



Brainwashed: The Seductive Appeal of Mindless Neuroscience

Sally L. Satel , Scott O. Lilienfeld

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FINALIST FOR THE *LOS ANGELES TIMES* BOOK PRIZE IN SCIENCE

What *can't* neuroscience tell us about ourselves? Since fMRI—functional magnetic resonance imaging—was introduced in the early 1990s, brain scans have been used to help politicians understand and manipulate voters, determine guilt in court cases, and make sense of everything from musical aptitude to romantic love. But although brain scans and other neurotechnologies have provided groundbreaking insights into the workings of the human brain, the increasingly fashionable idea that they are the most important means of answering the enduring mysteries of psychology is misguided—and potentially dangerous.

In *Brainwashed*, psychiatrist and AEI scholar Sally Satel and psychologist Scott O. Lilienfeld reveal how many of the real-world applications of human neuroscience gloss over its limitations and intricacies, at times obscuring—rather than clarifying—the myriad factors that shape our behavior and identities. Brain scans, Satel and Lilienfeld show, are useful but often ambiguous representations of a highly complex system. Each region of the brain participates in a host of experiences and interacts with other regions, so seeing one area light up on an fMRI in response to a stimulus doesn't automatically indicate a particular sensation or capture the higher cognitive functions that come from those interactions. The narrow focus on the brain's physical processes also assumes that our subjective experiences can be explained away by biology alone. As Satel and Lilienfeld explain, this “neurocentric” view of the mind risks undermining our most deeply held ideas about selfhood, free will, and personal responsibility, putting us at risk of making harmful mistakes, whether in the courtroom, interrogation room, or addiction treatment clinic.

A provocative account of our obsession with neuroscience, *Brainwashed* brilliantly illuminates what contemporary neuroscience and brain imaging can and cannot tell us about ourselves, providing a much-needed reminder about the many factors that make us who we are.

Brainwashed: The Seductive Appeal of Mindless Neuroscience Details

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L. Satel , Scott O. Lilienfeld**

From Reader Review Brainwashed: The Seductive Appeal of Mindless Neuroscience for online ebook

Holly says

There is a surprising and seemingly paradoxical trend right now that is making the old free will/determinism question fraught and dangerous. The progressive thinkers are now the determinists. Moral agency can be understood without free will. (See Heidi Ravven's *The Self Beyond Itself*) The authors of Brainwashed have a political reason to reify free will and they're afraid the new brain sciences are a threat.

One chapter in this book provided me with some information I needed about what exactly an fMRI measures and how it works (hence the 2nd star). And obviously neuroscience is being misapplied and misunderstood. They do a good job of illustrating some of that problem. After that, though, the authors' political positions shine through - particularly in a chapter on drug addiction and the brain. And though their delineation of how popular thinkers have misused neuroscience seemed by and large accurate and necessary, I'm still waiting for a book that can put it all into perspective without the libertarian agenda.

Jafar says

"A new study suggests feeling powerful dampens a part of the brain that helps us connect with others," is what I read in an article on NPR yesterday. You read something like this almost every day. The authors of this book have a valid point in that these days every emotion and thought and act is being wrongly associated with a brain activity pattern in an fMRI scan. The irony is that any pop neuroscience book that you pick up boasts about the complexity of the human brain — that it's the most complex known object in the entire universe, that it has some 100 billion neurons, each with one to ten thousand synaptic connections with other neurons, that the number of possible configurations of the human brain is greater than the number of elementary particles in the entire universe. And yet, among all this complexity, they can tell from a brain scan what you think about a political candidate, if you believe what's being published as science journalism.

Mellius says

Neuroscience heeft veel nieuwe inzichten opgeleverd over de werking van onbewuste denkprocessen en invloeden op gedrag. Dit boek brengt nuance in de hype rondom neuroscience.?Veel fysiologische bevindingen blijken samen te hangen met gedrag, maar dat is nog niet genoeg om gedrag juist te voorspellen. Activiteit in specifieke hersengebieden kunnen meerdere oorzaken hebben en op verschillende dingen duiden. Harde bewijzen voor effectief gebruik van neuroscience toepassingen zijn nog niet geleverd.?

Clayton says

A decent introduction to the dangers of using neuroscientific evidence for a reader who has little or no background in psychology or neuroscience. Although the authors provide good critiques, they still focus too much on people's morale when trying to overcome afflictions. It is not to say the authors are incorrect, but

they oversimplify the idea that people can "just decide" not to commit a crime, stop abusing a drug, or not be influenced by an advertisement. I believe this is a great book for an introductory course in behavioral neuroscience TAS a tool to help engage students in tricky philosophical and ethical issues that involve neuroscience and psychology.

Kaitlin says

This was alright, not the best book. I've always been curious about the brainwashing system in cults, politics, religion, etc...but while reading although it was interesting read but they went all over the place and would bring up things like mental health and all that which they decided to jump over after talking about brainwashing and how it effective and all that.

Miles says

As an amateur neuroscience enthusiast, I'm obligated not only to seek out the best and most recent neuroscientific findings, but also to be wary of how these findings might be abused. Any scientific discipline that can be easily monetized and/or misinterpreted by the popular media will spawn its share of hacks, prophets, and snake oil salesmen, and neuroscience is no exception.

Sally Satel and Scott O. Lilienfeld's *Brainwashed: The Seductive Appeal of Mindless Neuroscience* is a clever, concise, and balanced analysis of how certain individuals and groups misrepresent the discoveries and practical applications of modern neuroscience. Satel and Lilienfeld's approach is not to assault neuroscience with a polemic from outside the discipline, but to critique it from within, carefully sorting out supportable claims from insupportable ones. As they see it, the problem with "mindless neuroscience is not neuroscience itself," but rather how neuroscience is "oversold by the media, some overzealous scientists, and neuroentrepreneurs who tout facile conclusions that reach far beyond what the current evidence warrants" (xiv).

Comfortably situated in the tradition of responsible skepticism, *Brainwashed* is a terrific example of scientific self-correction. Satel and Lilienfeld take on a host of arenas in which unwarranted transgressions threaten to give neuroscience a bad name: brain imaging, neuromarketing, models of addiction, lie detection, neurolaw, and the problem of moral responsibility. The authors handle each topic adroitly, delimiting the areas where neuroscientific evidence is strong and exposing the ways it can be misunderstood or willfully misused. The text is accessible and brief, but not at the expense of clarity and nuance.

Brainwashed contains a thorough explanation of exactly why the results of brain imaging studies can be so easily misconstrued: "Scientists cannot 'read' specific thoughts with fMRI; they can only tell that brain regions already known to be associated with certain thoughts or feelings have demonstrated an increase in activity" (3). This means not only that collectors of fMRI data could be working with potentially flawed or incomplete assumptions about what kinds of thoughts and feelings are generated by activity in certain brain regions, but also that using fMRI results to make conclusions about subjective experience is an act of *interpretation*, not direct mind reading.

This does not discredit the validity of fMRI studies, which are hugely informative in many medical and research contexts, but it does place fairly strict limits on our ability to unambiguously link pictures of the

brain with their correlating modes of phenomenal experience. “Mental activities do not map neatly onto discrete brain regions,” Satel and Lilienfeld write. “Most neural real estate is zoned for mixed-use development” (11-2). So the problem is not that we are looking at unreliable data when we view a brain scan, but rather that the chances of the image correlating with mental experience that’s at least slightly (or significantly) different than what we *think* we’re looking at are often high. These facts, which are well known in neuroiterate circles but not always grasped by the general public, are too often glossed over or ignored entirely when funding or consumer wallets hang in the balance.

Satel and Lilienfeld’s most effective general strategy for debunking the modern neurocraze is simply to put it in historical context. Science’s history of genuine discovery and technological progress is matched by an equally robust tradition of overreach:

"Some experts talk of neuroscience as if it is the new genetics, that is, just the latest overarching narrative commandeered to explain and predict virtually all human behavior. And before genetic determinism there was the radical behaviorism of B. F. Skinner, who sought to explain human behavior in terms of rewards and punishments. Earlier in the late nineteenth and twentieth centuries, Freudianism posited that people were the products of unconscious conflicts and drives. Each of these movements suggested that the causes of our actions are not what we think they are. Is neurodeterminism poised to become the next grand narrative of human behavior?" (xviii-xix)

The hard version of “neurodeterminism” is a tough pill for most to swallow, but the broader neuroscientific perspective—along with the “evolutionary epic” within which it is situated—seems a likely candidate for “the next grand narrative of human behavior.” We have been here before, and likely will be again when the next big scientific breakthrough arrives. This background knowledge indicates that we ought to cultivate the promise of neuroscience while also avoiding the fallacies of the past. Hailing neuroscience as a “final” or “complete” method of analysis will create more confusion than enlightenment. (I won’t deny that it might one day be possible for neuroscience to yield highly reliable or even comprehensive predictions of human behavior, but that assertion is neither currently testable nor relevant when addressing contemporary issues that require immediate attention.)

In many ways, I think neuroscience’s recent popularity is a very positive development. Neuroscience has conferred on humanity many tools for both practical and imaginative forms of self-understanding. My discovery of neuroscience played no small part in reshaping my identity during the latter part of my undergraduate education, and the field continues to influence my ideas about who I am and how I should interact with the world. It’s certainly a more efficacious and empirically responsible narrative than most religious, mythological, or metaphysical explanations of human behavior. I do not suspect Satel and Lilienfeld would disagree with any of this; they want to save neuroscience from itself, to preserve its respectability by taking measured accounts of precisely when and how it can be useful. Every grand human story needs informed curmudgeons to poke holes and sniff out misapplications.

The final chapter of *Brainwashed*, “The Future of Blame,” provides a useful overview of the current research regarding free will and moral responsibility taking place in the field of moral psychology. Having recently read Walter Sinnott-Armstrong’s *Moral Psychology, Vol. 4*, which takes up these issues in great detail, I was pleased to find that Satel and Lilienfeld’s summary of the literature is accurate and even-handed. They understand well the fundamental tension between the assertion that neurodeterminism obviates blame and our “intuitions about fairness and justice [that] are so deeply rooted in evolution, psychology, and culture that new neuroscientific revelations are unlikely to dislodge them easily” (146). While they admit that neuroscience is a useful tool for understanding deliberation and possibly reshaping the justice system, they rightfully point out that it is only one filter among others through which we should funnel our theories of

justice and our conclusions about how to best mete it out.

Satel and Lilienfeld's final message is a call for improved neuroliteracy moving forward:

"Crucial lessons in neuroliteracy must also inculcate the importance of distinguishing the questions that neuroscience is equipped to answer from those that it is not. The job of neuroscience is to elucidate the brain mechanisms associated with mental phenomena, and when technical prowess is applied to the questions it can usefully address, the prospects for conceptual breakthroughs and clinical advances are bountiful. Asking the wrong questions of the brain, however, is at best a dead end and at worst a misappropriation of the mantle of science." (152)

I couldn't agree more.

This review was originally published on my blog, words&dirt.

Pandit says

Sally Satel's assault on 'neurobollocks' - the over-optimistic and ultimately deceptive use of neuro-language in modern science and arts. Pretty much every field is guilty of this - using spurious brain imaging to back up entrenched positions.

Satel agrees that neurology is great, and there have been strides. But when it is used to sell things like lie detection services, criminal convictions, marketing, drug rehab etc... then it has been vastly over applied. Great work. I've been very dubious of brain imaging - or at least the claims people make while providing fMRI scans as 'proof'. This book puts it all together. The final chapter was the only part where the message gets a bit confused - where Satel tries to deal with criminality and whether people have free will to commit crime. It ventured too far into speculative philosophy. But otherwise, a good read.

NB; over half the book is references and notes.

John Martindale says

Wow, this was an excellent read. Sally Satel wrote a book, that was quite the counterbalance to the pop-neuroscience audiobooks I've listened to over the years.

Satel, isn't by any means against the huge steps-forward in brain imaging and neuroscience, but she is opposed to the overeager popularizers who jump to hasty conclusions, and the media swallowing up the hype and spreading nonsense. She knows that this all could later discredit what is an important science.

Neuroscience is very young, and many scientist seem all too eager to get rid of the whole psychological part of the picture, neglecting the fact that humans have a mind. Satel seemed against to the religious and platonic notion of the non-physical soul, but believes instead, that the mind comes forth from the brain. Yet still mental states are not identical to the physical brain states. Both need to be considered important, to better understand human behavior and how we change.

Concerning brain imaging, just because a part of the brain lights up, when we look at a picture of Bill Clinton for example, doesn't conclusively show how we feel about him. Lets say the amygdala shows more activity, then the researcher may say that Clinton stirs fear in us. The problem is though the amygdala does

indeed light up when one is afraid, it also lights up in several other occasions, it could mean a number of things. It doesn't just serve one function, but many, so a speculative interpretation is required. Also, several part of the brain will light up in any given moment, all of which can indicate different things, muddying up the water further.

Satel, shows some of the many problems in the attempts the show the signature of a lie in the brain, and why lie detector test often fail.

She shows the how dangerous David Eagleman's ideas are in "Incognito" concerning how the whole justice system should be changed, since all crime is caused by malfunctioning brains.

She challenges the new wave of scientist who negate our having the freedom to do otherwise than we do, showing how there is just not enough evidence to be dogmatic determinist.

She argued against those who say teens aren't to be held responsible for murder, because their brain were still developing. Yeah, she had some excellent reflections on all of these things.

Concerning all the claims that addiction is a disease, Sally Satel, shared an interesting study done during the 1970s, when opium and high grade heroine flooded southern Asia. It was estimated that at least 50% of all the men serving in the army, ending up trying one of these drugs during the Vietnam war. It was believed that between 10-25% became addicted and deaths from overdoses begun to sore. The GI Addiction epidemic became a big deal and there was lots of fear that once the soldiers returned home, the the addiction would continue (for once an addict, always an addict). So Richard Nixon demanded drug testing to be done and made it so no one could return to the States unless they passed. If they failed the test, they would have to enter an army sponsored rehab until clean. Once this was announced, almost everyone just stopped using the drugs. And a 3 year study done on them only 12% relapsed briefly by the end of the 3 year follow up. This study undercuts the "once an addict, always an addict" mantra and the belief that addiction is a chronic brain disease. If it is, then how is it that 88% of the veterans who were strongly addicted to a hard drug, managed to just stop cold turkey and never relapse again? There were lots of motivating factors, for one in Asia the drugs were cheap and helped them deal with the stress of war and once they learned they couldn't come back home unless they were clean, they found the motivation to stop. Once back in the states, the fear of arrest, the high price of heroine and the shady drug culture didn't seem worth the risk, so most just transitioned back into ordinary life. This shows that in many ways the disease model ultimately fails. Lets says 50 percent of the solders got terminal cancer while in Vietnam, and the insensitive president said "You can't return back home until you are cancer free" then guess what, none of those with cancer would have come home, they couldn't have just made the decision not to have cancer. See how there is a difference? See how addiction being a disease is not quite accurate? Drugs do alter the brain, causing intense cravings, but there are other psychological factors involved. The Disease model has been pushed to far, one needs a holistic approach.

Steven Peterson says

Technology for studying the operation of the brain has been widely discussed in the media--as have those slides from f MRI (functional magnetic resonance imaging) that show certain parts of the brain "lighting up" in response to stimuli. Does this methods (and others as well) show us how the brain affects our political choices? Our feelings on race? And so on?

Much media attention has focused on the neurosciences and the associated technology. The authors speak of the danger of "neurodeterminism" and neurocentrism (page xiv), "the view that human experience and

behavior can be best explained from the predominant or even exclusive perspective of the brain." The focus of their book is to bring some perspective to what they see as the overhyped findings from neuroimaging and the sense that to understand the brain is to understand why humans do as they do.

Chapters explore neuroimaging--what we can and cannot infer from the results, addictions as explainable by brain functioning, the implications derived from the research for law. They raise questions about the variety of linkages proposed and urge caution.

In the brief final chapter, they summarize their concerns about neurodeterminism and argue for a more balanced view.

AJ says

I really like that this book debunks a lot of the crap "science" out there relating to fMRI. However I dislike that the authors use crap sociological "science" experiments to bolster their arguments.

Jitse says

Excellent popular scientific book which explains the limitations of neuroscience in a number of domains where our imagination and popular representation got ahead of the science. If you read anything on neuroscience, read this.

Daria says

It seems like nearly every day I read a new headline claiming "Brain Scans Show [insert erroneous conclusion]." Typically, I look at the information with some degree of skepticism then leave the article thinking "well something doesn't seem right, but the people who wrote this are professionals and probably a lot smarter than I am." After reading this book, I'm going to trust my initial skepticism and try to be more "neuroliterate" when evaluating claims. I first began to suspect foul play in anything with the prefix "neuro-" when I heard about how brain-training games do nothing to actually train skills beyond gameplay.

This book isn't meant to be a party-pooper; it's not here to quell anyone's enthusiasm for neuroscience and the authors make this clear. This book intends to deepen the public's understanding and appreciation of neuroscientific studies rather than teach people to dismiss new science outright. This book is similar to many other books I've read. In fact, one chapter is named The Tell-Tale Brain, which is the title of a book by V.S. Ramachandran which likely contributed to some of the "neuro-hype" that Brainwashed attempts to mitigate. V.S. Ramachandran, Oliver Sacks, and Robert Sapolsky have all written to varying degrees about how people are too impressed by pointless brain pictures and not impressed enough by psychological research. As I read, I could almost hear Sapolsky saying things like "of course there's a biological component to mental illness, just measure the glucocorticoids in a depressive patient. You don't need an MRI, duh."

I don't quite understand why people think brain scans suddenly make psychological conditions more real. This isn't really answered in the book, it's simply presented as a thing we accept. Of course mental illness is in a person's head, your entire experience of reality is just in your head, how does that help people to

overcome it? It's not like your brain is locked into certain response patterns and there's no changing connections. I believe plasticity was mentioned in the first chapter though not really expanded upon and I feel that going into more particular detail about how the brain can remap processes would have contributed more to the book, particularly in the chapter about addiction. However, the man who became a pedophile when he had a tumor was certainly a good story to outline the effects of physical illness on the brain and our power to heal. Many of the book's conclusions weren't new to me, but I found it well-organized with fascinating studies and examples. I particularly enjoyed the discussion on morality and blame in a deterministic universe in chapter 6.

Overall, I thought this was an enjoyable read. I recommend it to anyone interested in “neuro-” anything.

Mikhail Novoselov says

I've always had a feeling that a lot of much-advertised neurological articles were somehow biased - but I couldn't explain what kind of bias it was. Happily, the authors of this book did all the work for me. Frankly speaking, they are not the best narrators in the world, but the issue in question is important enough so that I can forgive them. Their well-argued resentment towards determinism and cartesian materialism in neuroscience (which I share) is also very appealing.

However, I didn't like how it slipped towards a poorly written law essay at the end.

Andy says

Good content debunking "neurobollocks" but not really enough for a book.

CarolynKost says

The authors present exhaustive evidence to demonstrate that brain science is being applied inappropriately for all sorts of purposes, to name but a few: in law, to determine guilt or innocence in crime; in business, to discern emotional preferences to market to consumers more effectively; and in education, to create educational environments that improve students' learning.

The Enlightenment has left a wonderful legacy in the scientific method, but scientists do a grave disservice when they overreach their boundaries, and this is a prime example. Lacking humility before the mystery, we have neuroscientists engaging in a "21st century phrenology," a reductionist and dogmatic aspiration to a “brain-based philosophy of life” as a panacea that will eliminate "suffering, war, and conflict." It is wisdom, not failure, to accept that there is an ineffable quality to human nature and behavior, as well as spiritual, psychological, and social dimensions. MRI brain imaging cannot and will never completely explain why some overcome addiction or behave kindly or violently. We need to proceed skeptically and understand that there is an astonishing complexity to the function of genes, the brain, and so much in our world, and that premature assertions of "decoding" merely reveal human hubris and do not necessitate that we apply them in such far-reaching ways.

If the reader remains unconvinced after the first chapters, by all means, they should read on. For most of us,

it's overkill.
