

First Discussion Class

Discussion Question

Should Golgi have conceded to Cajal?

Yes, Cajal made an overwhelming case for the discreteness of neurons.

Yes, since other scientists were siding with Cajal, he should have just conceded.

No, the evidence at the time was simply not sufficient—the images were not sharp enough and the action of his stain was not understood

No, it is important for scientists to keep unpopular views around as they might subsequently be shown to be at least partly true—as Golgi's views were.

Discussion Question

Brodman proposes that different structures are likely to have different functions. Is this

An obvious truth that anyone should endorse

A reasonable assumption that may fail but will provide useful guidance much of the time

A poor assumption that might work sometimes but overall will generally mislead researchers

An obvious falsehood—a structure can always be made to serve any function one wants

Discussion Question

Is holism a dead philosophy (at least regarding the brain)?

Yes. We clearly know that brains are made up of parts and they determine what the whole does.

Yes. Even if we don't have all the answers, the best research strategy is to take brains apart and study their components.

No. We have plenty of example of how components of brains behave differently depending on the whole of which they are a part.

No. Every brain region is connected to other regions, which are then connected to yet other regions. Nothing works in isolation from the rest

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Discussion Question

Where in the brain should you expect to find your self?

In a single neuron

In one or another Brodman area

As a product of the whole brain

No where—it is not found in the brain

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Discussion Question

Does research always have to go down to the lowest level components?

Yes, otherwise we don't understand how processes such as psychological processes are grounded in the world

Yes, because science stands to learn much more from discovering how everything is built out of basic components

No. For some inquiries it suffices to know causal processes at a given level, for example at the level of humans interacting in society

No. For some purposes what is happening at lower levels doesn't make a difference

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Discussion Question

Can there be differentiable regions within a continuous network?

No. A network is necessarily holistic with no divisions.

Yes. Regions of a network can specialize without there been gaps between the parts.

Only to a degree. Even if a region of the network is especially involved in a given activity, it can be influenced by activity elsewhere in the network.

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Discussion Question

Can one believe in discrete neurons and still be a holist?

No. Neurons represent a way to divide the brain up into distinct processing units

No. Each neuron processes inputs from its synapses in its own distinct way

Yes. Neurons have thousands of synapses with other neurons and that integrates them into a whole

Yes. There are lots of other processes in the brain that make neurons dependent on the whole

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Discussion Question

Huxley's "evidence" for his and Hodgkin's explanation of action potential boils down to "observation fits the theory." Is that compelling?

Yes. It took a lot of work to get an equation to fit the observations so the equation is probably correct

No. It just represents one way to fit the data. With a little/lot of work, one could find another

Yes. The elegance of the equation suggests it is on to something. It is not a surprise that it ended up describing the ion channels

No. Theoretical models can only be justified by mechanistic decomposition and finding the right parts

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Discussion Question

What is the best strategy for dealing with the potential of theory-laden perception to blind us to what those with other theories might see?

Learn all theories and try to see the world from all points of view

Accept that you will miss what others see but pursue your own perspective as far as you can

Rely on people in your community to look at the world from different points of view and alert you to important new insights

Other
