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CHAPTER 1

PROTOCOLS *for* SLEEP

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Sleep is the subject of the first chapter of this book because sleep profoundly impacts every aspect of our physiology and psychology. Put simply, sleep is the foundation of our mental health, our physical health, and our performance.[1] We win by sleeping.

I came to that realization pretty early but only because I struggled with sleep. As a kid I slept like a log—always a solid eight to nine hours, rarely waking up in the middle of the night even once. As a teen I would stay out late and sleep in on the weekends, as most of us did. I never thought about my sleep.

When I reached my junior year in high school, however, everything changed. I would lie down, fall asleep right away, but then wake up three to four hours later, wide awake. Then I would toss and turn. Eventually I would fall back asleep but then needed to sleep really late into the morning to feel rested. School started at 8:00 a.m., so that wasn't an option most days. That had me falling asleep in class, feeling wide awake in the evening, and then the whole cycle would repeat.

Toward the end of high school when I started getting into fitness, I learned that we recover from exercise during sleep. That was the early 1990s and the public was not yet aware of the importance of sleep. There was some science on it—in fact some of the best work on the role of sleep for health and

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cognition was coming from the Stanford Sleep Lab just a few miles up the road from where I lived. But it was from a prominent trainer in the world of fitness that I first learned to take sleep seriously. He gave me one mostly good suggestion for sleep, and one terrible one. The mostly good suggestion was to read the work of Allan Hobson—a sleep researcher from Harvard—and I eventually did, although I discovered Allan's focus was mainly on the importance of dreams, which felt like a bit of a tease for someone with sleep issues. The terrible advice he gave me? He told me if I woke up in the middle of the night and couldn't fall back asleep that I should drink a half mug of white wine. I was seventeen! I tried it anyway, and it didn't work for me. Thankfully. We now know alcohol greatly reduces the quality and restorative properties of sleep, even if it does help some people fall asleep.

Eventually I figured out how to master the art of getting a great night's sleep, but it took time. Years, in fact. The science progressed too, of course, and we now know a lot about both the importance of sleep and ways to remedy pretty much any sleep issue. I wish I had the information you are about to read back in high school, and college, and graduate school, and my postdoc. The reality is, the busier we are, the more important sleep is to our health and performance. But no matter how busy or calm our life is, a great night's sleep is crucial to our mind and body.

If you are like the majority of people, and you struggle to get a great night's sleep, you want to remedy that as soon as possible.[2] But even if you are one of those rare individuals who sleeps deeply every night and wakes up feeling fully refreshed every day, there are still ways to improve your sleep and thus, your quality of life. Regardless of which category you fall into, this chapter will help.

I'd like to mention here that this chapter is a long one. We go deep into the science of sleep, but I promise you it's all made accessible. I know that understanding this science will help you get a great night's sleep. I wrote this chapter so you can browse by topic or tool. Start with the parts that interest you most, or the protocols that you think will help you right now.

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I prefer to focus on the benefits of doing things correctly, but when it comes to sleep, it's worth thinking a bit about the downsides of getting things wrong too, and learning to avoid those. Sleep deprivation—a term that means getting too little sleep or waking up too many times during the night—has been linked to significantly elevated risk of heart disease, stroke, and numerous hormonal imbalances involving—just to name a handful: cortisol, estrogen, testosterone, and insulin, the latter of which can cause type 2 diabetes.[3] Obesity, mental health issues, physical injuries, cancer, car accidents, depression, hypertension, and age-related dementia have all also been linked to poor sleep.[4] Sleep deprivation doesn't necessarily *directly* create these problems; rather it impairs cellular mechanisms that cascade to produce multiple issues within and between different organs and systems.

To be clear, everyone has a bad night's sleep now and again. But here's a good goal for you: Aim to sleep well 90 to 95 percent of the nights of your life, and allow the remaining 5 to 10 percent of those nights to be bad due to uncontrollable negative circumstances, like a work conflict, or joyful experiences, like a great party. Do your best to make sleep a top priority so that the rest of your life can be that much better.

Perhaps you have heard some of this before. Most people know a bit about the benefits and importance of sleep. As I mentioned above, that is a fairly recent development. It was about a decade ago when Matthew Walker, who formerly directed the Center for Human Sleep Science at the University of California, Berkeley, and is currently at the University of Texas in Dallas, wrote the now famous book, *Why We Sleep*. At that time, the "I'll sleep when I'm dead" or the "I'll catch up on sleep this weekend" mentalities prevailed.[5] Thanks in large part to Matt's book and other public education efforts, people now recognize they *must* sleep, yet the majority of people still don't sleep well and far too many people sleep poorly, with nearly half of adults reporting their sleep satisfaction as an "F"—meaning the lowest possible grade.[6] It is true that we all have slightly different sleep needs.

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PROTOCOLS

Some of us consider ourselves morning larks. We prefer to rise early. Others are night owls who prefer to stay up late. These are what sleep researchers call chronotypes: genetically determined features of the chemicals, cells, and circuits that regulate when we prefer to go to sleep and wake up. You can blame your parents for your bedtime (and wake time) preference.

Separate from your chronotype is the total amount of sleep you need. Some of us need six hours to feel fully rested, others need eight, and some people feel great with just five. I should point out, however, that the feel-great-on-five folks are exceedingly rare. Most people need seven to eight.[7] But as mentioned above, according to recent reports from the National Sleep Foundation and the Centers for Disease Control and Prevention (CDC), at least a third of Americans do not get nearly enough sleep—and that statistic is likely to be a vast underestimate given the enormous increase in time spent on social media and online nowadays.[8] In fact, that figure skyrockets to more than 75 percent among high school students. That's right, approximately three-fourths of teens are not getting enough sleep,[9] which is extremely concerning given that our adolescent and teen years are when much of our brain wiring related to mood and behavior regulation, as well as attention and learning, gets solidified. From birth until about age twenty-five is an especially sensitive and time-limited phase, or what is called a *critical period.*[10] And the thing about critical periods is eventually they close: While our brains remain plastic our entire lives, the amount of neuroplasticity possible in those first twenty-five years far exceeds what is possible afterward, so teens can't simply make up for their lost brain wiring later on.[11] We have no idea what the long-term consequences of this kind of chronic sleep deprivation are, but we do know that far too many young people are missing out on sleep at exactly the time when they need it most.

Compulsive overuse of phones and other screen-based technologies at night is a major factor for the poor sleep of adolescents and teens, but also

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for the poor sleep habits of adults.[12] A central feature of life in the twenty-first century is to always be connected online and by text. So much so that by the classic definition of shift work, many—perhaps even *most* people—worldwide, now meet the definition of a shift worker, that is, awake for two to three hours between 10:00 p.m. and 5:00 a.m. Shift work is not just about staying up late but also involves reduced amounts of exposure to sunlight during the day, lack of sufficient darkness at night, and a nocturally-shifted eating schedule. That has well-established negative health effects, including poor gut health, mental health deficits, and even decreased lifespan.[13] So this is no trivial matter. Smartphone technologies are not to blame per se, but when we use those technologies certainly is. We can scroll 24-7 and unless we resist, the light from our phone, tablet, or computer screen impairs our sleep. Not to mention that the content we absorb on those screens often affects our sleep, too, because of the elevated levels of arousal—aka stress—that content creates. Even if being on our phones or tablets in the hours before sleep doesn't stress us out, it can disrupt our sleep.[14] We rarely hear how texting alters our sleep patterns but I would argue that for many people, it is at least as pernicious as social media in this regard. To be clear, texting is a wonderful tool for communication; it allows us to connect quickly. And social media can be a good source for learning, social connection, and entertainment. The downside, however, is that we can have conversations and observe events at any time of day or night. If we wake up in the middle of the night, we know we should roll over and go back to sleep, but many of us instead start reading and sending texts, or scrolling the internet or browsing social media.

So it comes as no surprise that most of us now qualify as shift workers but very few of us are sacrificing our sleep hours by doing actual work.[15] We have all become so habituated to this new normal of consuming content and communicating at all hours that we don't see how out of sync it really is with our sleep and therefore our health.

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The good news is, we can fix our sleep duration, quality, and even determine its timing—regardless of our chronotype—without having to disengage too much from these technologies.

And it's oh-so-worth it because when I say, "We win by sleeping," I am referring to the fact that sleep shapes everything about us—how we look, how we think, and how we feel. But I also mean that if you get your sleep right 90 percent of the time, you'll be absolutely amazed how your appearance, health, and performance will improve. The data say you'll likely live longer as well.[16]

This chapter offers protocols you can easily integrate into your life to get far more restful and restorative sleep. That is, to "sleep better." None take much time, and many of them are downright pleasurable. Let's consider these protocols in order of their importance.

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1

View Sunlight as Soon as Possible After Waking

WHAT TO DO:

- **Get morning sunlight in your eyes as soon as possible after waking.** Go outside and look in the direction of the sun for at least five to ten minutes each morning. Your goal should be to get sunlight in your eyes within the first thirty to sixty minutes of waking up.
- **A few things to keep in mind.** If you wake up before the sun rises, you'll obviously have to wait. If you can view the sun as it comes up across the horizon, great, but that's not vital for this protocol to work.

  Morning sunlight, as we will review, differs in quality from sunlight at other times of the day. It is best viewed by facing the sun without any physical barriers, like awnings or buildings, obscuring your view. Don't wear a brimmed hat, as it blocks some of the light that would otherwise reach your eyes from overhead. Wearing eyeglasses or contacts is fine but, alas, this protocol won't work nearly as well through a window or windshield, as that will filter out many of the relevant wavelengths of light. Skip the sunglasses while doing this protocol. What about clouds? No matter how overcast, there is always some sunlight coming through once the sun is up. In fact, the more accurate way to state this protocol would be "get as-early-in-your-day-as-possible *daylight* in your eyes," but that is a mouthful. The point is that the sun provides daylight even on overcast days. Just compare how bright it is at 8:00 a.m. on an overcast day

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to midnight the night before. So forget the "there is no sun out in winter where I live" argument. There is daylight, and you want to view it. Indeed, this protocol is especially important on cloudy days.

Caution: Do not stare at the sun. Never force your eyes to stay open. Allow your natural squint and blink reflexes to protect your eyes. If the sun still feels too bright, look a few degrees to the side of the sun.

HOW IT WORKS:

Correctly timed sunlight viewing—especially morning sunlight viewing—is immensely beneficial to our overall health. This simple, zero-cost protocol powerfully affects your daytime mood, focus, and alertness, and improves your sleep, which further improves your health and performance in myriad ways.

The power of this protocol arises from its impact on three synergistic elements: your circadian clock, your eyes (or more specifically, the nerve cells in your eyes that detect sunlight and communicate its presence to your circadian clock), and specific qualities of light that come from the sun, especially when it is low, relative to the horizon. Together, these three elements make up a robust network that drives many of the biological processes in your brain and body.

I first learned about the importance of viewing morning sunlight from one of the world's preeminent sleep researchers, Seiji Nishino, MD, PhD. I was working in his lab at Stanford during a summer home from college, and I noticed he would always stop to face the sun for a few minutes before going into the lab for the day. Even if he arrived at the lab before sunrise (not uncommon for researchers in a sleep lab!), he would make sure to step outside shortly after sunrise and face the sun for a few minutes before returning to work. That was way back in 1996—when our understanding of the mechanisms of human circadian biology was rudimentary compared to now. Seiji explained that viewing morning sunlight felt good, that it gave him more energy for the

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day, and that it improved his sleep. I started joining him and joked that we resembled the many ground squirrels around us up on their haunches doing the very same thing. Little did I know that the exact same morning sunlight-sensing cells, circuits, and mechanisms were at play in us and those squirrels and, in fact, in every mammal where they have been examined.

I quickly noticed that on days I viewed morning sunlight, I also felt good, had more energy for the day, and slept better at night, so I kept with it. You should experience those benefits, too, because of the way morning sunlight—whether on a clear or cloudy day—kickstarts a powerful set of hormonal and neural mechanisms that positively shift the state of your entire brain and body for many hours afterward. It can work the first time and every time, and once you understand a bit about those mechanisms, it will allow you to easily adjust this protocol to your schedule and circumstances to derive the maximum benefits with minimal time investment.

Your Circadian Clock

Located a few centimeters above the roof of your mouth is a small cluster of neurons called the *suprachiasmatic nucleus*, or SCN.[17] The SCN is your master circadian clock. Its job is to coordinate the activities of all the cells and organs in your body into a coherent twenty-four-hour rhythm so that certain cells and organs in your body are more active, and other cells and organs are less active, depending on the phase of that twenty-four-hour rhythm. The SCN keeps your body and brain on schedule.

The first documented discovery of a circadian clock came not from studies of humans or even of rodents, but of plants. In 1729, a French astronomer named Jean-Jacques d'Ortous de Mairan noticed that a mimosa plant kept in a totally dark room continued to rhythmically fold and unfold its leaves every twenty-four hours, just as if the sun was shining through the window.[18] It was a mystery: If the plant was not unfurling to absorb sun or other light, then what was guiding its movements? About two hundred years later, Ger-