

The Brain (Part 2)



PSYCH 1101

PROF. DAVID PIZARRO
DAY 6

Some Class Business

- Course info: cornellpsych.net
- 1103 Sections start week of September 11 (you should have heard/be hearing from Lisa Proper)
- You should have received an email from your “assigned” tutor (but remember you can seek out help from any of them—find their email on the website)
- Prelim conflict? Please see syllabus for allowable exceptions for alternats/ make-ups, and complete form with your request at least 1 week before (unless emergency, obvs).

Big Picture

- Recap: Psychology is the scientific method applied to the human mind-- thoughts, feelings, behavior (Day 1)
 - Variety of methods (Day 2 & 3)
 - Many different levels of analysis (Day 3)
 - The brain causes the mind, so it is a compelling place to start looking for answers (Day 4)

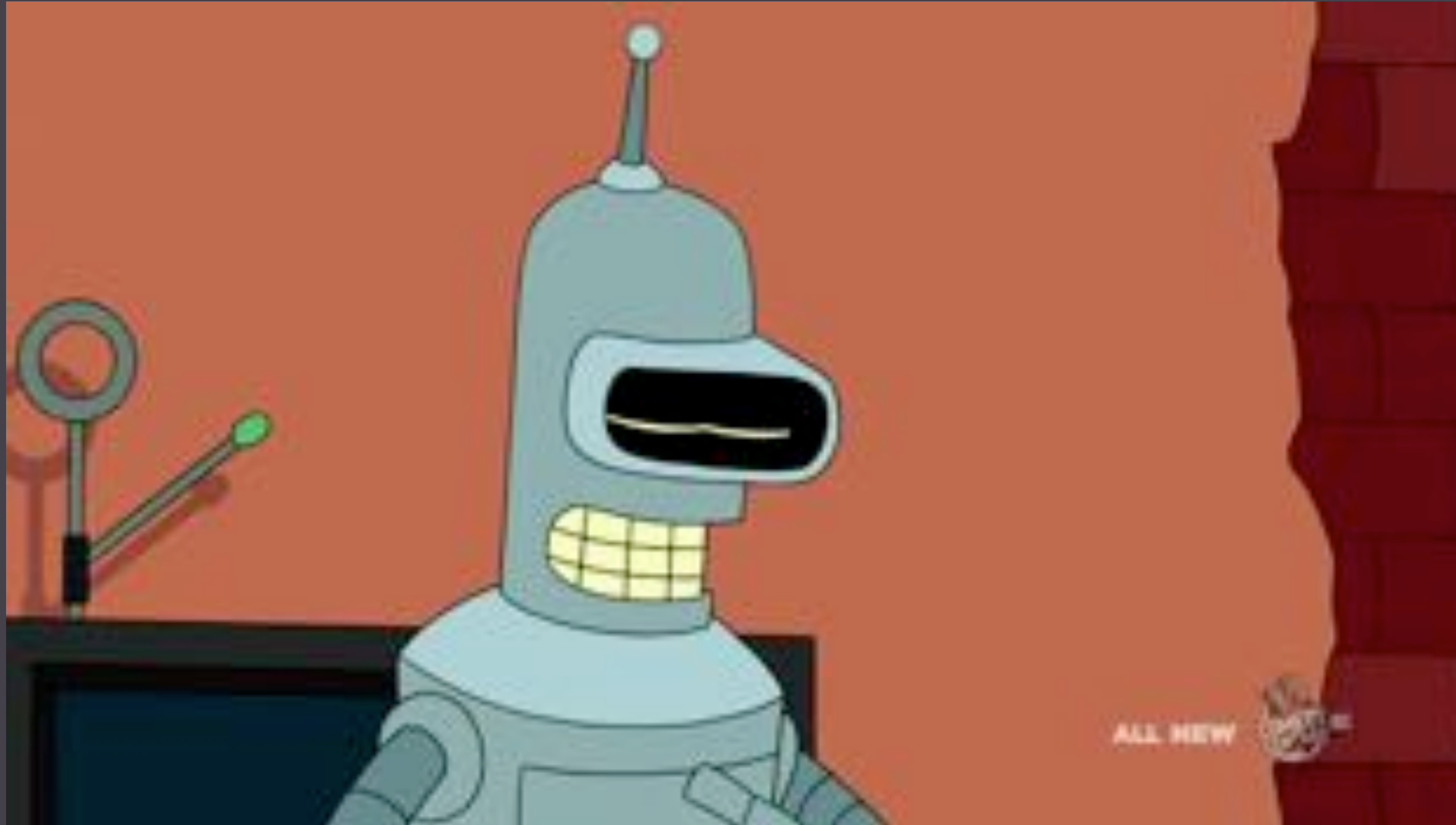
Dualism Seems Intuitive



PAUL BLOOM

“The notion that we are machines made of meat, as Marvin Minsky once put it, is **unintuitive** and **unnatural**. Instead, we feel as if we occupy our bodies. We possess them. We own them. Because of this, we talk about my brain, or my body, using the same language of possession that we use when we talk about my car, or my child. These are things that we possess, that we are intimately related to—**but not what we are.**”

-[emphasis added] from “Descartes’ Baby:How the Science of Child Development Explains What Makes Us Human.”



Futurama S06E10: "The Prisoner of Benda"

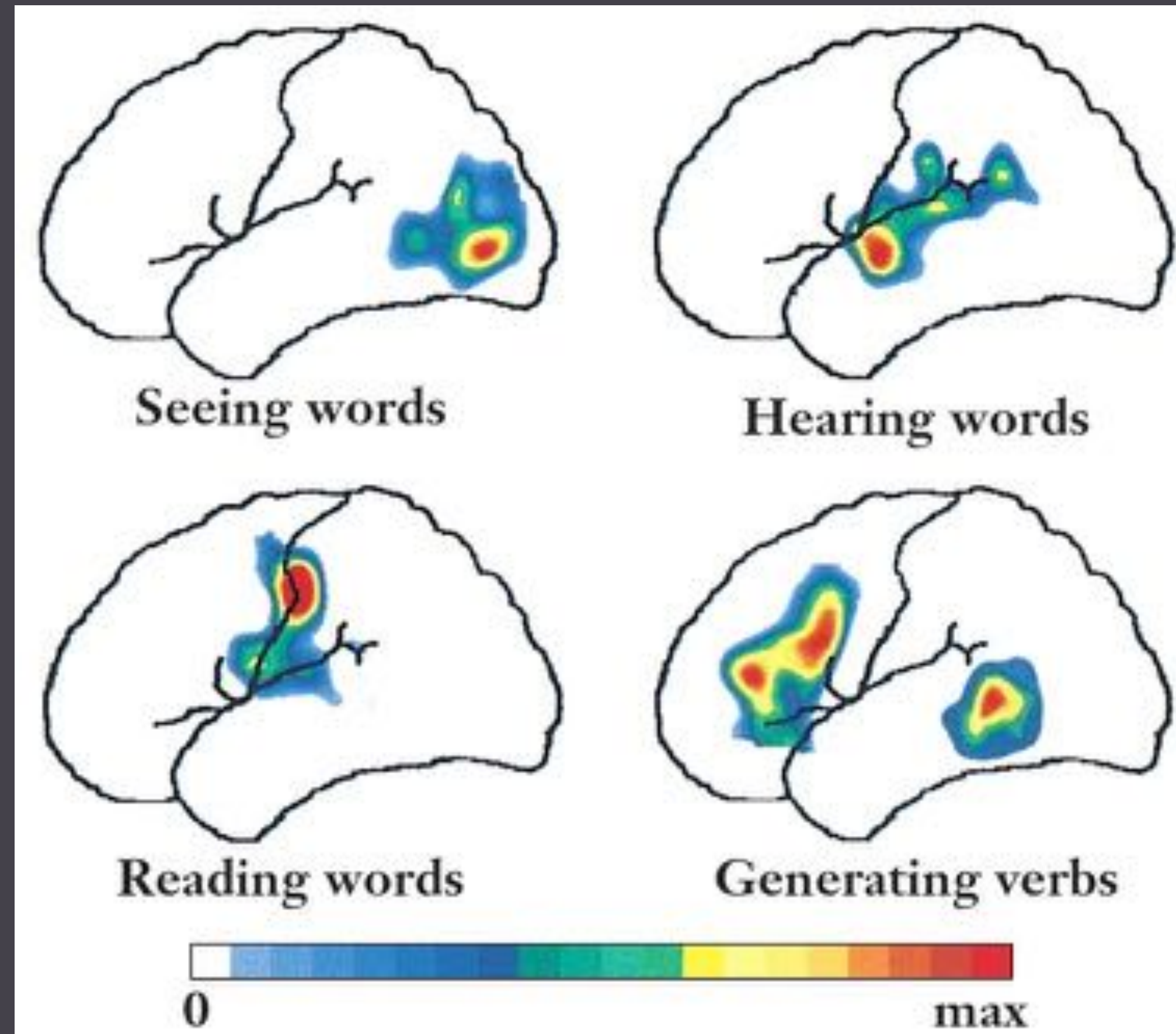
But Dualism Gets In The Way Of Our Scientific Understanding

- It is a problematic view to defend, even philosophically
- We are aware of what physical things (e.g., computers) are capable of doing
- Most importantly, it is more obvious than ever that our minds are linked to our brains in a *necessary* way

Brain Damage = Mind Damage



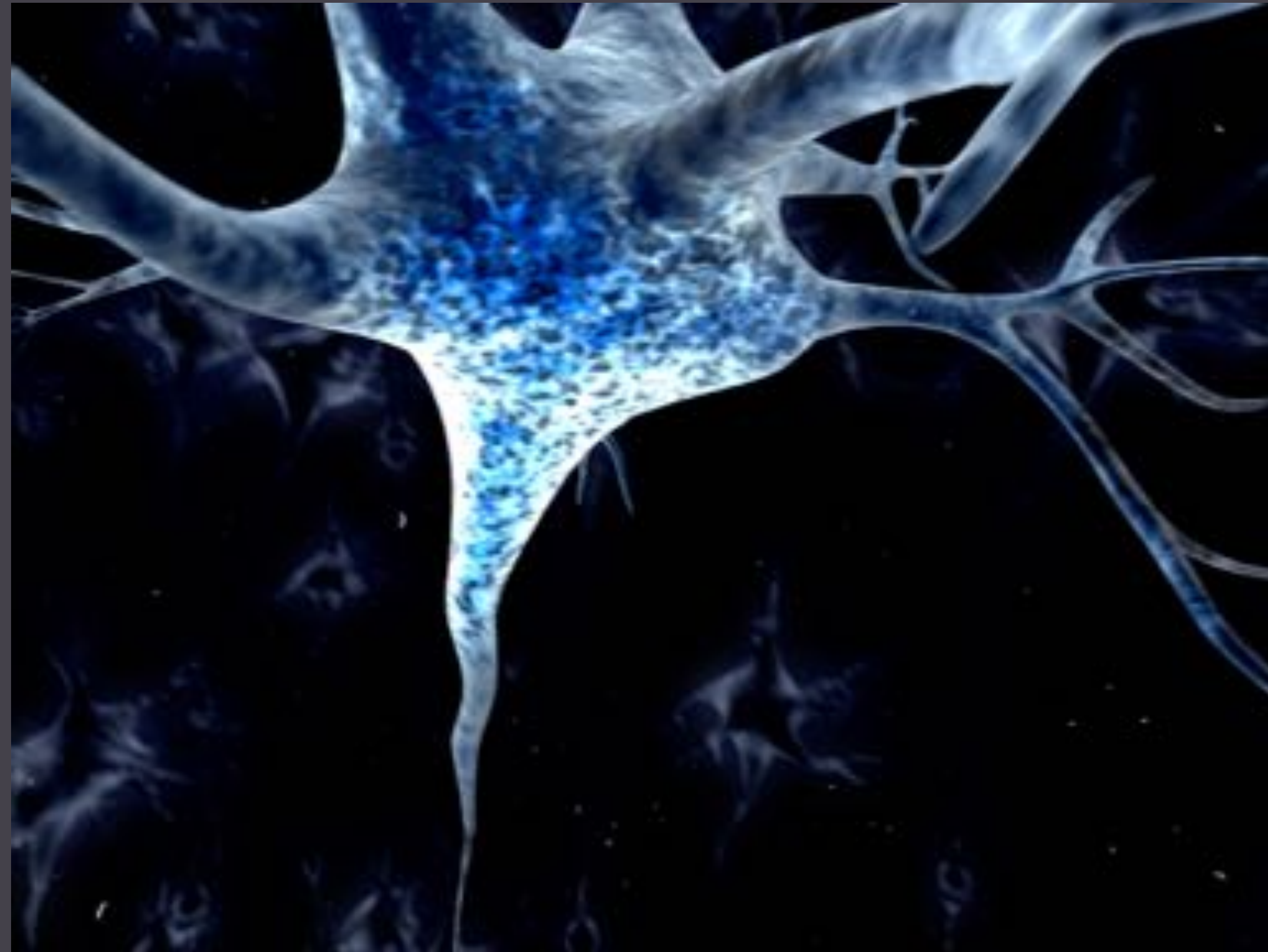
Localized Psychological Processes



Certain Drugs Reliably Alter Brain Chemicals And Affect Behavior, Cognition, And Feeling



How Does The Brain Work?

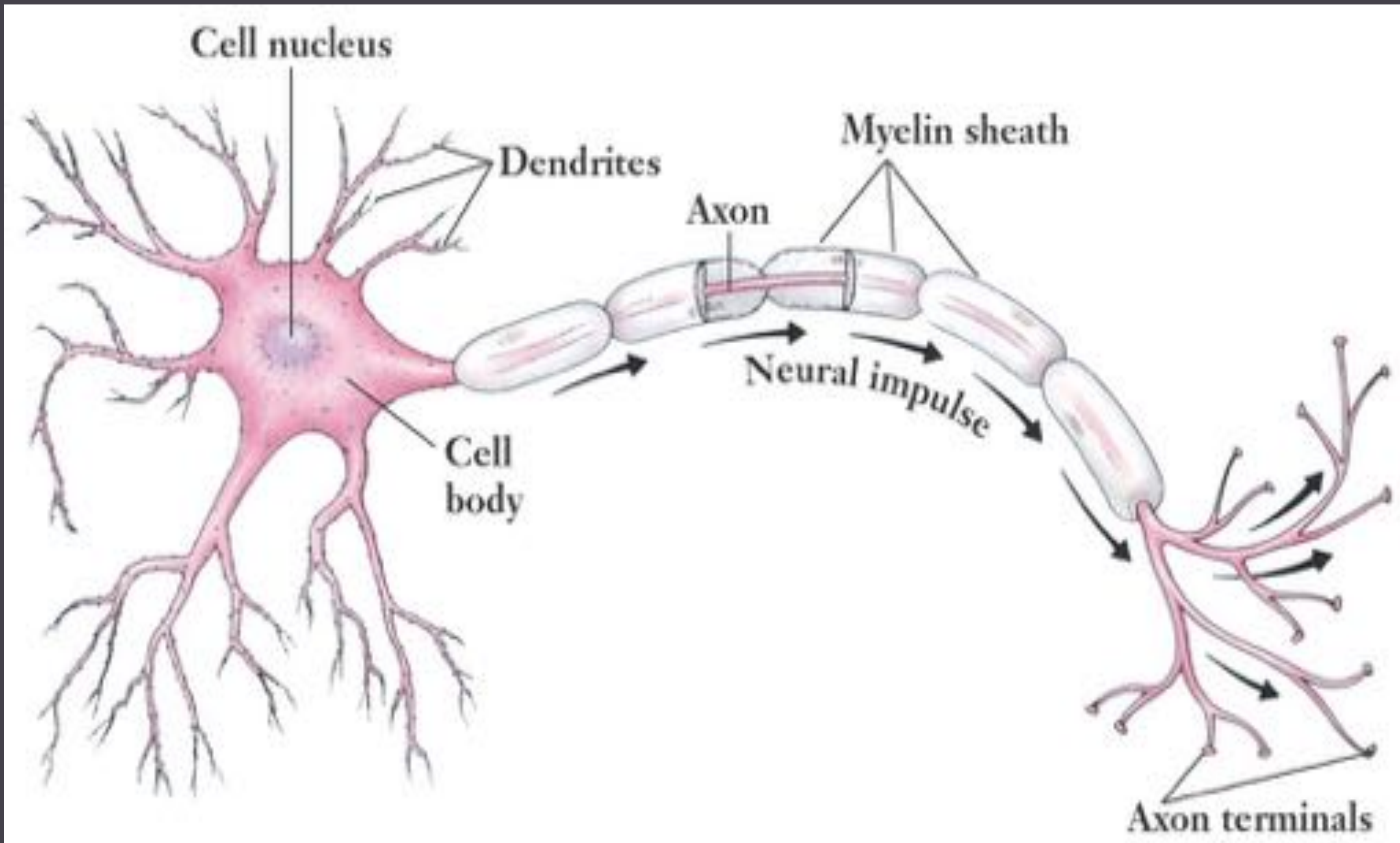


If the human brain were so simple that we could understand it, we would be so simple that we couldn't.

Emerson M. Pugh, *The Biological Origin of Human Values*

Neurons

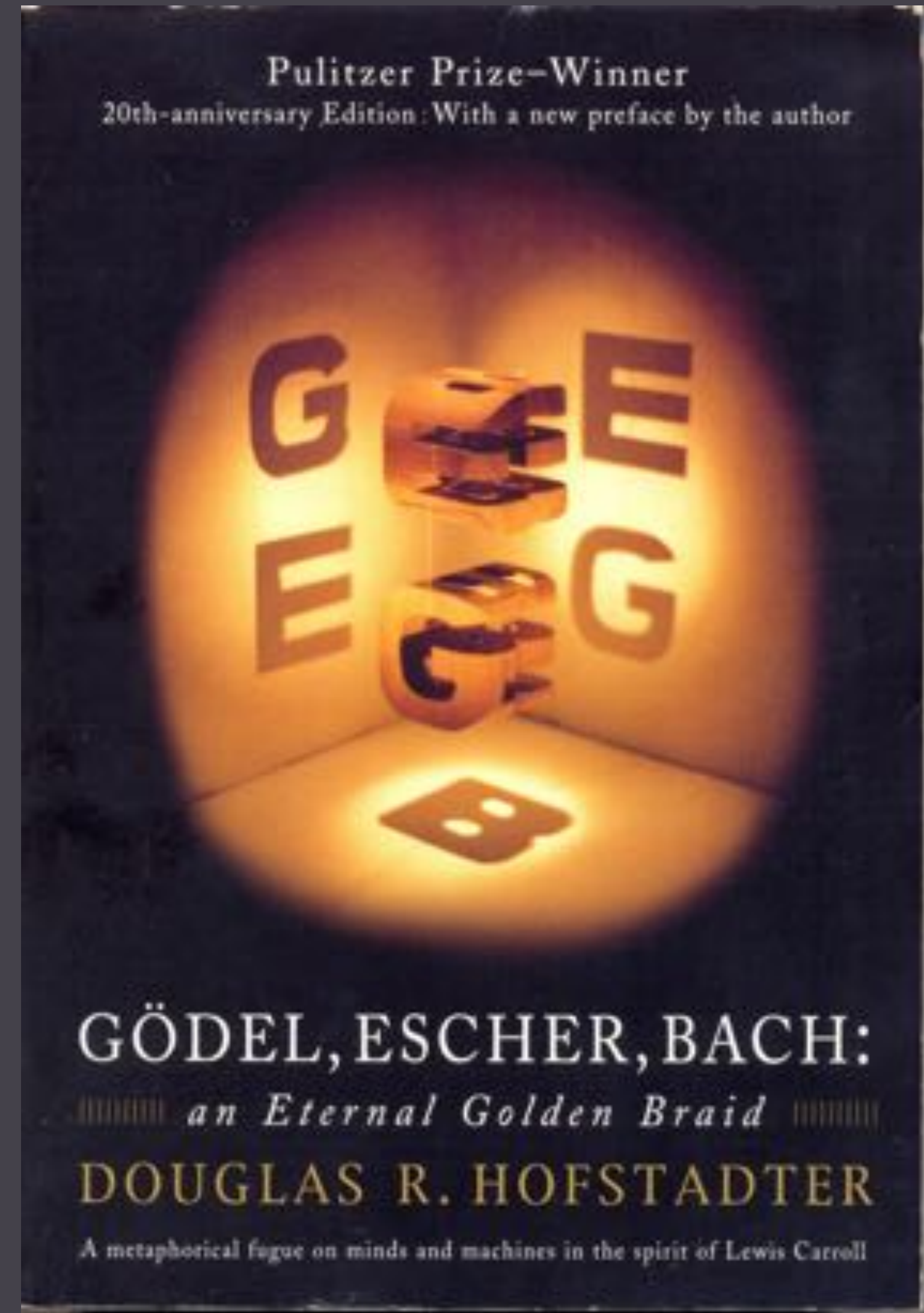
- About 86,000,000,000
- Sensory (afferent) neurons, motor (efferent) neurons, interneurons
- Characterized by all-or-nothing response
- Intensity: expressed through number of neurons firing and frequency of firing



How can a bunch of brain cells
working together make *me*?

"Aunt Hillary"

- **ANTEATER:** For example, even though ants as individuals wander about in what seems a random way, there are nevertheless overall trends, involving large numbers of ants, which can emerge from that chaos.
- **ACHILLES:** Oh, I know what you mean. In fact, ant trails are a perfect example of such a phenomenon. There, you have really quite unpredictable motion on the part of any single ant-and yet, the trail itself seems to remain well defined and stable. Certainly that must mean that the individual ants are not just running about totally at random.
- **ANTEATER:** Exactly, Achilles. There is some degree of communication among the ants, just enough to keep them from wandering off completely at random. By this minimal communication they can remind each other that they are not alone but are cooperating with teammates. It takes a large number of ants, all reinforcing each other this way, to sustain any activity-such as trail building-for any length of time. Now my very hazy understanding of the operation of brains leads me to believe that something similar pertains to the firing of neurons. Isn't it true, Mr. Crab, that it takes a group of neurons firing in order to make another neuron fire?
- **CRAB:** Definitely. Take the neurons in Achilles' brain, for example. Each neuron receives signals from neurons attached to its input lines, and if the sum total of inputs at any moment exceeds a critical threshold, then that neuron will fire and send its own output pulse rushing off to other neurons, which may in turn fire-and on down the line it goes. The neural flash swoops relentlessly in its Achillean path, in shapes stranger than the dash of a gnat-hungry swallow; every twist, every turn foreordained by the neural structure in Achilles' brain, until sensory input messages interfere.



Modern Methods, Levels Of Analysis, And Brain Maps

