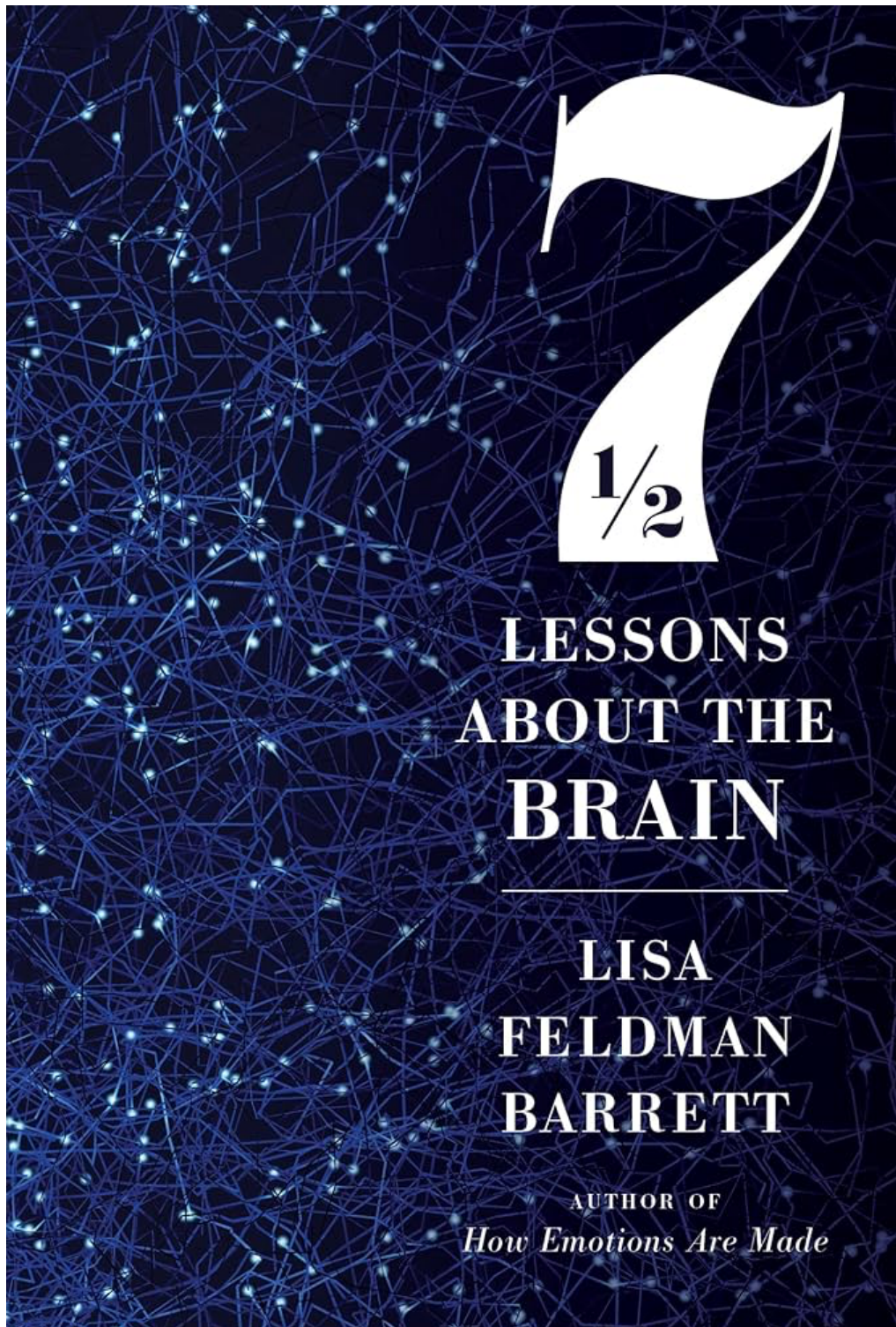


**Seven and a Half Lessons About the Brain (2020) - Lisa Feldman Barrett, PhD**



**About Dr. Lisa Feldman Barrett**

Among the top 1 per cent most-cited scientists in the world for her revolutionary research in psychology and neuroscience. She is a University Distinguished Professor at Northeastern University with appointments at the Massachusetts General Hospital and Harvard Medical School. Dr. Barrett was awarded a Guggenheim fellowship in neuroscience in 2019, and she is a member of the American Academy of Arts and Sciences and the Royal Society

of Canada. She is the author of *How Emotions Are Made*. She lives in Boston.

## Outline

*In seven short chapters (plus a brief history of how brains evolved), this slim, entertaining, and accessible collection reveals mind-expanding lessons from the front lines of neuroscience research. You'll learn where brains came from, how they're structured (and why it matters), and how yours works in tandem with other brains to create everything you experience. Along the way, you'll also learn to dismiss popular myths such as the idea of a 'lizard brain' and the alleged battle between thoughts and emotions, or even between nature and nurture, to determine your behaviour. Sure to intrigue casual readers and scientific veterans alike, *Seven and a Half Lessons About the Brain* is full of surprises, humour, and important implications for human — a gift of a book about our most complex and crucial organ that you will want to savour again and again*

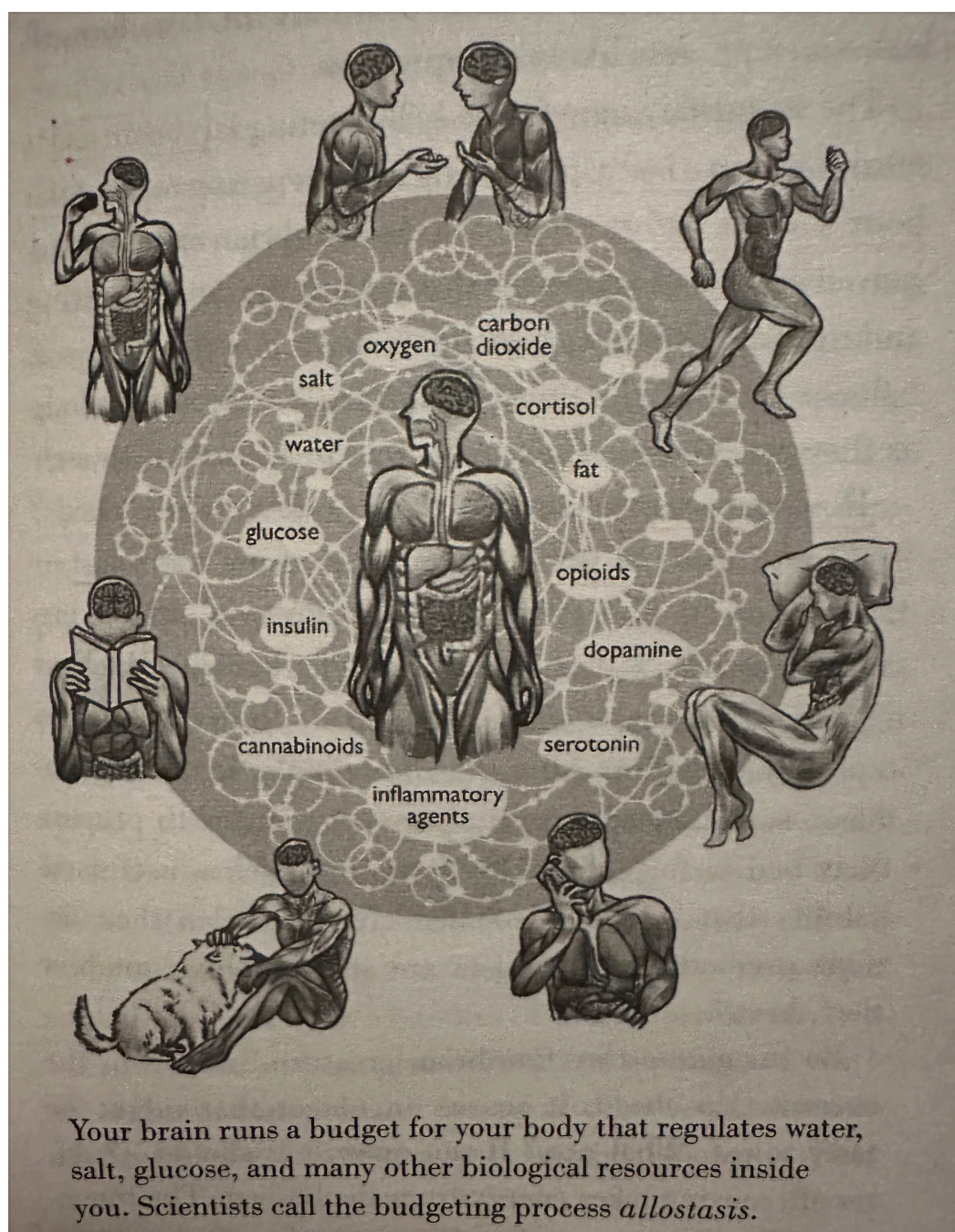
***What follows are quotes from the book above. These quotes stood out to psychotherapist Emil Barna in his reading of the book in 2024. They are not meant to be exhaustive nor representative of the entire book. All quotes are to be read in this context and must not replace medical and/or other professional advice. Note: Any typographical errors occurred through the transcription process and do not reflect what may be found in the book.***

***Note also: Beneath various quotations from the book, I may have added my own comments/things. These will always be in bold italics. Further, where I have made bold text from the quotations below, it's to emphasise a point. My emphasis does not appear in the original text.***

## The Half-Lesson: *Your Brain Is Not for Thinking*

"Every action you take (or don't take) is an economic choice — **your brain is guessing when to spend resources and when to save them.**"





"*allostasis* [...] automatically predicting and preparing to meet the body's needs before they arise."

"How can animals predict their bodies' future needs? The best source of information comes from their past."

"Your brain's most important job is to control your body — to manage allostasis — by predicting energy needs before they arise so you can efficiently make worthwhile movements and survive. Your brain continually invests your energy in the hopes of earning a good return"

***Your brain seeks balance. Without it, you're doomed to be thrown back and forth in the wind. C.S. Lewis famously said (about faith): "Now Faith,***

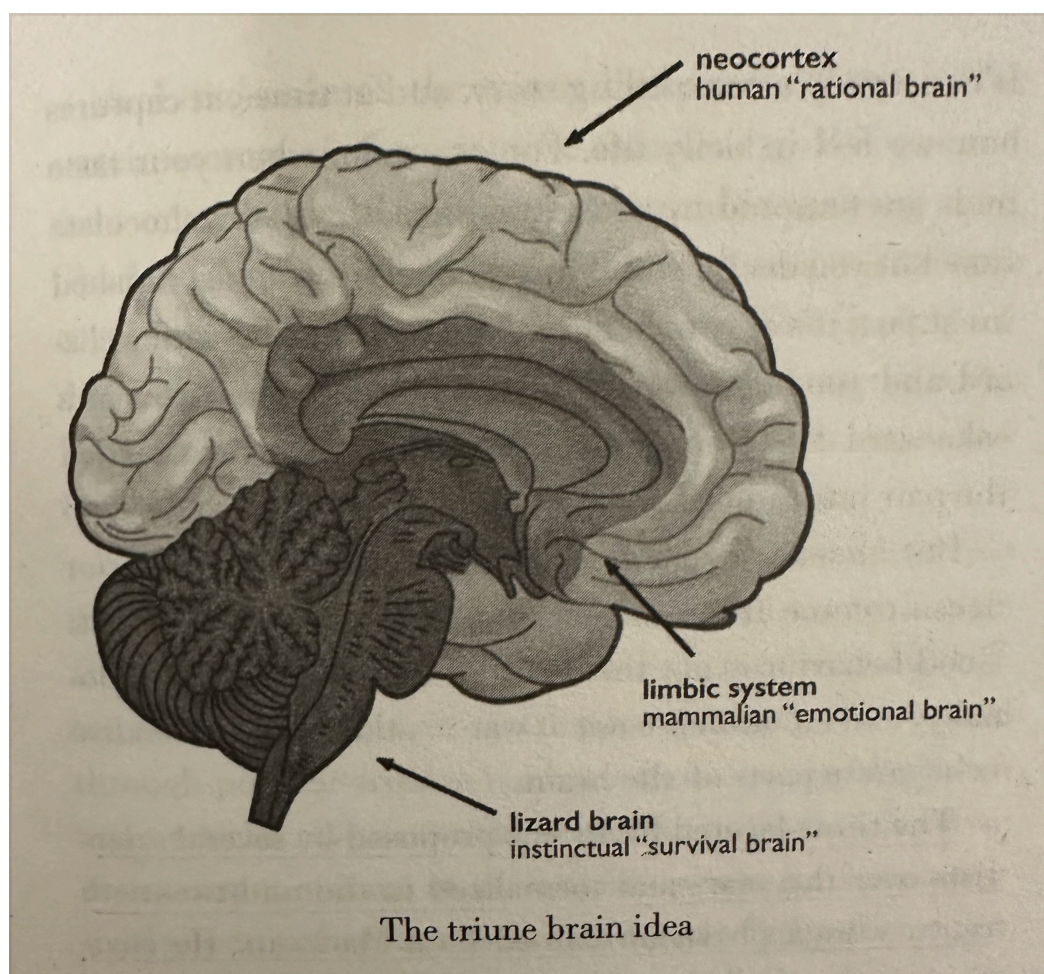
*in the sense in which I am here using the word, is the art of holding on to things your reason has once accepted, in spite of your changing moods. For moods will change, whatever view your reason takes. I know that by experience. Now that I am a Christian I do have moods in which the whole thing looks very improbable: but when I was an atheist I had moods in which Christianity looked terribly probable. This rebellion of your moods against your real self is going to come anyway. That is why Faith is such a necessary virtue: unless you teach your moods 'where they get off', you can never be either a sound Christian or even a sound atheist, but just a creature dithering to and fro, with its beliefs really dependent on the weather and the state of its digestion." (In Mere Christianity). Sure, he was speaking about his conversion to Christianity—I'm relating it here to finding balance within the constant state of flux we find ourselves in. Allostasis (apparently different to homeostasis which talks about how the body seeks to maintain rigid 'set point') is the process where we adjust how we're use energy according to what our environment demands. There's no rigid internal set-point—the brain, instead, interprets the environmental and coordinates whatever changes must occur using neurotransmitters, hormones, and other signals.*

## **Lesson No. 1: You Have One Brain (Not Three)**

*The triune brain idea is one of the most successful and widespread errors in all of science.*

*This idea is paradigm-shifting. Think about all the neuroscientists and therapists who would raise their eyebrows at this. My first thoughts go to Dr. Dan Siegel's work, and many like him. I shall withhold judgement and see where Dr. Feldman-Barrett's arguments lie...*





"The three-layered brain was proposed by several scientists over the years and formalized in the mid-twentieth century by a physician named Paul MacLean. He envisioned a brain [...] using the best technology available at the time: visual inspection. That meant **peering through a microscope at the brains of various dead lizards and mammals, including humans, and identifying their similarities and differences by sight alone.**"

"By the 1990s, experts had completely rejected the idea of a three-layered brain. **It simply didn't hold up when they analyzed neurons with more sophisticated tools.**"

"scientists have learned that **evolution does not add layers to brain anatomy** like geological layers of sedimentary rock. But human brains are obviously different from rat brains, so how exactly did our brains come to differ if not by adding layers? It turns out that **as brains become larger over evolutionary time, they reorganize.**"

Okay, this is a good point. If we thought of the triune brain as one layer built upon another, then it makes sense that people would but the idea of three different levels. But her point is that as neurons built the brain over time, they built it through connectivity, organising it in ways that made sense, kind of like how an artist

"Scientists have recently discovered that the **brains of all mammals are built from a single manufacturing plan**, and most likely, the brains of reptiles and other vertebrates follow that same plan."

***A template? Interesting.***

"the manufacturing process runs in stages, and the stages last for shorter or longer durations in different species. The biological building blocks are the same; what differs is the timing."

"the human brain has **no new parts**. The neurons in your brain can be found in the brains of other mammals and, likely, other vertebrates."

**"Our cortex is just a scaled-up version of the relatively smaller cortex found in relatively smaller-brained monkeys, chimps, and many carnivores.** It's also a scaled-down version of the larger cortex found in the larger brains of elephants and whales. If a monkey's brain could grow to human size, its cerebral cortex would be the same size as ours. Elephants have much more cerebral cortex than we do, but so would an elephant-sized human brain."

"during the course of evolution, certain genes mutated to cause particular stages of brain development to run for longer or shorter times, producing a brain with proportionally bigger or smaller parts. [...] **There is no such thing as a limbic system dedicated to emotions.** And your misnamed neocortex is not a new part; many other vertebrates grow the same neurons that, in some animals, organize into a cerebral cortex if key stages run for long enough."

***An enormous claim if one were to think about how much the idea of the limbic system being all about emotions is sold to us. Is the claim, then, that the entire brain is working based on a network of connections so that there's no one place where something is housed? Let's wait and see.***

***Your brain is not more evolved than a rat or lizard brain, just differently evolved.***

"What we call **mental illnesses** [...] **may be rational body-budgeting for the short term that's out of sync with the immediate environment**, the needs of other people, or your own best interests down the road."

"Distress can be evidence that your whole brain is expending resources toward an anticipated payoff."

**"You have one brain, not three.** To move past Plato's ancient battle, we might need to fundamentally rethink what it means to be rational, what it means to be responsible for our actions, and perhaps even what it means to be human."

## Lesson No. 2: *Your Brain Is a Network*

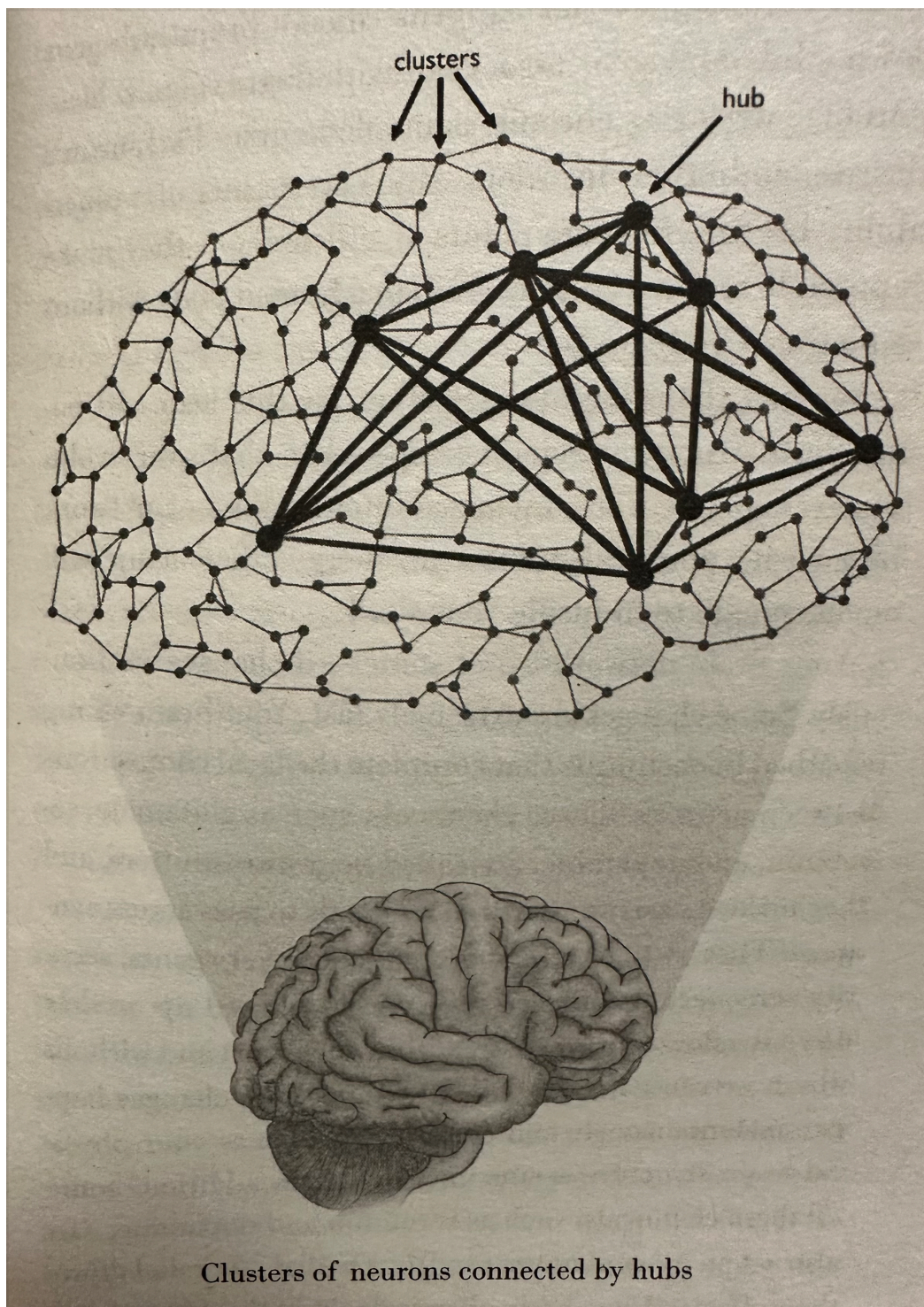
"Your brain, in turn, is a network of **128 billion neurons connected as a single, massive, and flexible structure.**"

"neurons never just sit around waiting for something in the outside world to make them fire. Instead, **all of your neurons chat constantly with one another through their wiring.** Their communications may become stronger or weaker depending on what's happening in the world and in your body, but the conversation never stops until you die. [...] **Each neuron directly passes information to just a few thousand other neurons and receives information from a few thousand others, give or take, yielding over five hundred trillion neuron-to-neuron connections.**"

*no neuron has a single psychological function, though a neuron may be more likely to contribute to some functions than others.*

"A brain network [...] allows us to consider how one physical structure reconfigures in an instant to integrate vast amounts of information efficiently."





Clusters of neurons connected by hubs

### Lesson No. 3: *Little Brains Wire Themselves to Their World*

"**Tuning** means strengthening the connections between neurons, particularly connections that are used frequently or are important for budgeting the resources of your body [...] Well-tuned connections are more efficient at carrying and processing information than poorly tuned ones and are therefore more likely to be reused in the future. [...] Meanwhile, less-used connections weaken and die off. [...] This is the process of **pruning**, the neural equivalent of "If you don't use it, you lose it." Pruning is critical in a developing brain, because **little humans are born with many more connections than they will**

**ultimately use.** A human embryo creates twice as many neurons as an adult brain needs, and **infant neurons are quite a bit bushier than neurons in an adult brain.** Unused connections are helpful at the outset. They enable a brain to tailor itself to diverse environments. But over the longer term, unused connections are a burden, metabolically speaking they don't contribute anything worthwhile, so it's a waste of energy for the brain to maintain them."

"Sensory integration itself is tuned and pruned as babies grow. A newborn at first can't recognize his mother by her face, because he hasn't learned what a face is, and his visual system isn't fully formed. He might know a bit about how his mother sounds, and he can smell her breast milk. **If you put a newborn on his mother's belly, he will wriggle up to her breast by following the aroma.** Soon, he learns to recognize his mother by different combinations of all his senses together. His little brain absorbs each pattern of sight, smell, sound, touch, and taste, plus sensations from inside his body, and learns its meaning: the person who regulates his body budget is here. **Sensory integration conjures his first feeling of trust. It's part of the neural foundation for attachment.**"

#### **Lesson No. 4: Your Brain Predicts (Almost) Everything You Do**

"Faced with [...] ambiguous scraps of sense data, your brain must somehow figure out what to do next. Remember, **your brain's most important job is to control your body so you stay alive and well.** Your brain must somehow make meaning [...] **Your brain can draw on your lifetime of past experiences [...]** *The last time I encountered a similar situation, when my body was in a similar state, what did I do next?* [...] **your brain combines information from outside and inside your head to produce everything you see, hear, smell, taste, and feel.**"

"Neuroscientists like to say that your day-to-day experience is a carefully controlled hallucination, constrained by the world and your body but ultimately constructed by your brain."

"think of the last time you were thirsty and drank a glass of water. **Within seconds after draining the last drops, you probably felt less thirsty. This event might seem ordinary, but water actually takes about twenty minutes to reach your blood-stream.** Water can't possibly quench your thirst in a few seconds. So **what relieved your thirst? Prediction.** As your brain plans and executes the actions that allow you to drink and swallow, it simultaneously anticipates the sensory consequences of gulping water, causing you to feel less thirsty long before the water has any direct effect on your blood."

your brain issues predictions and checks them against the sense data coming from the world and your body. What happens next still astounds me, even as a neuroscientist. **If your brain has predicted well, then your neurons are already firing in a pattern that matches the incoming sense data.** That

means this sense data itself has no further use beyond confirming your brain's predictions. **What you see, hear, smell, and taste in the world and feel in your body in that moment are *completely constructed in your head*.**

*Brains aren't wired for accuracy. They're wired to keep us alive.*

**"If you can honestly say, "I absolutely disagree with those people, but I can understand why they believe what they do," you're one step closer to a less polarized world."**

**"More control** also means **more responsibility**. If your brain doesn't merely react to the world but actively predicts the world and even sculpts its own wiring, then who bears responsibility when you behave badly? You do."

"Now, when I say *responsibility*, I'm not saying people are to blame for the tragedies in their lives or the hardships they experience as a result. We can't choose everything that we're exposed to. I'm also not saying that people with depression, anxiety, or other serious illnesses are to blame for their suffering. I'm saying something else: **Sometimes we're responsible for things not because they're our fault, but because we're the only ones who can change them.**"

Your developing brain was handed a trajectory. Things are different after you grow up. You can hang out with all kinds of people. You can challenge the beliefs that you were swaddled in as a child. You can change your own niche. Your actions today become your brain's predictions for tomorrow, and those predictions automatically drive your future actions. Therefore, **you have some freedom to hone your predictions in new directions, and you have some responsibility for the results**. Not everyone has broad choices about what they can hone, but **everyone has some choice**. As the owner of a predicting brain, you have more control over your actions and experiences than you might think and more responsibility than you might want."

## **Lesson No. 5: *Your Brain Secretly Works with Other Brains***

**"co-regulation** has measurable effects. Changes in one person's body often prompt changes in another person's body, whether the two are romantically involved, just friends, or strangers meeting for the first time."

"Without someone else helping to regulate our body budgets, we bear an extra burden."

"It's metabolically costly for a brain to deal with things that are hard to predict. No wonder people create so-called **echo chambers**, surrounding themselves with news and views that reinforce what they already believe—**it reduces the metabolic cost and unpleasantness of learning something new.**"



*An interesting (and accurate) reasoning around echo chambers. Not just laziness—metabolically pragmatic. Diane mean we have to like them. Take her previous point: "If you can honestly say, "I absolutely disagree with those people, but I can understand why they believe what they do," you're one step closer to a less polarized world." I often think about this. Why must we agree with others about everything? For goodness sake, I don't even agree with my wife about everything AND I'M MARRIED TO HER! Where does this expectation grow from—it's rife in our culture. This sense of tribalism. Perhaps we need to develop a thicker crust ... and understand that showing grace and tolerance doesn't mean agreeing with the other person. Another point: there's a difference between being nice and being kind—one is focused on people-pleasing while the other is focused on building relationships, and therefore a kind person might not be 'nice' in order to help the other...*

"many brain regions that process language also control the insides of your body, including major organs and systems that support your body budget. [...] **Words, then, are tools for regulating human bodies.** [...] Over time, *anything* that contributes to chronic stress can gradually eat away at your brain and cause illness in your body."

*Is this why, then, many people can't think of the words when they're feeling stressed? And, in the case of alexithymia, why people don't know how to describe what they're feeling, or know they're feeling at all?*

"Your nervous system is bound up with the behavior of other humans, for better or for worse. You can argue what the data means or if it's important, but it is what it is. [...] **The best thing for your nervous system is another human. The worst thing for your nervous system is also another human.**"

## **Lesson No. 6: Brains Make More than One Kind of Mind**

"The idea of a single, universal human nature is so much more comfortable than continuous variation. So even when scientists do acknowledge that there are different kinds of minds, they try to tame the variation by organizing it into categories. **They sort people into neat little boxes with labels.** [...] **what you believe about yourself** [...] research suggests **may have little to do with your actual behavior in daily life.**"

"An especially useful feature of the mind, and one of the closest things we have to a universal mental feature, is mood — the general sense of feeling that comes from your body. Scientists call it *affect*. Feelings of affect range from **pleasant to unpleasant, from idle to activated. Affect is not emotion; your brain produces affect all the time, whether you're emotional or not and whether you notice it or not.**"

"your hormones, organs, and immune system are producing a storm of sense data, and you're barely aware of it. [...] Your brain [...] makes meaning from this data storm continuously to predict your body's next action and meet its metabolic needs before they arise. [...] something miraculous happens. Your brain summarizes what's going on with your body in the moment, and you feel that summary as affect. [...] Affect hints at whether your body budget is in balance or in the red."

"transformation from physical signals to mental feelings remains one of the great mysteries of consciousness. [...] **you are not stuck with the mind you have. You can modify your mind.** People do this all the time."

"Military personnel have to **acculturate** at least twice —when they enter the armed forces and when they return home from deployment. Your brain constantly issues predictions to manage your body budget, and if those predictions are out of sync with your current culture, your budget may accrue a deficit, which makes it easier for you to become sick."

## **Lesson No. 7: Our Brains Can Create Reality**

"As your brain compresses data from all your senses, it integrates them into a cohesive whole, an activity that we previously called sensory integration. Each time one of your neurons compresses its inputs to make a summary, that multisensory summary is an abstraction of the inputs."

"The wiring of your cerebral cortex makes compression possible. **Compression enables sensory integration. Sensory integration enables abstraction. Abstraction permits your highly complex brain to issue flexible predictions based on the functions of things rather than on their physical form. That is creativity.**"

## **Appendix**

*The biggest challenge of science writing is deciding what to leave out. A science writer, like a sculptor, chips away at complex material until something compelling and comprehensible takes shape. The end result is necessarily incomplete from a strict scientific perspective, but (one hopes) still correct enough not to offend most experts.*

"the brain is not for thinking but for regulating a body in a particular niche"

"**Allostasis** [body budgeting] is a predictive balancing process over time, not a process that seeks a single, stable point for the body to maintain (it's not like a thermostat). The word for seeking a single, stable point is **homeostasis**."

"In the same way that your brain has a primary motor cortex and a whole

system of structures in your sub-cortex for controlling your muscle movements, it also has a primary visceromotor cortex and a whole system of subcortical structures for controlling your viscera. Some visceral organs, like your lungs, require your brain in order to function. Your heart and your gut, however, have their own intrinsic rhythms, and the visceromotor system in your brain fine-tunes them."

"Even though the limbic system is a myth, **your brain does contain something called limbic circuitry**. Neurons in limbic circuitry connect to the brain stem nuclei that regulate your autonomic nervous system, immune system, endocrine system, and other systems whose sense data create interoception, your brain's representation of the sensations in your body. **Limbic circuitry is not exclusive to emotion and is distributed across multiple brain systems. It includes subcortical structures, such as the hypothalamus and the central nucleus of the amygdala; allocortical structures, such as the hippocampus and the olfactory bulb; and parts of the cerebral cortex, such as the cingulate cortex and the anterior part of the insula.**"

"**chronic stress causes brain atrophy**. It reduces brain tissue, notably in parts of the brain that are important for body budgeting (allostasis), learning, and cognitive flexibility. [...] we can't view the microarchitecture of a living human brain in enough detail to know exactly what changes occur. This is why scientists study the impact of stress on nonhuman animals and then carefully generalize to humans where possible. [...] **people who reported exposure to verbal abuse in childhood were more likely to experience anxiety, depression, and anger during young adulthood.** [...] Participants who reported a harsher family environment with more verbal aggression showed more immune dysfunction and more metabolic dysfunction as time went on, whereas participants with average exposure showed no change in these markers, and those with the lowest exposures were healthier. [...] verbal aggression can alter the immune response sufficiently to reactivate latent herpes viruses, reduce the benefits of common vaccines, and slow the healing of wounds."

**Brief commentary:** If you want a deeper exploration into the deep science of this little book, check out Feldman-Barrett's *How Emotions Are Made*. It's dense ... like, *really* dense. For a non-neuroscientist that is. As a clinician, I want to understand what's going on beneath what I see in the room but when we get deep in the weeds, I lose focus. That's why this little book was great for me. In saying that, I did read her other one and, like this, she explains how what we take for granted in understanding the mind is commonly wrong ... or at least incomplete. I especially liked her interview on Steve Bartlett's DOAC podcast. If you want to get to know her ideas without reading her work, check it out [here](#).



*These notes were collected by psychotherapist and author Emil Barna in December 2025 in his efforts to assist with professional development and further education for himself and those who read them. You can find out more about Emil by visiting [www.barnacc.com](http://www.barnacc.com)*

***"A text without a context is a pretext to a proof text."***

**—Dr. Don Carson**