

## THE BIG IDEAS

### Goal Interference

Is what we need to address.

### The Pause

Is key.

### You + Squirrels

+ Your foraging behavior.

### Metacognition

Step 1 to reducing distraction.

### #1 Prescription

Exercise.



# The Distracted Mind

## Ancient Brains in a High-Tech World

BY ADAM GAZZALEY & LARRY D. ROSEN · THE MIT PRESS © 2016 · 304 PAGES

“This book is the first of its kind to explore the daily challenges we face with the highly engaging but extremely distracting high-tech world we now inhabit from the dual points of view of a psychologist and a neuroscientist. By providing both scientific foundations and real-world examples of people facing and addressing their own distracted minds, we share with you a unique perspective on how our increasingly information-saturated world (overflowing with pop-up windows, smartphones, texts, chat, email, social media, and video games) has coupled with the growing expectations of 24/7/365 availability and immediate responsiveness to place excessive demands on our brains. *The Distracted Mind* will take you on a journey into how and why we struggle with interruptions and distractions that emerge from both our inner and outer worlds, as well as offer practical strategies for changing our behavior and enhancing your brain function to alleviate interference and better accomplish your goals. It is clear that our interruptive technologies are only going to become more effective in drawing our attention away from important aspects of life, so we urgently need to understand why we are so sensitive to interference and how we can find a ‘signal amidst the noise’ in our high-tech world.”

~ Adam Gazzaley & Larry D. Rosen from *The Distracted Mind*

This is a fascinating, scientifically rigorous look at how our ancient brains respond to a high-tech world. Hint: They easily get distracted.

*“In many ways, we are ancient brains in a high-tech world.”*

~ Adam Gazzaley & Larry D. Rosen

It was published by MIT and is not your typical breezy self-help read. To put it in perspective, in Part I of the book (on “Cognition and the Essence of Control”), my normal 40-50 pages per hour reading speed was reduced to a grinding 20-pages per hour as I wrapped my brain around the underlying evolutionary, neuropsychological factors at play.

Things picked up a bit with Part II: Behavior in a High-Tech World in which we take a look at the psychology of technology and its impact on our lives.

Then I was in practical-tools heaven in Part III as we explored “Taking Control”—looking at specific, scientifically proven ways to boost our control and modify our behavior. (There’s ONE huge prescriptive tip that we’ll get to in a moment. Can you guess what it is?)

[Adam Gazzaley](#) is a leading cognitive neuroscientist who is a Professor in the Departments of Neurology, Physiology, and Psychiatry at the University of California, San Francisco. His Gazzaley Lab produced a bunch of the research explored in the book. He’s also the award-winning host of the PBS special *The Distracted Mind with Dr. Adam Gazzaley*.

[Larry Rosen](#) is one of the world’s leading authorities on the psychology of technology. He is a Professor of Psychology at California State University, Dominguez Hills, blogger for *Psychology Today* and author of many other books.

The book is packed (!) with Big Ideas. If you're interested in a challenging, deeply thoughtful, scientifically grounded look at how our minds work, I think you'll dig it. (Get a copy [here](#).)

For now, let's have fun exploring a handful of my favorite Big Ideas. We'll start by quickly wrapping our brains around how our brains work then we'll look at some practical tools.

## GOAL INTERFERENCE

*"So many technological innovations have enhanced our lives in countless ways, but they also threaten to overwhelm our brain's goal-directed functioning with interference."*

~ Adam Gazzaley & Larry D. Rosen

"Goal interference occurs when you reach a decision to accomplish a specific goal (e.g., retrieve something from the refrigerator, complete a work assignment, engage in a conversation, drive your car), and something takes place to hinder the successful completion of that goal. The interference can either be generated *internally*, presenting as thoughts within your mind, or generated *externally*, by sensory stimuli such as restaurant chatter, beeps, vibrations, or flashing visual displays. Goal interference, originating from either your internal or external environments (often both), can occur in two distinct varieties—distractions and interruptions—based on your decision about how you manage the interference."

"Goal interference."

<— I just love that phrase.

The authors establish the fact that "*Our ability to establish high-level goals is arguably the pinnacle of human brain evolution.*"

And...

They establish the fact that our ancient brains are susceptible to hiccups that distract us from achieving those goals.

They define distractions as "*pieces of goal-irrelevant information.*" We can experience these pieces of goal-irrelevant information INTERNALLY (hello, wandering mind, rumination, etc.) or EXTERNALLY (hello, push notifications and click bait!)

The book first strives to increase our "metacognition"—our understanding of how our minds work—and then helps us develop strategies to mitigate the tendency to be distracted.

Couple things to note:

1. We've ALWAYS been subject to distraction—it's just a limitation of our brains. But... Our modern, high-tech world seriously challenges our ancient brain with its non-stop assault of information via the Internet, social media and smartphones.
2. You're not alone. Pretty much EVERYONE struggles with this stuff—so don't beat yourself up. (Think [Kristin Neff's Self-Compassion](#): Common humanity!)

## THE EXTRAORDINARILY IMPORTANT PAUSE

"As described, brain evolution led to the insertion of a critical time delay that disrupts the reflexive nature of the perception-action cycle so that the neural processes that underlie goal setting—evaluation and decision making—may be engaged. This extraordinarily important pause in the cycle disrupts our reflexive responses to environmental stimuli, allowing us to generate top-down goals. These goals exert influence over both our perceptions and actions, which compete with those powerful bottom-up forces. But setting goals is not enough to affect our lives and the world around us; we need to enact our goals. The mediators of our top-down goals comprise another amazing collection of abilities that fall under the umbrella of cognitive control. This includes three major faculties: (1) attention, (2) working memory; and (3) goal management, each consisting of subcomponent processes. It is this battery of cognitive control abilities that allows us to interact in our complex world in a dynamic and goal-oriented manner. And with varying degrees of success, it is what allows us to resist the negative impact of goal

*"A major premise of this book is that our Distracted Minds are generated by a head-on collision between our high-level goals and our intrinsic cognitive control limitations; this conflict generates goal interference that negatively impacts quality of life. If we want to overcome the derailing forces of goal interference, we need to increase our understanding and expand our awareness of our cognitive control limitations so that we can find ways to minimize those factors."*

~ Adam Gazzaley & Larry D. Rosen

*"That is what our prefrontal cortex and its network offers humans to differentiate us from much less evolved animals: the ability to pause in response to a stimulus and enact complex goals in a nonreflexive way."*

~ Adam Gazzaley & Larry D. Rosen

*"All complex systems are susceptible to interference, including the functioning of our cars, laptops, 747s, and the Hubble Telescope. The opportunity for interference to degrade any system's performance seems to scale with its complexity. When it comes to the human brain, undeniably the most complex system in the known universe, it should thus come as no surprise that it is extremely sensitive to interference at many levels."*

~ Adam Gazzaley & Larry D. Rosen

interference. To understand the essence of the Distracted Mind, we need to carefully dissect these core abilities of our mind and appreciate their strengths and limitations."

There's a lot to chew on in that passage. Let's quickly chat about the pause, top-down vs. bottom-up and the big three of cognitive control.

First: The Pause.

That PAUSE between stimulus and response is one of the most fundamental aspects of our humanity. Rather than merely take action based on what we perceive in our environment, we have the ability to slow down and decide what to do based on a higher-level goal.

Ants don't pause. Rats don't pause. (Do you pause? :)

Second: Then there's "top-down goals" and "bottom-up" forces. Basic idea here is that it's our top-down choices that ensure we don't simply bounce from bottom-up stimulus to bottom-up stimulus.

Finally: We have cognitive control abilities: Attention + working memory + goal management. This is where it's at. And, this is what our high-tech world is assaulting—damaging everything from our work performance and driving safety to our emotional health and quality of our relationships.

The book walks us through the nuanced science behind each of these key cognitive control abilities. For now, to grossly oversimplify: Know that the more we unconsciously consume technology, the more we're splintering the very roots of our humanity.

P.S. [Viktor Frankl](#) comes to mind: "Between stimulus and response there is a space. In that space is our power to choose our response. In our response lies our growth and our freedom."

## YOU, SQUIRRELS AND FORAGING BEHAVIOR

"In chapter 1, we introduced the marginal value theorem (MVT), which has been used for decades to explain why, how, and when animals take the time and energy to travel to a new patch with additional food, rather than gather dwindling food resources from their current patch. In its simplest form, the MVT explains the cost-benefit relationship of remaining in a good patch versus moving to a new patch, with an animal's drive to survive as the instinctive force to accumulate resources. An animal's ability to find nourishment by spending an 'optimal time' at one source before traveling to another is a critical factor in its survival. ...

We propose that a human information foraging model, and specifically the MVT, can also be used to explain why we media multitask so avariciously. It may explain, for example, why we choose to: (1) stop working on a document we are reading online to check our smartphone for an incoming alert, (2) open a new tab to search for additional information on an unrelated topic, and (3) decide we need to text a friend to arrange an evening out, all before returning to our document. And then we are faced with having to remember where we were and rebuild the mental representation of the material in the document."

One of the key themes of the book is the hypothesis that our tendency to be distracted can be represented by something known as the "marginal value theorem."

Short story here: Very smart people have figured out a model to predict when, for example, a squirrel will stop foraging on one tree and move to another. There are a few key variables at play.

Imagine a squirrel in a tree. It's filled with acorns. Like, a ton of them. He starts munching. In the beginning, he has no incentive to hop to another tree because the supply is so abundant on this tree. Then, at some point, he hits a diminishing returns point where he has to start working harder to get acorns off the tree he's on and it makes more sense to hop off and find another potentially abundant tree than it does to stay on his current tree.

*"Everyone knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state which in French is called distraction."*

~ William James

*"And the faculty of voluntarily bringing back a wandering attention, over and over again, is the very root of judgment, character, and will. ... An education which should improve this faculty would be the education par excellence."*

~ William James

Again, very smart people have created a very cool model to predict when that leap will happen. Our very smart authors have leaned on that model to explain OUR tendencies to "media multitask so avariciously"—effectively hopping from tree to tree as we forage information-food.

Only problem is: The squirrels behavior is optimal. Ours is not.

In the squirrel's world, the "other" tree is far away and will take some time to find and confirm it's got some good acorns. In our world, our "other tree" is one click/swipe away. Our information is now \*astonishingly\* ACCESSIBLE. There's literally no cost to move on.

Further, whereas the squirrel pleasantly eats his acorns and doesn't have a whole lot going on inside that brain of his, we're constantly feeling a toxic brew of BOREDOM and ANXIETY.

The speed with which we get access to hyper-stimulating info these days has eroded our ability to enjoy things that go more slowly or that require a sustained amount of focused attention. As a result, we have a \*very\* low tolerance for "boredom." As such, we tend to switch from text to web browsing to video to news feed to social media to app to ...

Further, inside that human head of ours, we have a strong case of FOMO. Apparently, "fear of missing out" is actually a phrase used in the psychology of technology to explain that feeling we have of missing out on something "important" if we aren't constantly plugged into our phone. (Then there's "nomophobia"—the fear of being disconnected from your phone.)

Combine this boredom and anxiety that drive us to constantly seek new information with the astonishing accessibility of an infinite array of ever-stimulating new content and VOILA. You have a human foraging for new information like a squirrel on some *very* intense stimulants. (Hah.) Sound familiar?

(Sidenote: The authors note three key components to the tech boom: 1) The Internet + 2) Social media + 3) Smartphones. Part of a longer chat but smartphones have been the greatest accelerant to our distracted lifestyles; their usage is correlated with all the things we don't want.)

## STEP #1 TO ENDING DISTRACTION

"On top of the direct impact of changes in anxiety, boredom, and accessibility induced by modern technology on the Distracted Mind, there also seems to be an important role played by poor introspection into our own minds and its vulnerabilities and how this may affect our performance. This lack of metacognition—awareness and understanding of one's own thought processes—impacts the MVT model in two ways. On the right side: not understanding the benefits of remaining in an information patch *and* not appreciating our internal states of anxiety and boredom. On the left side: not accurately evaluating the consequences of moving to a new patch, that is, a lack of understanding of the performance costs of multitasking and task switching. Many people believe that we are most productive if we spend 'just a few moments' dealing with that incoming message or searching for that tidbit of information, rather than sustaining our attention on a task, and resisting distractions and the allure of interruptions. As described in previous chapters, this belief is misguided and causes countless problems both in terms of productivity and in preserving our physical and mental health. The truth is that we are mostly oblivious to the toll that constant task switching generates. We convince ourselves that we can handle it b/c we mistakenly believe that we possess a brain that is built for multitasking; or, b/c we do it all the time, we feel that we must have become really good at it."

Want to reduce the interference to achieving your goals—aka eliminate/reduce distractions?

Step #1: Work on your metacognition. Defined as: "*awareness and understanding of one's own thought processes.*" In other words, know thyself.

We need to be able to step back far enough from our lives to observe the way we see the world—having not just *metacognition* but meta-everything.

*"Former Microsoft executive Linda Stone dubbed this constant multitasking 'continuous partial attention.'... frequent task switching is something we all do, and the more often we switch, the more detrimental it is to our real-world performance."*

~ Adam Gazzaley & Larry D. Rosen

- How do your thought processes affect your life and well-being?
- How does the way you eat affect your life and well-being?
- How does the way you move (or fail to move) your body affect your life and well-being?
- How does the amount of sleep you get affect your life and well-being?

Well, how do they? And, more importantly, how can you bring a little more awareness to your habitual thoughts and behaviors to incrementally optimize today? :)

Back to the primary point of this Idea. We need to have a better understanding of how our boredom, anxiety and the accessibility of distractions are impacting the quality of our lives.

Fun research: Bring people into a lab. Ask them if they think they're good at multitasking. Then give them a multitasking test. Guess what? Those who said they are the best at multitasking tend to be the worst. Poor metacognition.

Speaking of multi-tasking, the authors make it clear that our brains are simply not designed to multitask. We don't have parallel processors like beefed up computers that allow us to do more than one thing at once. What we do is more accurately described as "task switching." When you feel like you're "multitasking," what you're *really* doing is switching from one task to another.

Research shows that in addition to diminishing the quality of your work, you're also increasing your stress and wasting an enormous (!) amount of time—as you have to spend way more time than you think getting back in the groove on what you left behind. Those are known as "switching costs." MUCH wiser to get clear on what needs to get done (top-down goal!) and then confidently (banish anxiety!) turn off all distractions (remove accessibility!) while you go from start to finish in a focused Deep Work block (say goodbye to boredom!).

Remember this little equation from [Cal Newport's Deep Work](#): "High-Quality Work Produced = (Time Spent) x (Intensity of Focus)"

For now, step back. KNOW that your avaricious media multitasking is sub-optimal and decide to change some behaviors!!

P.S. One of the behaviors you'd be wise to change is using technology within an hour of bedtime. The authors echo the wisdom we discuss in [Optimal Sleep 101](#) + these Notes on Sleep. If you want to DESTROY your ability to focus and ignore distractions, just skimp on sleep! :o Tip: Turn off all tech at least (!) one hour before you want to go to bed.

P.P.S. Remember the iPhone effect research we talked about in the Notes on [Are You Fully Charged?](#) You know, the research that shows the quality of your relationships erodes simply by having a smartphone in sight? The authors talk about that here as well. Tip: Turn your phone off/put it out of sight when you're around loved ones!!

P.P.P.S. The authors spend a considerable amount of time educating us on the incredibly dangerous practice of driving while texting. Here are some stats to enhance your metacognition here: Did you know that "text messaging creates a crash risk 23 times worse than driving while not distracted"? And that "using a cell phone increases your chance of being in an accident as much as being legally drunk"? Do you text while you drive? Stop doing that.

## THE #1 PRESCRIPTION TO FIGHT DISTRACTION (YOUR GUESS?)

"Let's swing the pendulum all the way back in the direction of effort-demanding approaches to aid the Distracted Mind and discuss the most 'active' of them all: physical exercise. We are sure most of you are now well aware that physical activity, and of course the more formal practice of physical exercise, has well-documented benefits on human health, including cardiovascular disorders, cancer, obesity, diabetes, and stroke. But these benefits also extend to mental health

"What information consumes is rather obvious: It consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention, and a need to allocate that attention efficiently among the overabundance of information sources that might consume it."

~ Nobel Prize-Winning Economist  
Herbert Simon

with evidence of a positive impact on symptoms of anxiety, depression, and schizophrenia. These findings have been complemented by an onslaught of fascinating data regarding neural changes induced by exercise, which span the gamut from increases in brain volume (both gray and white matter), nerve growth factors, blood flow, functional and structural connections, and even new neurons being born. Perhaps not surprisingly, this neural plasticity is accompanied by a host of cognitive benefits, a claim that has been supported by several meta-analysis studies."

That's from a chapter called "Boosting Control"—all about helping us boost control of our cognitive capabilities. (Remember our big 3? Attention, working memory, goal management.)

The authors walk us through a number of the potential ways to help our Distracted Mind. They bring a ruthless scientific focus to analyzing the potential things we can do—assigning the quality of interventions based on their scientific strength, ranging from "reasonable hypothesis" to "signal" all the way to "prescriptive."

Reasonable hypothesis stuff has seen some validation in the literature. Signal stuff has seen even more validation. Prescription is the highest standard—where it's basically unequivocally proven beyond a shadow of a doubt that it works and, therefore, merits a "prescription." Meditation is a signal. Time in nature is a reasonable hypothesis. The only prescription? EXERCISE.

In our last Note on [The Healing Power of the Breath](#) I was a bit aggressive about finding 20 minutes to train your breath rather than taking a pill. Fact is, if you only had 20 minutes to optimize, EXERCISE would be the wisest use of your time. Which, of course, begs the question: You exercising?

Let's give our ancient brains the best shot at optimally engaging in technology as we reduce goal interference, focus our energy and step into our greatest potential!

B

**Brian Johnson,**  
*Chief Philosopher*

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## About the Author of "The Distracted Mind"

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Brian Johnson loves helping people optimize their lives as he studies, embodies and teaches the fundamentals of optimal living—integrating ancient wisdom + modern science + common sense + virtue + mastery + fun. Learn more and optimize your life at [optimize.me](http://optimize.me).