



## **Brain Bugs: How the Brain's Flaws Shape Our Lives**

*Dean Buonomano*

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**Brain Bugs: How the Brain's Flaws Shape Our Lives** Dean Buonomano

**A lively, surprising tour of our mental glitches and how they arise.**

With its trillions of connections, the human brain is more beautiful and complex than anything we could ever build, but it's far from perfect. Our memory is unreliable; we can't multiply large sums in our heads; advertising manipulates our judgment; we tend to distrust people who are different from us; supernatural beliefs and superstitions are hard to shake; we prefer instant gratification to long-term gain; and what we presume to be rational decisions are often anything but. Drawing on striking examples and fascinating studies, neuroscientist Dean Buonomano illuminates the causes and consequences of these "bugs" in terms of the brain's innermost workings and their evolutionary purposes. He then goes one step further, examining how our brains function-and malfunction-in the digital, predator-free, information-saturated, special effects-addled world that we have built for ourselves. Along the way, Brain Bugs gives us the tools to hone our cognitive strengths while recognizing our inherent weaknesses.

## **Brain Bugs: How the Brain's Flaws Shape Our Lives Details**

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Author : Dean Buonomano

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## From Reader Review Brain Bugs: How the Brain's Flaws Shape Our Lives for online ebook

### **Brian Clegg says**

There are far too many popular science books around about emotions and pleasure and goodness knows what, so it might seem that the whole idea of writing about brain-related issues has got a bit tired... and then along comes Brain Bugs, which is an absolute delight to read and truly fascinating.

Dean Buonomano identifies the places where the brain gets it wrong, either because of technical problems - a classic example being optical illusions (there's one of the best optical illusions I've seen in the book) - or because it was 'programmed' for life on the Savannah 100,000 years ago and doesn't have a great fit with modern life. Along the way we'll find things like memory (and why it gets things wrong), incorrect estimation of the rate of passing of time, fear, advertising, probability and the supernatural (Buonomano argues that religion is probably so strong for evolutionary reasons). I really enjoyed all the sections talking about the way our brains get into a pickle.

The only downside is that when the author gets into the technical practicalities of what's causing what in the brain it can all become just a bit too techie and detailed. I'm with Richard Feynman, who explaining a cat's nervous system (I think), was told that biology students would have learned all the names for all the bits. No wonder, Feynman, said, it took them so long to get a biology degree. He thought there's no point knowing all those labels - you can just look them up - and I'm inclined to agree.

But this doesn't take away from the fact that this is a brilliant book about the failings of your most important organ. They won't kill you (usually) but they certainly will enthrall you.

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### **John Martindale says**

In writing a review I often find it most difficult to be verbose concerning books that I agree with and thus most of my favorite books don't contain reviews. But when I differ with an author, boy, my fingers get to typing. Please forgive me as I pontificate.

I am quite put off by religious fundamentalist who assume they and their own alone have a perfectly objective grasp of Truth, and yet at the same time are utterly oblivious to their unsupported presuppositions, assumptions and circular reasoning. They are completely unaware that they interpret (what they assumed to be the inerrant) bible through certain cognitive filters and biases. In their fundamentalist little world, all that doesn't coincide with what they already believe is nonsense, insidious propaganda, lies and misinformation. Though on the complete opposite end of the spectrum, Buonomano a staunch materialist, seemed just as much a fundamentalist as, say the pastor of Westboro baptist church. The author appeared completely dogmatic and unaware of his presuppositions, assumptions and circular reasoning. He seemed to assume that science, a wonderful method for discovering one aspect of reality can speak about all reality and all science can speak about isn't knowledge. It is like taking a microscope and claiming all that he cannot see through its lens doesn't exist and is nonsense.

So now, science explains everything and anything science can't explain doesn't exist, which is obvious

because we know everything that exist can be explained by science and this is known because science alone can explain everything. Now with this presuppositions in place, it is obviously true that science can only discover material and efficient causes--so only material and efficient causes exist. Materialism is therefore the ONLY rational world-view and only truths that are consistent with materialism are true. If you believe otherwise, you are delusional, irrational or inflicted by brain bugs.

Now with the discovery that the universe had a beginning and that science proves there is no necessary Being who is the source of all being, this means we must blindly accept that the natural laws just somehow came into existence of their own accord and all matter banged into being from nothing. After several billion years life formed from inanimate matter, complex information formed from randomness and noise and consciousness derived from non-conscious matter. We must just accept that the brain which evolved merely for survival and to propagate ones genes can in a purely deterministic universe just so happen come upon the Truth that we are all accidents in a completely meaningless and purposely universe destined for extinction. None of this is science, its philosophy and purely blind assertions. The author believes the irrationality of everyone who doesn't reason from these absurd presuppositions. It has been said that the game determines the rules and the rules determine the game. The author seems to think that religious people don't have ANY evidence AT ALL, all belief in God is completely irrational, a result of brain bugs. Of course, this is because, as we already know, only that which fits in his nice and tidy materialist world-view counts as evidence. He has stacked the deck.

Though not stated, I imagine he'd claim with other materialist that there is absolutely no evidence of design or purpose in the universe. So it was interesting the author repeatedly talked about evolution programming this and designing that, while sharing many of his unfalsifiable just-so stories. He also wrote like this evolution evolved some X for some purpose Y. I suppose it is just a useful metaphors....

He wrote how there is no evidence of a intelligent designer because creature out their could have been better engineered, hell, my truck could have been better engineered, is this proof of the same thing? Also, my truck cannot fly, surely this too is proof it had no intelligent designer. I am not arguing for intelligent design, but I just think it is silly to look at some function of an animal that in could be better in some other context, and confidently claim it as proof that it blindly and mindlessly designed and programmed itself on the fly for some unpurposeful purpose. I also feel the author made light of the phenomenal design we do find, sure, our eye cannot see a penny five miles away, but it is truly remarkable in what it does.

Of course, since the author is a hard-line fundamentalist, there is no shadow of doubt in his mind, that all religious beliefs are due to brain bugs. He then goes on to provide some explanations for these insidious bugs which keep people from seeing how obvious it is that nothing exist but the universe (or maybe a billion of other universes that popping in and out of existence).

Horrible brain bugs infect all children, causing them to irrationally believe in brain/body dualism and in a non-existent God, tragically many never escape the delusions even as they grow into adulthood. Fortunately a thoroughly materialistic indoctrination hopefully will cure them. I was surprise the author didn't discuss how maybe operations or medications might be developed that could kill these bugs, so finally we might live in a secular utopia and eradicate all religion once and for all.

So finally, I will address an example that was either disingenuous or a sign of ignorance in the author, hopefully the latter. He was talking about how religion might have evolved because it resulted in people treating those in their in group better, which results in that group utter hating those outside of their group. His example its truth was from the bible, he mentioned some verse that commanded good treatment of their fellow Israelite and then to contrast this with how Israelites supposedly considered all foreigners, he mentioned the horrendous passage about killing all the Canaanites. I despise this passage demanding the slaughter of men, woman and children, but it was context oriented and only was for those in the land of Canaan. There were MANY other commands in the Old Testament that demanded the Israelites to show

kindness to the foreigner, sadly the Canaanites were not included among them.

But yeah, my rant is over.

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### **Sean says**

I think I was the wrong audience for this book. It wasn't that it was terrible, but as one with a science background and a long interest in how the brain works, there wasn't any new information here. It didn't help that the book reads like a fake textbook in the same way that Jon Stewart is fake news. It's not that there isn't actual information there, but it's not a citable source. Some kind of narrative framework would have done this book a world of good. I like a great many non-fiction works, but the best ones still have a narrative that is used to present the information being conveyed. Instead it was just a dry "lets talk about neurons", next chapter: "lets talk about synapses", next chapter "lets talk about neurons AND synapses". Sure, there were little quips about observed human behaviors that can be directly correlated to the ways in which it is currently understood that the brain is wired, and perhaps those would help carry the dryness of the text for folks that were not already aware of those little quips.

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### **Correen says**

A review of research organized to explain why our brains sometimes lead us astray or do not work efficiently. Buonomano uses mostly well known and accepted research covering such topics as how we make decisions, how information biases our thinking, ghost limbs after loss of limb, tinnitus, and many more. He treats each of these as bugs in wiring and, for some, also discusses the value of the bug to our ancestors. In some cases the bug works beautiful under some circumstances and gets in trouble in other circumstances such as our automatic judgements that help us when speed is needed but lead to many errors. Buonomano covers much territory and leaves the reader with much to consider.

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### **Richard says**

Well, I'll probably never get around to reading this one. I've read quite a few PopCog books, and don't see any immediate evidence that this one will add anything fundamentally new. But it does seem like a good selection to point towards for someone new to the topic.

The author was interviewed on NPR's *Fresh Air* on July 14, 2011. To check out highlights of the interview, listen online or download an MP3, click over to "Brain Bugs": *Cognitive Flaws That "Shape Our Lives"*.

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### **A. says**

Really interesting and full of useful information. If you ever wonder why people do stupid things, this helps explain the brain's shortcomings.

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## Prof X says

Though many points in the book are interesting, the book suffers from several serious flaws.

First is Buonomano's insistence that everything humans do be explained exclusively in terms of stories about what must have, or at least might have, led our ancestors to live longer and thus be able to have more sex. The telling of such stories is, evidently, what "doing science" amounts to these days, in some disciplines.

The reduction of everything to the amount of sex our great, great, great, . . . great grandparents, furthermore, is not only kind of crude, but ultimately unsatisfying as an explanation of anything. It's like explaining why a billiard ball rolled in a particular direction simply by saying it was struck by a cue stick, while neglecting to mention anything about the game being played.

As William James wrote in his *Varieties of Religious Experience*, "By their fruits ye shall know them, not by their roots!" Saying where things come from in mechanical terms tells us nothing about their value. Since his point is that what he is describing are "bugs," and thus that they have no value, one wonders what good it does us to listen to stories about how such "bugs" could've helped our ancestors have more sex.

Second, in the book, Buonomano is condescending to anyone not of his (non)religious and political persuasion. You might not think that making fun of religion and the political opinions of half the country would have a place in a popular science book, but Buonomano evidently does.

Third, Buonomano repeatedly uses the language of intelligent design to explain the workings of evolutionary processes. If he is going to present things as intelligently designed, perhaps he shouldn't be making fun of those who believe they are intelligently designed.

Fourth, Buonomano repeatedly appeals to "rationality," or "what is rational," as his ultimate standard for what is good and bad, but never once bothers to explain what rationality is, where it comes from, and what makes it a legitimate standard. Perhaps we should simply make up a story about how appealing to rationality as a standard (is a biproduct of something that) helped our ancestors live longer and thus have more sex.

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## Hamideh Mohammadi says

It was a good book, but it took me a while to finish it because some element was missing. Something that would make the argument more interesting, hence 4 stars.

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## Bryna Kranzler says

We all know that our brains play tricks on us; if you have any doubt of this, just watch some Ted videos that give dramatic examples of this. But Dr. Buonomano's excellent, lighthearted and very accessible book provides cogent examples of how and why our brains perform the tricks on us that they do, and how we often benefit. One of the first examples Buonomano cites is in his explanation of how "the brain edits and censors

much of the the information it feeds the conscious mind [in] much the same fashion that your brain likely edited out the extra ‘the’ from the previous sentence...” Huh? I had to go back and reread the previous sentence to see that there was an extra “the” that my brain (eyes?) had just skipped over.

Reading Brain Bugs is like watching a skilled magician, knowing he’s trying to misdirect the audience but still being unable to spot the deception. This information is valuable even if you don’t want to use it to manipulate your environment, but if you do, there are other fascinating examples. Another one that hook my attention was an experiment in which people are given clipboards to hold – one group gets a heavy clipboard and the other gets a lightweight clipboard. Then both groups were given a foreign currency and asked to estimate its value. The people who held the heavier clipboard attributed a higher value/heavier weight to the currency! This opens up all sorts of possibilities for using the power of suggestion or exploiting “crosstalk” in the brain.

Bryna Kranzler, author, *The Accidental Anarchist*

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### **Amir Tesla says**

This book depicts a decent picture of our brains associative architecture which has been developed through millions of years of evolution and natural selection.

The book explains numerous mechanisms of the brain that in the course of evolution were developed to protect and further help the survival of human beings but the very same mechanisms now are the source of many of our flaws in decision making and susceptibility to various exploits.

The downside to the book was first: As far as I'm concerned with neuroscience and brain flaws, the book wasn't even close to cover an exhaustive list of the bugs. The second problem I had with the book was that the author frequently took detours out of science realm into the philosophical domain which I couldn't feel was his area of expertise.

I mean common, I bought the ticket to watch some neuroscience, what's up with the philosophical debates :| :P

All in all, I would claim I got more in depth knowledge regarding associative architecture of the brain and I think I'm more adept at exploiting certain sets of bugs (for good purposes of course :D). Especially eliciting desired goal through priming and anchoring effects.

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### **Bettie? says**

travelling mp3, new car and an open road...

Description: *A lively, surprising tour of our mental glitches and how they arise.*

*With its trillions of connections, the human brain is more beautiful and complex than anything we could ever build, but it's far from perfect. Our memory is unreliable; we can't multiply large sums in our heads;*

*advertising manipulates our judgment; we tend to distrust people who are different from us; supernatural beliefs and superstitions are hard to shake; we prefer instant gratification to long-term gain; and what we presume to be rational decisions are often anything but. Drawing on striking examples and fascinating studies, neuroscientist Dean Buonomano illuminates the causes and consequences of these "bugs" in terms of the brain's innermost workings and their evolutionary purposes. He then goes one step further, examining how our brains function-and malfunction-in the digital, predator-free, information-saturated, special effects-addled world that we have built for ourselves. Along the way, Brain Bugs gives us the tools to hone our cognitive strengths while recognizing our inherent weaknesses.*

The plan was to have a fab fic feb however with a surprise new car and some vacation time full of flexi-time goodness, the month will be dedicated to non-fic as it is far superior at engrossing my neck-top computer.

Buonomono demonstrates how bad we all are at maths, well, mental arithmetic to be more precise, and also included was that forensic education staple of misidentification by Jennifer Thompson of Ronald Cotton. Found most of this book contained ideas that I had read before in Science magazine etc. Still, the nodule does contain some strange landscape and is always worth a re-visit.

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### **Ed Smiley says**

Very readable.

Many books on the brain spend a lot of time on brain physiology which gets really esoteric for the layperson, and many fundamentals get lost. However Dean Buonomano discusses basics for how our thinking is composed, associatively, of neural networks and synapses.

On the basis of Hebb's law (popularly described as "wired together fire together") and a few other considerations, such as that brain architecture is evolutionarily based, he is able to describe the foundations of a whole panoply of common cognitive errors and illusions. The associative nature means that the presence of other thoughts can taint our logic. The evolutionary aspect means that certain instinctual beliefs or biases were either adaptive to primitive conditions or invisible in them; the rapid ascent of technics and civilization has made many of them maladaptive. Of course this review is no substitute for actually reading the book. I think that it will change the way you think about your own thinking.

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### **John Kaufmann says**

Really good read. Right up there with the best of the books on the brain/cognitive science/neuroscience/evolutionary psychology (of which there is a growing number): comparable to The Invisible Gorilla: And Other Ways Our Intuitions Deceive Us and Subliminal: How Your Unconscious Mind Rules Your Behavior, Willpower: Rediscovering the Greatest Human Strength, Predictably Irrational: The Hidden Forces That Shape Our Decisions, though a little shy of the two best, Kahneman and Tversky's Thinking, Fast and Slow, and Steven Pinker's The Blank Slate: The Modern Denial of Human Nature.

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### **Christopher says**

This was a very interesting and informative book. The author draws on (and provides detailed references to) a wide variety of research on how our brains work, and specifically, how they are wired. He points out specific ways that our brains have not caught up to the complex decisions that our modern society call for and why we often make poor long-term choices. I especially liked: Chapter 4 - Temporal Distortions and the section where he illuminates the Subjectivity of Time; Chapter 5 - Fear Factor and the section on Amygdala Politics; Chapter 7 - The Advertising Bug and his revelations on Animal Advertising; and finally Chapter 9 - Debugging where he provides usefull suggestions for how we can use what we have learned about our brain bugs to help us counter-act their influence.

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### **Steven Turek says**

The information in the book was interesting, but there were points that got a little too condescending for my taste. Apparently if you are in any way spiritual or religious, you are a primitive yokel who needs to look to science for answers rather than have faith. Apparently the draw to believe in something more powerful than yourself is a flaw in your brain that you need to overcome.

That being said, the majority of this book is good. The author is able to provide a myriad of research to back up his points up to the last two chapters. At that point he starts to leave us with only his opinions (which he clearly states that he is going to do) and the book devolves into a rather weak ending.

Overall pretty good, though I would suggest skipping the chapter on the "Supernatural" if you are spiritual and don't want to feel made fun of.

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