# BEING THE PERSON YOUR DOG THINKS YOU ARE

*The Science of a Better You*

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# FRONT MATTERS

Most of the work cited here is from psychology literature. If I mention a scientist or other scholar without their occupation, assume they are a psychologist. I will tag others as neuroscientists, economists, and so on as needed.

There's some neuroscience in this book. Like all popular accounts of neuroscience, what's presented here is a simplification. The brain is really, really, really complex. I mean *mad* complex. Some people, even some who have read Eminem's lyrics, say it's the most complex object in the known universe. If you haven't studied neuroscience, you have no idea how deep the rabbit hole goes.

My colleague and podcast cohost, neuroscientist Kim Hellemans, told me that it's common in undergraduate education to teach one thing to the students in their first and second years to only tell them later that what they were taught before isn't quite true—the reality is much more complex. But if you try to teach what's actually going on in the brain right away, with no simplification, it's hard to get off the ground at all with any idea of what's going on. Useful fictions become the scaffolding for an understanding of the deeper ideas that will be better understood as one climbs it.

To understand what neuroscientists actually think about how the brain works requires reading primary material—articles in neuroscience journals. Unfortunately these papers are all but incomprehensible to anyone without a graduate degree in neuroscience (my graduate degrees are in psychology and computer science, so I have trouble with many of them, too).

Furthermore, there are enormous controversies in neuroscience, and many of the things I will say about the brain will be in conflict with what some neuroscientists believe. I can guarantee you that for everything I say about the brain *some* neuroscientist agrees with me, but rather than burdening you with endless hedges and qualifications, I'm just going to tell you now that many things I say about the brain are still debated but the account I'm giving you here is plausible by the standards of at least some qualified neuroscientists.

Technically, we don't encounter this in scientific psychology, except in the most complex areas. When I simplify a psychology theory, I will say so. But rest assured that *everything* I say about the brain is a simplification. If you want more detail, I encourage you to use the references I cite as a treasure map and start digging.

# FRONT UNMATTERS AND FRONT ANTIMATTERS

Whether or not it's completely true, we strongly feel that dogs look at us with love and awe. Our dogs make us feel like we are important and deserving of love, even when we don't feel that from people in our lives. I like the vague, demigod feeling I get from a dog's attention. It's something to live up to. But a dog's love is big on heart and short on specifics. This book is about the specifics.

In this book I'm going to talk about what you can do to make yourself better in three major areas that people care about: personal productivity, happiness, and moral goodness.

I'm a scientist, and I'm going to shed light on these issues and our ultimate goal of improving both ourselves and the world around us through a scientific lens. Science is often numerical in nature, and the wonderful thing about numbers it that you can look at two of them and know *which one is bigger than the other*. Isn't that exciting?

It is, when you consider that many qualitative analyses don't enjoy this benefit. If having a bit more income makes you happier, and spending a bit more time with your friends makes you happier, too, without numbers you can't tell their relative importance.

Even more fundamentally, maybe one of them doesn't really do any good at all. You can read all kinds of things telling you that this or that will make your life better, but without numbers it's hard to tell if it actually does. If it does, it *matters*. And some things matter much more than others.

Numbers can tell you if something is ineffectual, or has an effect so small that it's not worth concerning yourself with—these things *unmatter*.

Then there are things that are supposed to help, but actually hurt. These things *antimatter*. Of course, the word "antimatter" has another meaning, in physics, but I'm using it differently here because there is no word in English that means "something that appears to make things better but actually makes things worse."

Sometimes there are things that matter a little bit. Sometimes it might make sense to focus on these things. This is the idea behind the idiom that "every little bit helps." But unfortunately, focusing on things that matter only a little bit has a hidden cost. The resources (energy, money, attention, time, or whatever else) you're putting into things that matter only little bit are not going toward something that matters more. Furthermore, everyone has in their minds a bunch of equilibria that they are trying to maintain, that we can think of as psychological thermostats. For example, you don't want to be too hungry or too full, so you eat when the hunger thermostat gets too low, and you stop eating when it gets too high. We also have these thermostats for happiness, productivity, and morality.

Let's take a look at climate change as an example. Nowadays lots of people acknowledge that climate change is a real problem and that something should be done about it. One way that people often talk about how they can help reduce climate change is to reduce their energy consumption. And indeed, in many places, reducing your energy consumption does have an effect on reducing climate change. But how much can you really do for the climate by changing the way you live in your own household? Governmental laws and regulations have the potential to have far bigger effects, because they will effectively force many, many people into changing their energy consumption habits. So maybe you should advocate for policy changes instead of taking short showers.

You might be thinking: why not do what you can in your own home, and support policies in your government as well? Unfortunately, because of the nature of these equilibria that we are constantly maintaining in our brains, focus on one thing will crowd out the other. One study introduced people to a potential carbon tax as well as a suggested governmental intervention to then help people protect the climate through their own actions. Merely exposing them to the "nudge" idea reduced their support for a carbon tax.[1] There seems to be a trade-off going on. Focusing on something that matters very little, even though it does actually matter, can have negative side effects. People already feel they've done "something." This is how things that appear at first glance to matter might in practice antimatter, as they draw attentional and time resources away from more important things.

This effect is more relevant for morality than for the other things I'm going to be talking about in this book. Because when it comes to your own productivity and happiness, it is precisely those things you do in your life that matter the most. (What are you going to do, support a sadness tax?) But morality involves more than just you. It involves the entire universe, until the end of time. You can find calculations, errata, and other materials at http://www.jimdavies.org/science-of-better/.

These cutesy words that I'm using very unconventionally are intended to draw interest, but also to frame the whole book. Science can help guide us to focus on the things that matter, ignore things that unmatter, and oppose things that antimatter.

Let's get started.

# PART I

# ABOUT YOU

# 1

# PRODUCTIVITY

## An Optimizer

I want my life to be as good as it can be.

You might think that everybody's like this. I don't think that many people would come out and say they want their life to be worse, but there is a particular personality type that actively tries to make things as good as they can be, always searching through options in search of something better. These people are optimizers.

What does it mean to have a good life? We'll get to that. But for now, let's assume that optimizers actively try to make their life better, whatever a better life means to them.

My name is Jim, and I'm an optimizer.[1]

I'll give you an example of what I mean. At the time of this writing, I use an iPhone 6 for my cell phone. iPhones have virtual pages of app icons. Some people leave the app icons where they first appeared. But if you're optimizing icon location, you will move them around.

One kind of optimizing is to move the app icons around so that the apps you use pretty often are on the front page, and the ones you use the most often go in the "dock," where they are visible no matter which page you're looking at. So if you play *Hearthstone* a lot, it would make sense to put it on your front page.

My optimization of this is a bit different. I put on the dock and front page not those apps I use most often, but the apps that I *aspire* to use most often. If I'm hooked on a game that wastes a lot of my time, if I can't bring myself to delete it completely, I'll bury it in a folder on page three. I do this because I know that if you add some cognitive speed bumps to a task—make it just a little bit more of a hassle to do, you'll do it less often.

Throughout this book I'll refer to what matters, what unmatters, and what antimatters. When you're trying to optimize, it might *feel* like everything is equally important, but when examined more closely, and more scientifically, you find that some things matter much more than others. Figuring this out requires thinking in terms of the magnitude of something's impact. This isn't always easy to do, and requires modern tools, data, and ways of thinking that aren't natural. If you decide things with your gut, or intuition, you won't optimize very well. Emotions can often draw us to things that antimatter, so using data can help us stay away from having our emotions override reason to detrimental effect.

There is lots and lots of advice you can read on these topics already, but most of it is not based on any science at all. I know because I've looked at most of it in researching for this

book. I'll give my opinion on what science says matters and what unmatters, but the main takeaway is *how* to think about these things. With new data, different values, or better reasoning, you might disagree or change your mind about what matters and what unmatters. That's great, as long as you're using science, rationality, and data to inform your decision. Although I do draw conclusions in this book, they are all preliminary.

It's the way of thinking I want to communicate: using science, respecting magnitudes, and to never stop reflecting on how you're living your life.

## Personal Productivity

Productivity is a word that gets thrown around without a lot of reflection on what it really means. The root of the word invokes the notion of some "product," which, in its more crass meaning, is some commodity that can be aggressively sold to people. Its more benign meaning suggests something that is produced. A nicer notion, but it still has connotations of creating widgets of some sort or other.

For many professions, the widget idea isn't too far off. If you're a professor like me, your widgets are books, papers, and competent students. If you're a painter, you want to produce paintings. If you run a theater company, you want to produce shows—which are, appropriately, called "productions."

But sometimes productivity is less tangible. If you're a defense lawyer, being productive means handling many clients. If you're a social worker, your productivity is helping people help themselves with their lives. If you're an athlete, productivity might mean getting better at your sport.

Every endeavor has its own definition of what productivity means, and what non-productivity means. I'm using the word "endeavor" because your career or your job might not be what you care most about optimizing. You might do blue-collar work for money, but are a novelist when you're not working. You might have different standards for productivity for different endeavors in your life.

Whatever you are trying to do in your life, there are activities you engage in that interfere with those goals. How much time should you spend directly pursuing your most important goals? How much time should you rest? What counts as busy work and what makes real progress? Let's see what the science says.

## Sharpening the Saw versus Cutting

Sometimes I like to think of my life as a saw. Being really productive, to me, is like using the saw to cut wood and build things. But you can't cut wood very well with a dull saw, so I have to spend time sharpening the saw, too. Sharpening the saw isn't productive, exactly, but it makes it so you're more effective when you do cut something. Sharpening the saw is improving yourself, and cutting with the saw is effecting change in the world.

This part of the book is about productivity, which is different from making yourself happy. If you're lucky, being productive makes you happy, but when I talk about being

*productive* here, simply making yourself happy doesn't cut it. You have to effect change in the world beyond your own mind. So even if you like to get high and play video games all day, even if it makes you happy, it's not being productive.

Let's look at reading. Reading is a wonderful thing, providing the reader with new information about the world, new ways to approach things, the perspectives of other people, and stories and examples the creative mind can use for a lifetime. It's also fun. With all of these benefits, some people believe that reading books is, all by itself, productive, but I don't see it that way. I read because I want to *do* something with that information. Reading is not inherently productive, it only prepares you to be productive later on. Reading is sharpening the saw, not cutting.

To take an extreme example, imagine a person who does little else with their life other than read books. Even if they're reading great books, they're not using what they've learned from those books to do any good. They spend their whole life sharpening the saw and never cutting anything. There is an important caveat here—if the person *enjoys* reading, there is some happiness gain, which is important, but a fairly small contribution to the world, given how much wisdom they must have gained from a lifetime of reading!

Reading, education, training, and even networking are all ways to sharpen the saw. It makes sense that younger people should spend more of their time sharpening the saw than cutting anything. For many activities, young saws aren't yet sharp enough to cut much very effectively. Even when they do produce things, they're not all that good, for the most part, and that's okay. They are producing things for practice. They have to write many, many terrible essays, or play the violin many, many times, or draw horses over and over before they create something anybody else can appreciate.

But as you grow older, you should spend more and more of your time cutting and less time sharpening. Again, an extreme example is helpful: suppose we have a ninety-year-old man who is too old to travel. He doesn't know anybody who speaks German, but has always thought he should learn it. Finally, at ninety, he starts learning German. Your first instinct might be to say "good for him!"

But from a productivity point of view it makes no sense to sharpen the saw of someone when they're not going to have an opportunity to use that skill for cutting anything. There is nothing inherently good about learning German, or any other language. If that old man has sharpened his calligraphy skill for thirty years, he should be producing works of calligraphy, not learning new skills. The saw is sharp enough, and an older productivity optimizer needs try to cut as much as possible before they die. I feel this acutely, and sometimes try to estimate how many books I'll be able to write before I run out of time. Remember, we're talking only about productivity here, not happiness, which we will discuss later.

Near the end of one's life, one might lose the ability or drive to do much cutting with the saw. This is a time of retirement from productivity (which might or might not coincide with a retirement from one's occupation). I look at this time as one of pure appreciation. When this happens to me, my mission, if you can call it that, will be to enjoy myself and appreciate the world around me, hopefully without making it much worse in the process. A

person in productivity retirement should only do saw-sharpening activities that they find enjoyable. That might be reading or learning German, but that's not because it's productive, but just because those activities happen to be fun to do.

You can further break down sharpening the saw into two categories: the first one I'm going to call "maintenance." Maintenance activities are those that help you maintain your general well-being. These include things like meditation, time with friends and family, writing in a journal, exercising, and so on. In terms of health and happiness, socializing with people you care about is about the most important thing you can do. It's one of the most important maintenance-sharpening activities. Objectively speaking, socializing should take priority over exercise. So keep that in mind, even if you're the kind of person who prefers exercise to socializing. Keeping yourself happy and healthy is an obvious prerequisite for optimizing your productivity, so at least some amount of this saw-sharpening is necessary.

But there's another kind of saw-sharpening that you can do, and that includes improving skills that you can use later in life. Things that you want to get better at, like learning to write, fixing a bicycle, or washing a horse.

How much sharpening versus cutting you should do every day should be based on an estimate of optimizing the amount of (and quality of) cutting that you will do over the course of your entire life.[2] Crudely put, this means that the best thing you should do at any given time will be affected by how much time you have left to live.

We can make an analogy with eating at restaurants. Suppose you have no plans to move out of the city you're in. If you're in the mood, you might want to explore and find a new restaurant. You might not like it, but it might be a new favorite. It's risky. But imagine that you are moving out of this city in two weeks. The benefit of exploration is much lower. You would probably try to hit all of the restaurants you already know you love in the remaining time that you have. The situation is analogous to sharpening and cutting. Sharpening is preparing for the future, and it makes less sense the less future you have to take advantage of that preparation.

I think it's good to think about all the ways of sharpening the saw that are important to you. Recently I did it for myself, and I'll describe my thinking process to give you an idea of how it works. There are several things that I want to get better at, and they include drawing, math and statistics, computer programming, writing fiction, dancing, playing guitar, cardistry, and calligraphy. I also have a lot of saw-sharpening activities that I have abandoned, like martial arts, swing dancing, and comedy improvisation.

Of the things on this list the most important ones to me are drawing, math, programming, and writing. The benefit of three of these (drawing, programming, and writing) is that I'm already good enough at those things that while I sharpen the saw I'm also cutting with the saw. That is, the drawings that I make will be useful for something (I'm illustrating a serialized fiction story in *Altered Reality Magazine*, so these drawings will be published), the programming practice that I do will probably contribute to my scientific progress and productivity, and the writing that I do I might very well be able to publish

someday. Producing is also practicing, so I simultaneously cut and sharpen. That makes my inner optimizer very happy.

I want to learn more math so that I will be better at understanding scientific papers and have more mathematical sophistication with my science down the road. But the process of learning math, at this point, is not going to be anything that's productive for the world, or leading to publication. It's more like traditional formal education; pure saw-sharpening without producing anything useful along the way.

With this list of your most important ways to sharpen the saw you can try to think about what kind of schedule you want for yourself, so you can make sure you get to them pretty regularly. The bottleneck is your limited time and energy. How do you prioritize doing meditation, exercising, journaling, practicing drawing, practicing writing, learning programming, all while doing your actual job, commuting to said job, sleeping, hanging out with your friends, and having a bit of leisure time to watch new *Star Wars* content? There's no easy answer to this. If you work forty hours a week you're not going to have a lot of free time to dedicate to all of these other things. If you have to take care of young children, your time is extremely limited.

There are two ways to deal with it. One is simply to prioritize. Of the ambitions that you might have to make yourself a better or more skilled person, or to make yourself happier, some ambitions might have to be simply dropped. If there's something that you really want to get to every day, then you can give that priority, but something else might have to fall by the wayside. (I miss you, martial arts!)

The other thing you can do is to schedule different things on different days. This allows you to do more things, at the expense of slowed progress. If you want to do it this way, it's best to follow the standard cyclical notions of time: we have the hours in the day, the days of the week, and the days of the month, because it's simpler to keep track of. If there is one thing you want to practice more than anything in the world, you should try to make time every single day to practice it. If you have *seven* things that are very important to you to do, you can dedicate perhaps one half hour every day of the week to doing a different thing. Drawing on Monday, learning programming on Tuesday, and so on.

If you have *thirty* things that you want to do, then you might want a bit of time dedicated on a different day of the month to each of those activities. Although you might scoff at the idea of having *thirty* activities that you might be interested in doing, one thing that could probably be applied to everyone is reinforcing social connections with people you care about. If you can come up with a list of thirty people you most want to stay in touch with, it might be worth dedicating a half hour a day every day to making sure you've reached out to some particular person for each day of the month (you get to rest on the 31st). If today is Tammy, you send her a little note, or give her a call if you haven't corresponded with her in a while, expressing gratitude for her, or asking how she is. But if we're talking about general skill-building activities, one half hour a month spent in practice is very little time, and improvement will be very slow.

Another interesting finding from the psychology of expertise is that not all practice is equal. When I was young, I took piano lessons. My teacher told me to practice a half an

hour a day. I tried to keep to this, but in retrospect I see that I did it poorly: I spent the half an hour playing the songs I was already good at playing. I was enjoying the good feeling associated with doing something well. What I wasn't doing was *deliberate practice*: working on the things I was bad at. The most efficient way to practice, in terms of time, is to practice what you are bad at, not what you're good at. Unfortunately, this takes more effort, energy, and is less fun—which is why I didn't do it. But to the extent that you care about getting better over having fun, you should engage more in deliberate practice.

For me, I really want to get better at drawing. So when I practice drawing, I try to draw things that are going to turn out terrible, because I need to work on my weaknesses. I also play the guitar, but I decided that I don't really care about getting really good. I play guitar *only* to have fun, and getting better at it, though it is happening, isn't very important to me. So when I "practice" the guitar, I allow myself to play songs I already am pretty good at. I'm just happy I can play some Paul Simon songs. (It feels good not to optimize *everything*!)

Keep in mind that some endeavors *matter* more than others. This is important to think about when you prioritize your list of saw-sharpening activities. You might find yourself with a goal to complete a difficult video game, or get better at playing pool. I understand the draw of these activities, but it's important to reflect that the skills you gain when you get better at video games or pool are limited, and you might want to prioritize other skills more. I'm a sucker for this, and have to keep myself in check. There's a game I like to play —*Hearthstone*—and it's so easy to get caught up in the ambition of improving your rank, getting better decks, etc. It *feels* productive when I make progress on these things, but it all unmatters. I'm climbing ladders that don't lead anywhere.

For purposes of this book, doing anything productive is cutting with the saw. If we are going to optimize productivity, we need to cut effectively. We need to do it at the right times, for the right lengths of time. Likewise, we need to cut where it's most efficient and effective.

## Your Mind, Your Time, Your Attention

One important aspect of being productive is being able to completely focus on what you're doing. Cal Newport calls it "deep work," and defines it as "professional activities performed in a state of distraction-free concentration that push your cognitive capabilities to their limit. These efforts create new value, improve your skill, and are hard to replicate."[3]

Working without distraction seems to be getting increasingly difficult. Computer technologies are so advanced that a large and growing number of people on Earth regularly carry around supercomputers in their pockets. (I'm talking about smart watches and smartphones.) Email, web surfing, social media, and video games all vie for our attention, and many of us are unable to resist. Part of this is because there are lots of very smart people designing these systems to optimize your paying attention to them. Companies have created applications that, in many cases, are diabolically designed to draw attention to themselves. Design ethicist Tristan Harris said, "There are a thousand people on the other

side of the screen whose job it is to break down the self-regulation you have."[4] These smart people are working hard to make technologies designed to keep you from working hard.

Things are constantly happening in our environments, and we ignore most of them. The ones that are likely to become distractions are ones that are surprising or salient. Something can be salient for many reasons. You might get excited when your phone makes a *ping* sound—it's distracting because you know you got a text message, and you're used to being rewarded by reading texts. A similar sound from a truck backing up outside is not as distracting because it doesn't mean anything to you: it is a signal of something that is irrelevant to your life.

In 2012, the average "knowledge worker" spent 60 percent of their workweek dealing with email and searching the Internet.[5] Young people have a reputation for always being on their phones. A study of students showed that most of them weren't even able to get through ten minutes without checking some kind of device, be it a phone, tablet, or e-reader. Some students switch tasks every two minutes![6]

Chris Bailey, author of *The Productivity Project*, confesses to how he used to start his day: "After I woke up, I would immediately reach for my phone and then mindlessly bounce around between my favorite apps in a stimulation-fueled feedback loop for about thirty minutes, continuously bouncing around between Twitter, email, Facebook, Instagram, and several news websites until I snapped out of my trance."[7]

The reputation that younger people have with constant interaction with technology is true: the younger someone is, the more likely they are to multitask with texting, music, television, and other technologies. But careful studies show they aren't any *better* at doing it.[8]

Distractions come in a few forms. Some distractions are forced upon you. If someone walks into your office to tell you that vampire rappers are the original sucker MCs, then you either have to deal with them or risk social rudeness trying to get them out. Either way, you are distracted.

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### YOU HAVE TOO MANY THINGS TO DO TO WORRY ABOUT OTHERS' LAMENESS: A LESSON FROM THE 2 LIVE CREW

One source of distraction that many people struggle with is the desire to complain about and correct other people's actions. There have been many times in my life when I've wasted far too much time on fruitless Internet debates. Every time I read a bit of newspaper (which isn't often), I have to resist the urge to get online and rant about what garbage it is, with a point-by-point analysis of what the paper is doing wrong. For the most part, actually doing this would unmatter. I could fill my life complaining about other people's products, and never produce anything of my own.

I found solace in the most unlikely of places: a track from the 2 Live Crew's album *As Nasty As They Wanna Be* called "I Ain't Bullshittin'." This strange track seems to be a drunken rant about some other MC, but it contains a line that basically says that this MC should create his own music, rather than criticizing the 2 Live Crew.[9]

For decades, this line has helped keep me focused. Every time I feel the temptation to spend my mental energy and time criticizing others, I remind myself of all of positive things I can do in this world, and that every minute I spend criticizing others—and even *thinking* about criticizing others—is time taken away from what I can accomplish in this world.

As for the album in general, I can't recommend it unless you have a high tolerance for misogyny. Beats are sick, though.

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Incoming phone calls are distracting, even if you don't answer the call. You can turn off your phone's sound notification and vibration, but many people are loath to do this because phone calls are sometimes important. You should know that on many phones there is a function that allows a call to come through even if the phone is on silent if the caller is in your contact list, *and* they call twice in a row. This allows you to have your phone quiet a lot of the time—at the very least, when you're sleeping, but allowing emergency communications to come through.

Similarly, text messages are external interruptions, but they are the kind that you can turn off. That is, when you want to concentrate, you can make your phone silent. (And by silent I mean you are not aware of any notifications. Phone quiet, not vibrating, screen down.) In general, notifications on your phone that interrupt you should be kept to an absolute minimum.

The same goes for email. Reading email puts your mind into a stressed mode, and cutting yourself off from it makes you more relaxed.[10] Just about everybody should turn off notifications for email, and check it only periodically.

## The Effects of Distraction

So how bad is it, really, if you check your email in the middle of working on a paper? Science shows us that it's pretty bad.

The most obvious problem with checking your social media (and I'm including email in this concept) is that while you're doing it you're not doing something else. This is the "opportunity cost." The cost of what you're doing isn't just time, money, and other resources you invest to do it, it's also the cost of not doing all of the other, better things you could be doing with your time.

So if you play an hour of video games, that's an hour you aren't being productive.

But it's worse than that. Because when you switch from one task to another, say, from manipulating a spreadsheet to playing *Mario Kart*, or back again, you are just a little bit dumber for a short time. If you're switching a lot, you're just plain dumber a lot of the time. There are many studies that show that if you're rapidly switching from one task to another, you suffer performance deficits in at least one of the tasks.[11]

### Multitasking

Doing more than one thing at a time is often called "multitasking." Sometimes this is true multitasking, such as when you're jogging while listening to an audiobook. But in general, when you multitask, you're worse at all the things you're doing. For example, talking on the phone while driving makes your driving worse. (Laws that allow hands-free cell phone use in the car don't make any sense, because it's the *talking* that distracts you, not whether or not you're using your hands.)[12] Because we crave constant stimulation, multitasking "rewards" our brains with novelty, creating a constant dopamine rush, effectively training your brain to enjoy being distracted. At the same time, it causes stress (increased cortisol) and increased adrenaline (putting you in fight-or-flight mode).[13] Though it can be exciting, it is not good for your long-term prospects.

But most of the time when people talk about multitasking they're really talking about rapid task switching. If you're texting while watching television, for example, what you're really doing is paying attention to the show, then the text conversation, and back to the show. While you're typing out a text, you miss what's going on in the show.

I often listen to audiobook novels while I walk my dog. This isn't a problem, though, for two reasons. First, even if my "performance" drops for dog-walking and novel-listening, it unmatters. The stakes are really low. Second, these tasks don't interfere with each other very much because they use different parts of my mind. Dog-walking involves watching my dog and navigating my physical environment, and listening to a novel involves verbal comprehension and imagination. Interference is worse when two tasks are competing for the same functions in your mind—listening to (and comprehending) an audiobook while you read a magazine is impossible, for example. When the tasks are similar you get much higher costs. When you're watching TV and texting, the two tasks are visual and verbal, and when your mind is occupied with one, it has no resources left to process the other. Experiments in which people did a visual task while engaging in a voice chat experienced less of a performance drop than they did for tasks that drew upon the same kind of thinking.[14]

There are exceptions, times when multitasking is okay. Listening to instrumental music while you study or do computer programming can sometimes help.[15] Doodling during a boring lecture helps you retain more of the lecture. This seems to be because when an important task is really boring, your mind actively tries to search for something else to do. If you're listening to a boring lecture, your mind might wander, looking for a more interesting thing to think about. In one study, the students who were instructed not to doodle often detached completely from the lecture, getting nothing out of it. But the doodling students were less bored. With part of their attention on the lecture, and part of it on doodling, they were better able to attend to the lecture content.[16] Now we're talking doodling here, not making some masterpiece. It has to be relatively mindless or you'll be too cognitively engaged in the drawing to have any attention left for the lecture.

So if it's a boring, cognitively engaging task, you can do another task at the same time, as long as it's *not* cognitively engaging—walking, instrumental music, doodling. But if your

main task is cognitively demanding and engages your interest, you would be best off not doing anything else at the same time.

For noncognitive tasks, multitasking is a good way to optimize your life. Let's take exercise, which I personally find so boring that I can't get myself to do it for very long. My solution has been to play squash, which is a game that I find fun (also it's a game I can play year-round). But if you are into weight lifting, or running, or some other repetitive, non-game exercise, listening to music helps you enjoy it more, and might even make you exercise harder or longer.[17] If you have a long commute, listening to podcasts or audiobooks might help pass the time, and you get to read a lot of great books. Since I started listening to audiobooks, in addition to traditional reading, my book consumption has tripled. (Audiobooks are not as bad as having phone conversations in the car because they are not interactive and can be turned off pretty easily or safely ignored when driving gets hairy.)[18]

So if you're going to multitask, it should be with tasks that don't use the same parts of your mind, because switching tasks has a cost. The trick to it is not to multitask anything that really requires *thinking*. Don't listen to the radio while you write a report. Don't have the TV on while you're doing your taxes, but listen to music while you exercise.

**Task-Switching Costs**

Scientists have put numbers to these costs, in terms of time. So what is the task-switching cost? Measurements range from 200 milliseconds to 25 minutes.

Wha—?

With a range this big, we need to dig a little deeper into the research. The 200-millisecond measure comes from psychologists studying people doing tasks on a computer screen. For example, they might show people a series of faces, some happy, some sad, some male, some female, and instruct them to *identify the gender* of the face as fast as possible. The task switch is to start *identifying the facial expression* instead. In this study, switching from gender-identifying to expression-identifying cost about 200 milliseconds (one-fifth of a second) in response time.[19]

The 25-minute measure, on the other hand, came from real-world, observational studies of interruptions at the office. You might be working on a budget, and a coworker comes by your cubicle to tell you about how they binge-watched *Fringe* over the weekend. This kind of thing happens all the time, and the U.S. economy suffers an estimated loss of $650 billion a year from these distractions.[20] Computer scientist Gloria Mark found that when people got interrupted like this, it often took them a while to get back on track—often about twenty-five minutes.[21] It often takes over a minute to even remember what you were doing before you got interrupted, and sometimes people never got back to what they were doing at all.[22]

We often are vaguely aware that distractions and interruptions make us less productive, but the scary thing is that a lot of times we don't. Often people think they are just fine at

multitasking, and are oblivious that their performance suffers.

### Can You Get Better at Multitasking?

You have to wonder what the long-term effects of multitasking are. On the one hand, frequent multitaskers get a lot of *practice* multitasking, so maybe they get better at it. On the other hand, perhaps all that training is rendering them less able to focus when they need to, because they are "addicted" to the dopamine rush of the constant novelty associated with task switching. Really, these are separate, independent questions: does habitual multitasking make you better at multitasking, and does habitual multitasking make you worse at focusing?

Multitasking seems to be difficult for two underlying cognitive reasons. The first is that when you change to a new task, your mind has to prepare to do it. Think of your mind like a desk. When you're working on your taxes, you put the stuff on your desk that you'll need —your tax forms from work, your donation receipts, and so on. When you want to do some painting, you clear all that stuff off and get out your painting stuff. Your working memory is a bit like this. When you switch from one task to another, this "advance preparation" means activating in your mind the right representations, responses, and internal processing mechanisms you'll need. Because they are somewhat different from the previous task, it takes some time to prepare them, causing a time delay, and sometimes a performance reduction as well. The other problem is that after you switch to the new task, the activation of all of those things related to the *previous* task are still active and potentially interfering. These take time to become less active, in a process known as "passive decay." It's the combination of these two factors that generate the lion's share of our task-switching problems.

Advance preparation is related to fluid intelligence, and heavy multitaskers seem to be a little better at this aspect of multitasking, though we do not yet know if they got this way through practice. The studies to date are correlational, and don't shed light on causation.

Passive decay, in contrast, is unrelated to intelligence and seems to be independent of how much multitasking a person does, which suggests that it doesn't get any better with training. This is a large enough factor, though, that we see in some studies there seem to be no differences between heavy and light multitaskers.[23] Unfortunately, the science on this isn't conclusive. Another study shows that frequent multitaskers have higher task-switching costs and are worse at ignoring irrelevant information than low-multitaskers.[24] But again these studies don't show whether multitasking causes poor task-switching, or that people with poor cognitive control can't help but be distracted more often, and multitask more.

Adam Gazzaley created a video game called *NeuroRacer* to test to see if practice at multitasking could make people better at it. Specifically, the game required you to drive while attending to some distracting signs while ignoring others. Playing this game improved people's multitasking abilities.[25]

In sum, the science of getting better at multitasking is inconclusive. We know that frequent multitaskers are worse at it, suggesting that you probably are not going to get much better at multitasking by doing it more. In the modern world, so many people are so distracted that the ability to concentrate is like a superpower. Learn to harness it, stop multitasking, and you will have a competitive advantage.

### Work at the Office or Work at Home?

One way to get more concentrated work is have your door shut at work, but that's only possible if you're lucky enough to have a door (see sidebar "What a Workplace Should Look Like"). But another option is to work from home, or telework. Many of us were able to experiment with telework during the 2020 coronavirus pandemic. You'll likely experience predictable benefits and drawbacks when you spend more than half of your workweek teleworking.[26] This is assuming that you can concentrate at home, don't have to do your own child care, have a good Internet connection, etc.—something not everyone had access to during the pandemic. Further, many people have only laptops at home, which have smaller displays. Using a large monitor helps your productivity because you don't have to constantly switch between windows—you can just move your eyes.[27]

On the bright side, at home you'll have less work-life conflict, greater job satisfaction, less stress from meetings and interruptions, less exposure to office politics. Telework also reduces commuting, which means more time for work as well.[28] You'd think telecommuting would save energy, but this is doubtful.[29]

On the downside, you'll have lower quality relationships with your coworkers. A study of scientists showed that teams have more impact than people working alone, and that collaborators had the most impact when they were physically close together—preferably in the same building.[30]

Now, communications technologies have gotten so good that you can work from home and really stay connected to the people at work. The problem with this is that the more intensely one engages with this, the fewer benefits one derives from teleworking in the first place! One gets more interruptions, and gets involved with discussions they might otherwise have been able to avoid.[31]

## Why Are People Sabotaging Themselves?

In a typical work environment, people average about two to three minutes on a task before switching to something else. This is fairly rapid task-switching, and performance suffers from it. The younger generation checks its mobile phones every fifteen minutes, and about 75 percent of young adults sleep with their phones nearby, *with vibration or the ringer on* so as not to miss nighttime alerts![32] This is a terrible idea.

There are two important parts of removing distraction from your life. The first is the removal of external interruptions—other people, and your devices, alerting and

interrupting you. The second is the removal of internal distractions, which is your own mind sabotaging your concentration by giving in to temptation to check your phone, daydream, or otherwise screw around when you should be working. Most interruptions are of the internal kind. A study of workers found that over half of the interruptions involved "checking in" with social media or something else, with no alert or notification prompting them to do so.[33]

So if multitasking is distracting, and impairs productivity and performance, then why are people doing it so much?

When you ask people why they multitask, many say they believe it helps them. Without their beliefs in the right place, they have no motive to make a change. Hopefully this book will fix this for you. People think they're good at multitasking. Young people believe they can successfully juggle six forms of media simultaneously.[34] But in truth, heavy multitaskers are worse at multitasking than light multitaskers.[35] This is really important: *you cannot trust your feelings about your productivity when it comes to multitasking*. But even if you know it's bad, it's hard to stop.

Sometimes people switch tasks because they get frustrated with what they are doing. They don't know the way forward, and that doesn't feel good, so their minds start looking for something that is more rewarding. Switching tasks can feel amazing, and gives the *feeling* of productivity because you're responding to so much.[36] You get a notification, and your brain anticipates that it might get a reward. It might be a message from someone you like, or a cool picture. This anticipation can build if you don't check the notification, causing you to obsess about checking in, causing further internal distraction from what you're trying to concentrate on.[37] So you give in, and check the notification. Your curiosity is satisfied, but you've distracted yourself from what you were doing, and also made the checking more of a habit, making it harder to resist phone-checking in the future.

Unconsciously, we discount future rewards, like eventually getting some major project done. Switching to another task feels rewarding, and we can get that reward right now. This is how we can constantly switch between tasks, feel great and productive, and yet never get anything accomplished.[38]

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### THE IMPORTANCE OF WRITING

As an academic scientist, much of my productivity is based on writing. I run experiments, I make computer programs, I have meetings and discussions with people, but eventually these are in service of creating scientific papers and books, which means writing. Other people do other things, like dance or painting. There are lots of productive activities.

But there seems to be something special about writing.

I have a writing assignment in the class I teach, which has over 1,000 students in it. Why would I put myself through this?

Writing can help people deal with emotional issues in their lives. Jamie Pennebaker ran an experiment where people wrote about upsetting, traumatic experiences they had in their lives

—preferably ones that they haven't told anybody about. The people who did this went to the doctor fewer times over the course of the next year.

And the kind of writing mattered—those who just complained about the trauma, or ranted with anger didn't feel any better. Catharsis doesn't always work, it can just remind you of what makes you upset and make you upset all over again. The biggest benefit went to people who tried to make sense of what happened, and had increasing insight over the course of a few days. He found that dancing and singing about emotions didn't work. It had to be creating words, through writing or talking into a recorder. If you're dealing with a traumatic event in your past, you might want to write for fifteen minutes a day about it, trying to figure out why it happened and what benefit you could get from it.[39]

Writing is hard for people, and I can't find any research looking into why that is. If you read books about writing fiction, for example, it seems that a third of every book is about motivational strategies to get your ass in the seat to actually write, and the rest is about how to make the writing actually good. In contrast, books about painting do not dedicate pages to trying to get you to paint. But people have a strange block about writing. This is a shame, because writing is so good for you.

When it comes to writing fiction, there is also this strange idea that it's purely a matter of talent. Compare this to, for example, playing the violin. If someone picks up a violin for the first time, maybe watches a video about how to play, and then tries to play a song, they don't record that first attempt and then try to peddle it to record labels. People understand that learning to play the violin, like drawing, is difficult and takes a lot of practice before you're good at it. They understand that for a while your violin playing will be poor.

But with writing, you'll often see people decide at some point in their adult life to try writing, say, a short story or a novel, and then show it to friends, hoping to be told that it's brilliant and should be published. Of course it's terrible, just like one's first playing of the violin is terrible. But people will conclude from its terribleness that they are bad writers, and never write again.

Writing takes practice, just like violin playing, but for some reason I don't know, people don't appreciate that.

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If you want to optimize your productivity, you have to fight this instinct.

People are tempted by multiple, competing needs all day long. The most common desires that people get include wanting sex, sleep, or food. But stopping work, including checking email and social media, wanting to watch television or listen to music, are also very common distractions. This was found in a study where they gave people beepers that randomly went off, and asked people what they were thinking about.[40]

To understand this, let's back up and look at why anybody does anything: people have various brain functions simultaneously trying to control the body and what the conscious mind focuses on. Each of these works in a different way—you might think of them as valuing different things. Often, the behaviors being pushed by those brain areas are different. It's like a board meeting, where the board members disagree on what the company should do. But instead of reasoning, each just shouts as loudly as it can. The board member (or brain function) who shouts the loudest determines what the company (or your body) does.

We can look at multitasking as an attempt to gratify multiple needs. The varying strengths of those needs determine what we turn our attention to at any given moment. Over time, a social "need to connect" might grow in one's mind, making turning attention to chatting with someone or checking in on social media more likely. When this temptation is indulged, the need is satisfied, and becomes low-powered enough that other needs (such as a cognitive one, such as curiosity about a book you're reading) end up determining behavior in the next moment.

Suppose a student is studying because of a cognitive need to understand class material. As the studying progresses over time, other needs grow in strength. The need for social engagement is held at bay for only so long, but when it gets stronger than the cognitive need, the student checks their social media accounts to see if they got any "likes" recently. They got a few, so they are satisfied and return to studying.

Or perhaps the studying is boring, or depressing, and the student has an emotional need to be happier. The student turns on music, which improves mood. The emotional need is satisfied, and the student studies while music is playing, even though it renders the studying less effective. A study by Zheng Wang shows that this happens, but the emotional need is subconscious. That is, students don't turn on the music *because* they will be emotionally satisfied, but they end up getting emotionally satisfied anyway.[41]

Crucially, these self-interrupting behaviors are reinforced by the gratifications they cause. If listening to music while studying makes the student happier, then they are more likely to listen to music in the future during study time. This is conditioning.

It's also important to realize that there is often a mismatch between gratifications sought and those actually obtained. That is, sometimes we engage in a behavior to satisfy some need, but that behavior actually doesn't pay off the way we want it to. This is clear in cases of uncertainty—a person might attempt to initiate a conversation with a stranger on a bus because of a social need for human connection, but if that stranger blows him off, his need is not satisfied. Or a person might check Facebook to get a mood boost, but come away feeling worse because they attend to someone else's life that looks so much better.

Another way to think about our constant task-switching is in terms of foraging for information. Just like an animal will spend some time at a location until it seems to be exhausted of food before going off to another location, we too gather information at a "location," like Instagram, and then feel the urge to switch to another source of information, like television or email. The instincts that guide this behavior evolved in a world where switching locations had a higher cost. But in today's world, we can have a hundred information locations *on our phone*. The cost to switch from one to the other is so low that we overestimate the utility of switching. We also get bored more quickly than we used to with the information we're getting from one source. Unfortunately, our instincts lead us astray: we often are better off staying at one particular information source than switching. If you follow your feelings, you are likely to go down the rabbit hole, jumping from app to app on your phone, wasting the day away, not getting anything done, feeling productive the whole time, but feeling bad afterward![42]

### WHAT A WORKSPACE SHOULD LOOK LIKE

Helena Jahncke ran a study in which she simulated two open-plan office work environments: high-noise and low-noise. Participants in the high-noise environment rated themselves as being more tired and less motivated to work than those in the low-noise condition. Noise impairs cognition.[43]

Open-plan offices reduce privacy and are much louder. They allow easier interaction, more creativity, and are more flexible in terms of change. They also are more stimulating, so they can be better for routine, boring tasks.[44] But whether these benefits are smaller than the penalties is controversial.[45]

A study by Craig Knight showed that worker performance was better in "enriched" offices than in sparse, minimally decorated offices. Performance was best when people could decorate their workspace however they liked, but even top-down placement of plants and art made for a more productive workplace.[46]

## Procrastination

Try to be the kind of person who doesn't need to have others remind you to pursue your own goals. Part of being like this is avoiding procrastination.

Procrastination is what we call it when your immediate needs for gratification win control of your behaviors at the expense of your longer-term goals. Let's take an example that many people have to deal with: doing their taxes. Let's assume that you are going to do your taxes at some point, it's just a matter of when. There is a span of a few months before the spring deadline when you have all the information you need to do them. If you don't enjoy doing your taxes, then it's an easy thing to procrastinate. Even cleaning your house might seem more promising, in terms of expected reward, than doing your taxes, at every given moment.

We feel the temptation for procrastination when we expect to feel worse doing what we *should* do than some other, more fun thing you could be doing instead. Which means that, ultimately, procrastination is about emotion. The things you're likely to do when procrastinating, are, by definition, temptations: things that feel good but don't move you toward your greater values and life goals.

Thirty-one percent of people admitted to procrastinating at least an hour a day, and another 26 percent said they wasted more than two hours a day. And these are just the people willing to admit it. My colleague Tim Pychyl found that university students wasted about a third of their waking hours procrastinating.[47] So if you have a problem with procrastination, join the club.

Tasks are much more fun when you think they can be finished, offer novel challenges or things to learn along the way, and you get feedback according to how well you're doing while working on it. Tasks you are tempted to procrastinate are those that are boring, frustrating, ambiguous, difficult, or lacking in meaning or a good reward structure.

We procrastinate because it feels good. But it's a classic short-term gain with a much worse long-term payoff, like eating junk food now and gaining weight later. That's why you should try to eliminate procrastination from your mental diet. If you want to abandon a task, do it for the right reasons.

Not every problem with getting things done is due to procrastination—some people have trouble starting projects, and some have trouble finishing them.[48] In these cases, a coach, either formal or informal, can help with these specific problems.

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### PERFECTIONISM

Perfectionism—the classic answer to the dreaded interview question "What is your greatest weakness?"—actually has two different kinds, one good, one bad.[49]

The good perfectionist simply has high standards, a striving for excellence, and persistence that encourages better performance.

But perfectionism gone too far is associated with anxiety, depression, stress, and test-taking anxiety. When I am considering taking on graduate students, I see perfectionism as a big red flag. I attribute some of my modest success to my non-perfectionism. When I was in graduate school, I would write crappy drafts of things, turn them in to my supervisor, who would tear them apart, then I'd write another draft, and go through two or three iterations of this while the students sitting next to me were still "perfecting" their first draft. In many projects, not just writing, you risk excessive polishing of parts that will be cut from the final product, which antimatters. It's rearranging deck chairs on the *Titanic*.

The bad kind of perfectionists probably get less done because they keep polishing things past the point when the improvement of the product for a given amount work gets negligibly small. Do you want to make one perfect project, or three really good ones?

I tell my students that their job is to give me shitty first drafts.

The perfectionists react to this with surprise and horror.

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# HACKING YOUR BRAIN, HACKING YOUR LIFE

The mind and brain are incredibly complex, but in this book I'm going to simplify things just a bit into a structure that is mostly true and easy to understand. Let's ask a fundamental question: what is happening, in your mind and brain, that determines what you do at every moment? Why do people do anything?

The basal ganglia part of your brain controls action. It is your procedural memory. Think of it as storing the codes for everything you can do. This includes everything from simple physical actions like reaching for peanut butter to complex actions like break dancing, and also includes purely mental procedures, such as the steps required to do long division in your head.

Interestingly, all of the things you could do are constantly trying to happen—the basal ganglia actually works by suppressing all of these actions in the supplementary motor area, and selectively allowing just one at a time to happen by stopping the suppression.[1] When you're cognitively taxed, your habits, encoded in the dorsolateral striatum (DLS) part of your basal ganglia, can take control of your body with the habits stored there.[2] Habits form because of repetition and conditioning (associating the action with something pleasant or unpleasant). In this way the basal ganglia can control what you do all by itself. This is the habit system.

Let's review the systems involved in how your mind chooses what to do next, and come up with cute names for them. These systems compete for control of your body. If your brain is functioning properly, each of these systems will be in control at the right time.

**The Habit System** tries to get you to do what you're used to doing, and isn't particularly goal-directed. One of the marvelous things about your mind is that it can automatize things. This is how you can learn to talk to a friend while driving, or tie your shoes while thinking about what to have for lunch. There's nothing inherently good or bad about habits in general—you can have good ones or bad ones. The important thing to understand is that in many situations, you have habits waiting in the wings to take over, and your basal ganglia will be pushing you toward engaging in those habits. If your cognitive system is otherwise distracted, you are more likely to engage in habitual action. What I casually refer to as "habits" can be genetic instincts or learned repetitive behaviors. Habits are less sensitive to reward in any particular context—that is, you might engage in habit without your mind considering very carefully whether it would be appropriate in this particular situation. The environment cues the habitual behavior, but it's less like a deliberative decision.[3]

been recruited to justify this action (e.g., "I went to the gym, so I deserve it!") but the original motivation is the seeking of pleasure. This is also mesolimbic, and more opioid.

Because wanting and liking are often felt together, I'm going to group them as reward—but they can be separated, particularly in addictions.

So far I've ignored learning, which is another story entirely. Conditioning and repetition can cause habits and compulsions to form, but later, when the actions are taken, conditioning and the immediate context is less relevant to whether the action is taken or not (in cases of habit or compulsion).

I just want to remind you that this is a simplification. I'm not talking about drives like hunger and the need for sleep, for example. The whole thing is really complicated. But now that we've got four systems with cute names, we can think about what you can do to each of them to get yourself doing more of what you want, to make your life more like you want it to be.

## How to Hack Your Cognitive System

When you are trying to do something important, and your phone pings a notification sound, your brain has a choice to make. Do you stay on task, or do you check to see what news your phone brings? I say "your brain" and not "you" because often what you end up doing isn't the result of a deliberate choice at all. If you pick up your phone, you might not have consciously chosen to do so. You're reacting without even considering. It might happen so fast that your cognitive system doesn't have time to even weigh in.

Even if you know about how damaging constant interruptions are, and wish to not give in to them, it can be hard to avoid them. You remember you have a notification that hasn't been checked. It sits there, taking up valuable working memory in your mind, causing a mild anxiety. Eventually, the tension gets so distracting that you just have to check it. This falls under a larger problem of "weakness of will." Cognitive science can help us look under the hood a bit and see what weakness of will actually means in the mind.

I had a friend who was doing consulting for a snack food company. He told me that when he'd go to a meeting, there would be a big pile of these snacks in the middle of the table. At the start of the meeting, everyone would avoid them. But as the meeting dragged on, everyone's fingers would start itching toward the center, and eventually everybody was eating snacks and would go into a sugar coma. They'd all feel regret.

This is a classic example of weakness of the will. What's curious about it is that we might describe it as doing something we didn't want to do. But if we didn't want to do it, how could it have happened? Philosophers call actions that are against your better judgment "akratic actions."

Your "better judgments" are a function of your cortical brain regions, associated with reasoning, memory, and belief. The part of your brain that actually initiates action, the supplementary motor area, decides what to do based on the judgments of the cortical brain areas, but others as well, such as the reward system, the emotional system, and the habits (and related behavioral inclinations) stored in your basal ganglia. These subcortical systems

do not have representations of judgments as we normally think about them. The supplementary motor area takes information for all of these areas and "decides" what to do. And sometimes the subcortical "opinions" on what to do win the day.[7]

These subcortical areas are much older than your cortical areas. They're also faster. People are about a fifth of a second faster at judging the tastiness of food than judging healthfulness.[8] We share versions of the emotional system, reward system, and basal ganglia with lizards, who have no "better judgments" at all.[9] Rather than scratching our heads, wondering why we act against our better judgments, we should be thankful that we even have better judgments all! For millions of years, our ancestors didn't.

These subcortical inputs are very powerful. They respond to immediate gratification, whereas your cortical areas respond relatively strongly to long-term reward.[10] Even a ten-minute delay makes something feel like a long-term reward.

What we call discipline, self-control, or willpower is best described, neurally, as the relative strength of your cortical areas to suppress your subcortical areas when it comes to action selection. It is a self-initiated suppression of impulses in the service of longer-term goals.[11] We need discipline because when we're doing something hard, our mind tries to find something else that's more rewarding.

Acting badly isn't always caused by a weakness of will. Sometimes you can be "irresolute." Let's say you have an intention to avoid cake at a party. You get there, and you find yourself thinking of reasons to eat the cake: you haven't had cake in a long time, you deserve it, you went on a run that day, it would rude to the host not to have any, the cake was baked by poor people who need the economic support, etc. Eventually you actually *believe* it's okay to eat the cake. You've talked yourself into it! You can see how being smarter allows you to think of *more* justifications to eat the cake. Thanks, prefrontal cortex.

Some say that this is different from a weakness of will. Rather than giving in to temptation and doing what you know is wrong, it's your old brain recruiting the rationalization powers of the new brain to work against itself by changing its mind about what's right and wrong.

People with more willpower have a lot of advantages. They are better able to deal with stress, adversity, and conflict. They are happier, healthier, make more money, maintain better and longer-lasting relationships, and are more successful in their careers. Willpower is more important to grades than intelligence. Oh, and they live longer, so they can enjoy these things for a longer time.[12]

When you're under stress, it takes more willpower to do what you want to do, so one way to take better advantage of the willpower you have is to reduce stress, both in the moment and in your life in general. Getting enough sleep is the easiest and most pleasurable way to do this.

Another way to increase your willpower in the moment is to forgive yourself when you slip up and give in to temptation. Just saying to yourself, "It's okay, everybody makes mistakes, I'll try to do better next time," increases your chances of doing exactly that in the future. Beating up on yourself actually reduces your drive to be better.[13] You've heard of

the golden rule? Here's my platinum rule: Do unto yourself as you would do unto the people you love.

### Can You Increase Your General Willpower?

Maybe. Some evidence suggests that meditation can improve it.[14] Research on meditation is difficult because it's hard to have a placebo group (it's hard to make someone think they're meditating but actually not be).[15] Aside from meditation, simply being *mindful* as you do things at least gives you the opportunity to exercise your willpower, because being mindful reduces the chance of falling back on habit (though, as we'll see later, you can hack your habit system so that this isn't such a bad thing).

Your willpower system is often in conflict with the other systems. Here's a metaphor I like to use. Think of your body like a car. The habit system is a silent cab driver going where she normally goes, your willpower system is an adult in the passenger seat opining on all the places the car needs to go, and the reward system is a hungry kid whining in the back seat. When the willpower/passenger is telling the driving where to go, there's a decent chance the driver will go that way. But if the willpower/passenger is quiet, because she's thinking about something else, the reward/kid will make the habit/driver go where he wants it to go. If the reward/kid is quiet too, the habit/driver will go wherever she's used to going. The more familiar the terrain is, the more power the habit/driver has—sometimes to the point of ignoring the other two people in the car altogether. In a new place, the habit/driver doesn't know what to do, because there are no triggers for the installed habits, and more readily takes instruction from the others in the car.

This was shown in a study of students who transferred from one university to another. The new environment broke habits to some extent, and intentions were able to gain control of the student. If the student had been exercising at the old university, would she exercise at the new university? It depended on her *intention*, not so much habit. Students who wanted to exercise did, and those who didn't want to stopped. The environment failed to trigger their old habits, putting the students back under more cognitive control.[16]

Cognitive control is also increased by doing physical exercise, and the benefits are even greater if the exercise is cognitively engaging (like tennis) versus cognitively passive (like running on a treadmill). Even doing a brief bout of exercise has beneficial effects on your cognitive control system immediately after.[17]

You're already hacking your cortical system by reading this book. You are using your cognitive system's values to hack the other sources of motivation in you. You need to want the right things, and knowing what to want means having good values, and knowing how the world works well enough to know the difference between what matters, what unmatters, and what antimatters. Using conscious intention and willpower has limited power, so you don't want to blow it on intentions that do no good or actually hurt. Reading and getting advice from wise people you want to emulate installs values and conscious strategies that can be recruited by your willpower system.

In this section, I'll talk about conscious strategies and mindsets that can help you get your willpower system working better.

### The Six-Second Rule

It feels like there's something magical about six seconds. Example: when you think "I should do some push-ups," your mind will start working on an excuse not to. If you wait more than six seconds, you'll probably come up with something. So when something like the sudden desire to do push-ups comes to mind, try to do it within six seconds of thinking about it.

I hurt the muscles in my back and hips a while back from playing squash. My physical therapist gave me a bunch of exercises to do every day. It took me about half an hour to do all of them. To help get myself to do it, I put on an audiobook, and did them one by one, as indicated by a stack of index cards. I like the stack because it's not easy to see how many are left, and because I can only look at one at a time, I'm not as tempted to skip ahead. If it were just a list on a piece of paper, my eyes would scan past the next exercise to the ones lower in the list, hoping to find one that looked more pleasant. Anyway, some of them, like plank, were very onerous for me. I find that when I turn the card over, and see something like plank, my heart sinks, and I have to get started doing it within six seconds. If I don't, I'm toast, because I'm smart enough to be able to rationalize a reason why I shouldn't have to do it. Although this works for me, I have not been able to find any research on anything like this six-second rule, so this advice is anecdotal, but perhaps will help you avoid the common pitfall of talking yourself out of something you don't *feel* like doing, but should.

### Your Inner Voice

Have you ever been thinking of doing something, and some inner voice tells you that it's not going to work? Or that you're unattractive? That people will figure out that you aren't good enough? That nobody likes you? That you're in over your depth?

Since it's hard to get away from, you'd hope that your inner voice was soothing and encouraging, and for some people it is. But for many people, their inner voice is a little shit, undermining their confidence, causing self-doubt or self-loathing, and on balance holding their lives back.

In general, my inner voice isn't so bad, but I have troubles with anger. When I get angry at something, I get a mad, complaining voice in my head that crowds out other, more happy and productive thoughts.

Here is one strategy to deal with it: when my inner voice gets oppressive, I try to picture it as a one-foot-tall cartoon creature that is comically angry—I actually picture the Calcifer character from the film *Howl's Moving Castle.* When he has control over my mind, I picture him on my lap. I gently pick him up (in my imagination) and place him beside me. I immediately feel a little better. When I notice the angry thoughts showing up again, I


image
not
available

Sometimes people will deliberately buy small packs of candy rather than large ones, so they don't eat as much. This makes good scientific sense, as studies show that people eat less if food is put in smaller packages.[36] Why might this be? Once a package is opened, it's easy to just keep eating. When you have to open a new package, it's a salient cue that you're consuming. It breaks the grab-food-and-eat-it loop that your basal ganglia is running on mindless autopilot.[37] People tend to keep eating until food is gone, more or less ignoring their own hunger or satiety. One of the main theories of why French people are thinner than Americans is that they eat less due to smaller portion sizes.[38]

Habit is a major contributor to your behavior, more likely to take control when your conscious mind is focused on something else. You can use your cognitive system to override your habits, but this is not sustainable. Sometimes you have to consciously think about something other than what your body is doing: you might be giving a presentation about your company's marketing plan for next year, and not thinking about how many sips of latte you're drinking, or having a tough conversation with your daughter about her crappy boyfriend, and not focusing on driving, or wondering about why Qui-Gon Jinn didn't vanish when he died, even though he came back as a force ghost later, and not focusing on the peanut butter sandwich you're eating.

In moments like these, your body will act on habit.

We can see just how powerful habits are by looking at how durable they are in the face of other mental problems. People who suffer from an inability to form new memories can still learn new habits of surprising complexity. Charles Duhigg's book *The Power of Habit* describes Eugene, who was unable to create new episodic memories, and indeed could not remember anything from the past several decades. His wife was stressed because he would wander out of the house and get lost. But after taking him on the same walk every day, it became a habit for him, and when he wandered off again, he would just find himself going on the habitual route he'd taken with his wife over and over again, without knowing why, and without even consciously remembering ever going on that route before. Unless there was something different about how the route looked, like construction or something, he would just find himself back home again, much to his wife's relief.[39]

**Habits Ignore Reward**

I had a friend who was trying to avoid eating candy. He was at a restaurant, and at the end of the meal, was deeply engaged in a conversation. Then he looked down and saw the empty candy wrapper in his hands. He'd eaten the candy without pleasure, consciousness, or memory of the event. Such is the power of your automatic, habitual behaviors. When your goal-directed, cognitive brain functions are weakened, or otherwise occupied, habits are more likely to control you.[40]

People simply don't have the mental resources to behave deliberately all day long. Suppose you start craving a doughnut at 12:30 in the afternoon. You resist. Then at 1:15 you get another craving, which you also resist. Then again 45 minutes later. By now, you're

feeling pretty proud of yourself for successfully resisting eating the doughnut three times now. You almost deserve the doughnut for your efforts, right? You give in two more times before finally giving in and eating one at 3.

Forty percent of what people do is on autopilot, based on habit and what you're used to.[41] One way scientists can test to see if some action is the result of habit, rather than higher cognition or the reward system, is to see if doing the behavior is sensitive to changes in expected reward. That is, if you change how good or bad the expected outcome will be, if it is cognitively motivated, the probability of doing it will change. Not so much if it's a habit.[42] This suggests that the habit system bypasses the normal decision-making that weighs benefits and drawbacks to an action that we often engage in. When you want to drive from work to a doctor's appointment, but you end up driving home out of habit, this is what's happening. If you were considering the benefits and drawbacks, you would have realized that going home meant a waste of time, and that taking the route to the doctor is the best thing to do. But habit took over.

My writing of this book is a good case in point. I worked on it every morning of the week except Saturday. When it became a habit my experience was that I did not need make a *decision* every morning to work on the book. I just sat down and started working. My conscious mind was thinking about *what* to write, not *whether* to write. Ideas of doing anything else never even crossed my mind, freeing up my willpower for other things.

Even when you're paying *some* attention to what you're doing, your mind tends to look for reasons to engage in the habits you already have, making it harder to avoid bad habits even when you're thinking hard about it.[43]

### Habits Have Big Effects Over Long Periods of Time

By definition, habits are things done over and over again. Because of this repetition, small changes can build up over time. For example, buying an expensive drink once in a while is no big deal, but if you do it every day, it can cost you thousands of dollars a year. Similarly, riding your bike to work once is nice, but doing it every day increases your lifespan. Habits are hard to change, but this has a good and bad side—good habits are hard to establish, but once they are there they work for you without effort, like interest in your bank account. With just a little habit maintenance, you can focus your limited attention on other issues in your life, trusting that what you'll do on autopilot is in line with improving your life.

This is why optimizing yourself requires curation of your habitual activities. First is to recognize the habits you already have. Then you can decide which ones to reinforce and which ones to replace. Think of them like apps on your phone, they take up memory, and some make your life better, and others make your life worse. Which habits should you uninstall?

In the moment, a habit is triggered by something perceived in your environment, and over time, habits change because of conditioning—reward and punishment from engaging in this or that behavior in this or that situation.

very primal—we are wired for liking sweets. (In contrast with sugar, caffeine's reward takes about fifteen or twenty minutes to kick in.)

Breaking this habit would be challenging to do. The reward for *not* having a sugary drink every morning is what—better health in the long term, and perhaps a slight difference in my weight? Avoiding Vietnamese coffee on any given day simply does not create the same kind of feeling of reward that drinking it does. These far-future rewards are so uncertain and speculative that they are trapped in the cool, emotionless belief system in the cognitive part of my mind. The habit system barely even registers them. Instead of a great taste in your mouth, you have to settle for a belief that you're doing your future self a favor, and try to feel good from that. The satisfaction of the taste of sugar versus the satisfaction of a nice belief? You can see why changing habits is hard!

Similarly, watching television instead of exercising provides the immediate gratification of a primal urge to conserve energy, and our basic thirst for hearing good stories, where exercising is boring and strenuous in the short term, and you only feel good when it's all over, and experience health and happiness benefits down the road. Many new habits are hard to establish because they pit short-term gratification against long-term goals.

If you try to break a habit through sheer force of will, you are relying on your cognitive system, which has a lot of other jobs, too. When it's distracted, which it eventually will be, you will accidentally engage in the bad habit, reinforcing it again. This is why breaking habits is very hard for people.

So if you have trouble breaking bad habits, you are not alone. It's hard. In fact, you probably cannot ever completely remove bad habits from your brain. Studies show that the old habits are still in there. It sounds like an impossible task.

But there are ways to break bad habits. Rather than thinking of getting rid of bad habits, it can be helpful instead to think of replacing them. That is, instead of having Vietnamese coffee every morning, I can try to have green tea instead. Over time the tea habit will be stronger than the coffee one, even though the coffee one is still in my head, waiting to be triggered again. I use my willpower in the short term to force myself to drink green tea for a while, until the habit takes over. Then I can let my cognitive system relax a bit, and my habits will be in line with my goals for this issue.

This is very important, so I'll say it again: your old, bad habits will probably always be in your mind, so if you want to "break" them, you need to install better habits that are triggered by the same things, and work at those until the new habit is stronger than the old, bad one. Don't think of eliminating habits. Think about *replacing* them.

### When to Replace Habits

Because habits are triggered by environmental situations, making a big change to your life, like moving, getting married, or getting a new job, can disrupt your habits, for better or for worse. If you have a desire to change habits, either by removing bad ones or installing good ones, a big life change is a good time to do it. Studies show that big context changes

# INDEX

**A note about the index:** The pages referenced in this index refer to the page numbers in the print edition. Clicking on a page number will take you to the ebook location that corresponds to the beginning of that page in the print edition. For a comprehensive list of locations of any word or phrase, use your reading system's search function.

## A

## B

## C

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