



Brain Rules (Updated and Expanded): 12 Principles for Surviving and Thriving at Work, Home, and School

By John Medina

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Most of us have no idea what’s really going on inside our heads. Yet brain scientists have uncovered details every business leader, parent, and teacher should know—like the need for physical activity to get your brain working its best.

How do we learn? What exactly do sleep and stress do to our brains? Why is multi-tasking a myth? Why is it so easy to forget—and so important to repeat new knowledge? Is it true that men and women have different brains?

In *Brain Rules*, Dr. John Medina, a molecular biologist, shares his lifelong interest in how the brain sciences might influence the way we teach our children and the way we work. In each chapter, he describes a brain rule—what scientists know for sure about how our brains work—and then offers transformative ideas for our daily lives.

Medina’s fascinating stories and infectious sense of humor breathe life into brain science. You’ll learn why Michael Jordan was no good at baseball. You’ll peer over a surgeon’s shoulder as he proves that most of us have a Jennifer Aniston neuron. You’ll meet a boy who has an amazing memory for music but can’t tie his own shoes.

You will discover how:

- Every brain is wired differently
- Exercise improves cognition
- We are designed to never stop learning and exploring
- Memories are volatile
- Sleep is powerfully linked with the ability to learn
- Vision trumps all of the other senses
- Stress changes the way we learn

In the end, you'll understand how your brain really works—and how to get the most out of it.

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Editorial Review

Review

"Dissects the workings of the brain in plain English, explaining its role in the workplace and classroom...a writing style that makes words leap off the page."

- **USA TODAY**

"Oliver Sacks meets Getting Things Done."

- **Cory Doctorow, co-editor of Boing Boing**

"A marvelous job in simplifying the best ways to get the most out of our brains. He is funny, tender, and completely engaging. Everyone should read this book."

- **John Ratey, MD, author of *Spark and A User's Guide to the Brain***

"Brain Rules is one of the most informative, engaging, and useful books of our time."

- **Garr Reynolds, author of *Presentation Zen***

"A self-designated 'grumpy scientist,' Medina cites only research that has appeared in peer-reviewed journals and that has been successfully replicated. Remarkably, this molecular biologist is a gifted communicator who is able to write for both the scientist and the layperson."

- **Psychiatric Times**

"Medina has taken what may be the most complex thing we know -- the human mind -- and explained it in a way that even the human mind can understand. Brain Rules is THE book on how neuroscience can help you at work and at home."

- **Douglas Stone, co-author of *Difficult Conversations***

"Few people are better qualified to help managers sift through all the hype than John Medina."

- **Harvard Business Review**

About the Author

John Medina is a developmental molecular biologist and research consultant. He is an affiliate professor of bioengineering at the University of Washington School of Medicine. He was the founding director of two brain research institutes: the Brain Center for Applied Learning Research, at Seattle Pacific University, and the Talaris Research Institute, a nonprofit organization originally focused on how infants encode and process information. Medina lives in Seattle, Washington, with his wife and two boys.

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Introduction

Go ahead and multiply the number 8,388,628 x 2 in your head. Can you do it in a few seconds? There is a young man who can double that number 24 times in the space of a few seconds. He gets it right every time. There is a boy who can tell you the precise time of day at any moment, even in his sleep. There is a girl who can correctly determine the exact dimensions of an object 20 feet away. There is a child who at age 6 drew such vivid and complex pictures, some people ranked her version of a galloping horse over one drawn by da Vinci. Yet none of these children have an IQ greater than 70.

The brain is an amazing thing.

Your brain may not be nearly so odd, but it is no less extraordinary. Easily the most sophisticated information-transfer system on Earth, your brain is fully capable of taking the little black squiggles in this book and deriving meaning from them. To accomplish this miracle, your brain sends jolts of electricity crackling through hundreds of miles of wires composed of brain cells so small that thousands of them could fit into the period at the end of this sentence. You accomplish all of this in less time than it takes you to blink. Indeed, you have just done it. What's equally incredible, given our intimate association with it, is this: Most of us have no idea how our brain works.

12 Brain Rules

My goal is to introduce you to 12 things we know about how the brain works. I call these Brain Rules. For each rule, I present the science, introduce you to the researchers behind it, and then offer ideas for how the rule might apply to our daily lives, especially at work and school. The brain is complex, and I am taking only slivers of information from each subject—not comprehensive but, I hope, accessible.

Here is a sampling of the ideas you'll encounter:

- We are not used to sitting at a desk for eight hours a day. From an evolutionary perspective, our brains developed while we walked or ran as many as 12 miles a day. The brain still craves this experience. That's why exercise boosts brain power (Brain Rule #2) in sedentary populations like our own. Exercisers outperform couch potatoes in long-term memory, reasoning, attention, and problem solving tasks.
- As you no doubt have noticed if you've ever sat through a typical PowerPoint presentation, people don't pay attention to boring things (Brain Rule #6). You've got seconds to grab someone's attention and only 10 minutes to keep it. At 9 minutes and 59 seconds, you must do something to regain attention and restart the clock—something emotional and relevant. Also, the brain needs a break. That's why I use stories in this book to make many of my points.

Ever feel tired about three o'clock in the afternoon? That's because your brain really wants to take a nap. You might be more productive if you did. In one study, a 26-minute nap improved NASA pilots' performance by 34 percent. And whether you get enough rest at night affects your mental agility the next day. Sleep well, think well (Brain Rule #3).

- We'll meet a man who can remember everything he reads after seeing the words just once. Most of us do more forgetting than remembering, of course, and that's why we must repeat to remember (Brain Rule #7). When you understand the brain's rules for memory, you'll see why I want to destroy the notion of homework.
- We'll find out why the terrible twos only look like active rebellion but actually are a child's powerful urge to explore. Babies may not have a lot of knowledge about the world, but they know a whole lot about how to get it. We are powerful and natural explorers (Brain Rule #12). This never leaves us, despite the artificial environments we've built for ourselves.

What we know about the brain comes from biologists who study brain tissues, experimental psychologists who study behavior, cognitive neuroscientists who study how the first relates to the second, and evolutionary biologists. Though we know precious little about how the brain works, our evolutionary history tells us this: The brain appears to be designed to (1) solve problems (2) related to surviving (3) in an unstable outdoor environment, and (4) to do so in nearly constant motion. I call this the brain's performance envelope. Each subject in this book—exercise, sleep, stress, wiring, attention, memory, sensory integration, vision, music, gender, and exploration—relates to this performance envelope. We were in motion, getting lots of exercise. Environmental instability led to the extremely flexible way our brains are wired, allowing us to solve problems through exploration. To survive in the great outdoors, we needed to learn from our mistakes. That meant paying attention to certain things at the expense of others, and it meant creating memories in a particular way. Though we have been stuffing them into classrooms and cubicles for decades, our brains actually were built to survive in jungles and grasslands. We have not outgrown this.

Because we don't fully understand how our brains work, we do dumb things. We try to talk on our cell phones and drive at the same time, even though it is literally impossible for our brains to multitask when it comes to paying attention. We have created high-stress office environments, even though a stressed brain is significantly less productive than a non-stressed brain. Our schools are designed so that most real learning has to occur at home. Taken together, what do the studies in this book show? Mostly this: If you wanted to create an education environment that was directly opposed to what the brain was good at doing, you probably would design something like a classroom. If you wanted to create a business environment that was directly opposed to what the brain was good at doing, you probably would design something like a cubicle. And if you wanted to change things, you might have to tear down both and start over.

Blame it on the fact that brain scientists rarely have a conversation with teachers and business professionals, education majors and accountants, superintendents and CEOs. Unless you have the Journal of Neuroscience sitting on your coffee table, you're out of the loop.

This book is meant to get you into the loop.

Users Review

From reader reviews:

Nicole Oneal:

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