is running.*

Functionalism and AI

- AI (Artificial intelligence) tries to design computer *programs* that will perform mental tasks of some kind.
- The whole idea of AI assumes functionalism.
Functionalism says that the mind is software, not hardware.
- (In his “Chinese Room” paper, Searle attacks functionalism.)

Part 2

Arguments for and against functionalism

An argument for functionalism: the problem of other minds

- How do I know that other people are conscious, as I am?
- The only evidence I have is their *behaviour*, in response to different situations.
- If functionalism is false, then of course this wouldn't be very good evidence at all, so that our belief in other minds would be quite unjustified!

The Turing Test of intelligence

- Suppose we can program a computer so that it is able to hold (apparently) intelligent conversation, just like a human being. Such a machine would, in conversation at least, be functionally equivalent to a human. Now how could you regard the words of such a machine as “meaningless” to it, or claim that “it has no idea what it’s saying”?
- If it overhears such talk, then it will firmly set the matter straight! “You might just as easily think that your own mother lacks intentional states,” the machine protests. “It’s discrimination, plain and simple.”

Argument for functionalism: “neuron-replacement therapy”

- Suppose you’re starting to have some mental problems, perhaps memory loss, confusion, emotional instability, or a difficulty solving math equations. It’s gradually getting worse. Your GP refers you to a specialist, who says that some of your neurons are breaking down. The best treatment is NRT, or neuron-replacement therapy. This unfortunately cannot undo the existing damage, but will prevent further decline. They identify neurons that are close to failure, remove them, and replace them with digital circuits that are (you guessed it!) functionally equivalent to the old neurons. (Of course the electronic neurons will last indefinitely.) By replacing all the neurons that might fail in the next 5 years, the treatment gives you 5 years with no further mental decline.

- You're understandably nervous about the procedure, worried that you'll no longer be fully human, but part machine. The specialist reassures you with this argument:

“There'll be no loss of function at all, since the replacement neurons are functionally equivalent to the old ones. If you replace part of a system with another part that is functionally equivalent to it, then the whole system is functionally unchanged.”

- But, you reply, even if my *behaviour* is the same, under all possible stimuli, might I not *feel* different?

“Not a chance,” he says. “For if you *felt* different, you might *talk* about it, saying things like “I feel funny”. But in that case your *behaviour* is also different, which we know is impossible! So you cannot feel any different either. Don’t worry.”

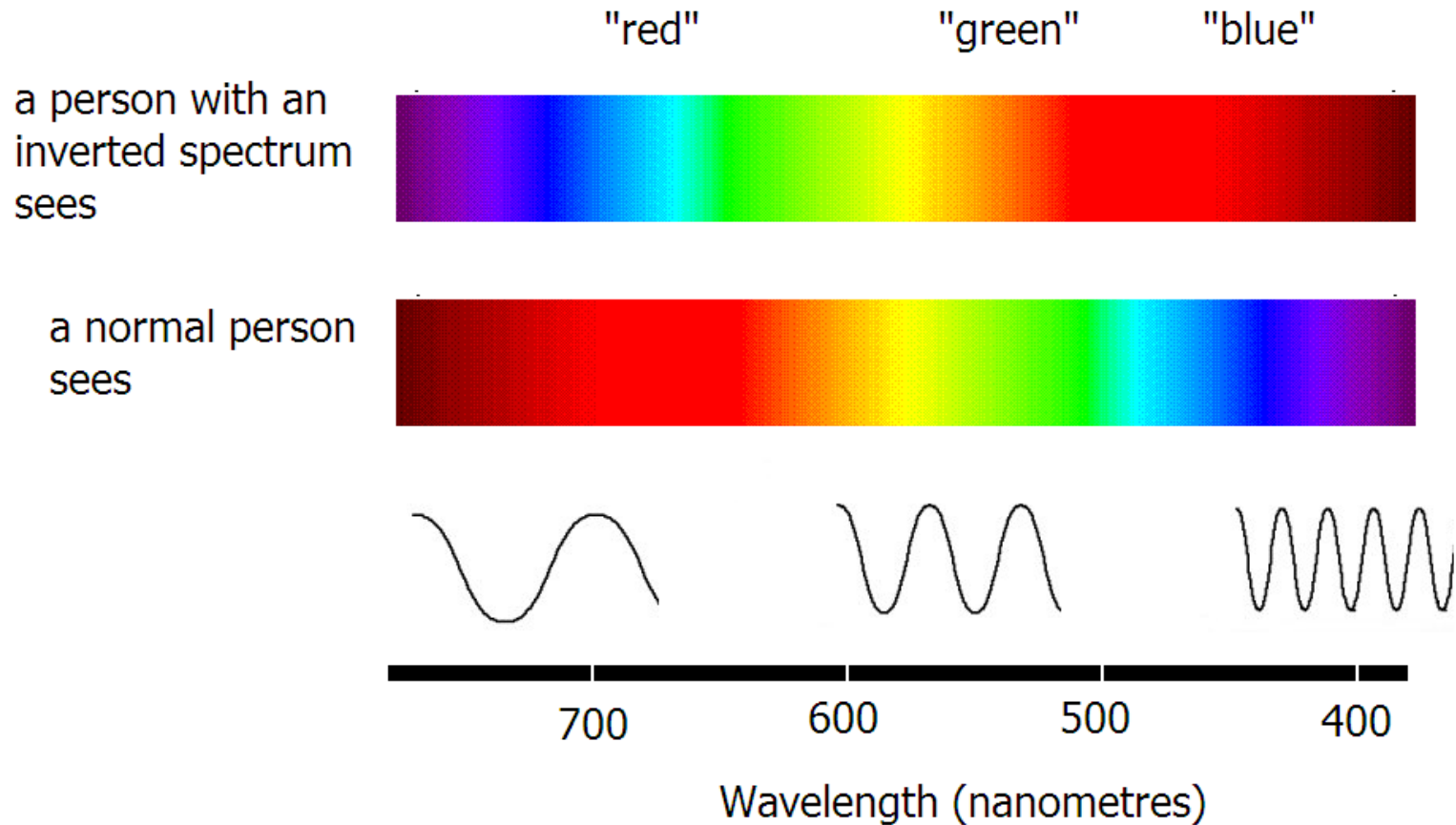
- Every 5 years you need another round of NRT, until eventually your brain is entirely electronic. But, of course, all is well. You recommend NRT to all your friends.
- This argument *seems* to establish the view that there cannot be a change of mental state as long as everything is functionally the same.
- Does it?

- Note that this argument *assumes* materialism as a premise.
- So if it works, it means that every materialist should be a functionalist.

Arguments against functionalism

- 1. The inverted spectrum.** A person with an inverted spectrum will be functionally equivalent to us, but have different mental states. (Ned Block)
- 2. Functional zombies.** We can *conceive* of a being that is functionally equivalent to a human, but which has no consciousness at all.
- 3. Searle's Chinese Room.** A Chinese-speaking chatbot app could be executed by Searle himself, acting as the CPU. But Searle wouldn't *understand* what "he" is saying in Chinese.

1. The inverted spectrum



Such a person will be *functionally equivalent* to us. But their mental states will be different.

2. “Functional zombies” are conceivable.

A “functional zombie”, as philosophers use the term in this context, is someone who is functionally equivalent to a human and yet “no one is home”.

Such zombies are not conscious, any more than electronic calculators are. Hence our *conception* of consciousness, at any rate, is distinct from any functionally-defined state.

- E.g. Ned Block's "Chinese nation" may be a functional zombie. The population of China is connected together to be functionally equivalent to a human brain. Then, while individual Chinese people will have conscious experiences, the whole system (the "Blockhead") will conceivably have no experiences at all.

- So a having a certain functional role isn't *sufficient* for a conscious experience.
- Is it *necessary*?
- Could a person have conscious experiences that didn't cause any behaviour?

“... people may have mild, but distinctive, twinges that have no typical causes or characteristic effects”
(Stanford Encyclopedia)

Churchland defends functionalism

- While not a functionalist, Churchland defends functionalism from some of these arguments.
- E.g. the inverted spectrum argument. Churchland suggests that, even if we have different *experiences* of red objects, we are still in the same *mental state* of “sensation of red”.