

Sleep Toolkit: Tools for Optimizing Sleep & Sleep-Wake Timing

The two hours before you wake up: Andrew Huberman's sleep toolkit

Your body hits its lowest temperature of the entire 24-hour cycle about two hours before you normally wake up. Andrew Huberman calls that moment your temperature minimum, and he says learning where yours falls is what lets you move your schedule on purpose: light, exercise or caffeine before it push your clock later, and the same three things after it pull it earlier.

Huberman is a professor of neurobiology and ophthalmology at Stanford School of Medicine and the host of The Huberman Lab Podcast. He had covered sleep before, in an episode called "Master Your Sleep," but new science had come out since and thousands of listener questions had piled up about the specific protocols. So this time he recorded the protocols. "Today I'm mainly going to focus on the practical tools that anyone, indeed, all people, I believe, should use in order to optimize their sleep," he says.

A body locked inside a skull, and the seven levers that reach it

Your brain and nervous system control whether you move, whether you digest, whether you are calm or stressed, and all of it sits sealed inside your skin and your skull, needing cues to know what time it is.

Those cues arrive through seven entry points: light and darkness, temperature, food, exercise, caffeine, supplements, and digital tools. That last category is not gadgets. "Now, when we say digital tools, I don't necessarily mean devices," he says. "What I mean are things like non-sleep deep rest scripts." Plus self-hypnosis, which he separates from the stage version fast: "I know some of you hear hypnosis and you think, oh, you know, people clucking like chickens and doing things that are outside their control. That's not at all what I'm referring to here."

Why bother? “Sleep is the foundation of mental health, physical health, and performance of all kinds,” he says, running through the catalogue of what goes wrong without it: immune function, wound healing, skin and appearance, memory as you age, how long you live. What he thinks gets left out of that catalogue is the upside. “Basically everything in life gets better when we’re sleeping well.”

The sponsors: Momentous, InsideTracker, Eight Sleep, and LMNT

Huberman announces that the podcast has partnered with Momentous supplements. His reasons: they ship internationally, the quality of their supplements is, in his words, second to none, both in purity and in the precision of the ingredient amounts, and the range emphasizes single-ingredient supplements, which lets you titrate one component of a protocol without disturbing the others. The link is livementous.com/huberman.

He notes that the podcast is separate from his teaching and research roles at Stanford, then thanks the episode’s sponsors.

InsideTracker is a personalized nutrition platform that analyzes blood and DNA data. His pitch is that plenty of tests hand you numbers for lipids, hormones and metabolic factors and leave you with no idea what to do about them, whereas InsideTracker’s portal tells you how to adjust nutrition, exercise or supplementation to bring those numbers into the ranges that are best for you. Listeners get 20% off any plan at insidetracker.com/huberman.

Eight Sleep makes smart mattress covers that cool, heat and track sleep, and his pitch for it is the episode’s own science. “It turns out that your body temperature and your ability to fall and stay asleep are very closely related,” he says. “If your body does not drop by one to three degrees, you are simply not going to get into deep sleep or stay in deep sleep.” He had been using one for about six months at the time of recording, and says it completely transformed his sleep, and he already thought he was sleeping pretty well. You can program the cover to cool early in the night and warm toward morning. eightsleep.com/huberman saves \$150 on the Pod Pro Cover, shipping to the US, Canada and the UK.

LMNT is an electrolyte drink with no sugar, and his angle on it is neuronal. Your nerve cells depend on sodium, magnesium and potassium in the proper ratios to fire action potentials, he says, and plenty of electrolyte drinks either carry a lot of sugar or get the ratios wrong. drinklmnt.com/huberman gets you a free sample pack with your first purchase.

Morning sunlight is the foundational power tool

When you wake up, your body temperature is already climbing, which is one of the main triggers for why you woke at all, and it drives a release of cortisol. Cortisol is treated as the stress hormone, but it also supports your immune system, raises metabolism and sharpens focus, provided it peaks early rather than staying up all day and night.

The way to make it peak early is bright light in your eyes, ideally sunlight, within the first 30 to 60 minutes of waking. Sooner is better, ideally within five.

Bright light hits a set of neurons in the eye called melanopsin cells, and he tells you not to bother with the name. They signal your circadian clock, which broadcasts to the whole body: cortisol rises, you get a wake-up signal, and a timer starts for you to fall asleep roughly 16 hours later.

His own version is unglamorous. “I wake up in the morning and I want to reach for my phone, but I know that even if I were to crank up the brightness on that phone screen, it’s not bright enough.” So he gets out of bed and goes outside.

Do not stare at the sun. If it is low enough to be comfortable, looking at it is fine; if it is bright enough to hurt, look toward it instead, and blink whenever you feel like blinking. “Never look at any light, sunlight or otherwise, that’s so bright that it’s painful to look at ‘cause you can damage your eyes.” Sunglasses come off. Eyeglasses and contacts are fine and actually help, because they focus the light onto your retina.

“First of all, this is not some woo biology thing. This is grounded in the core of our physiology.” He counts hundreds, if not thousands, of quality peer-reviewed papers behind it.

If you wake before sunrise, turn on every artificial light you want, because you need to be awake, then get outside once the sun is up. Do not expect the lamps to substitute. “The bright artificial lights in your home environment are not, I repeat, are not going to be sufficiently bright to turn on the cortisol mechanism.”

The same lamps do the opposite job at night. “The diabolical twist, however, is that those lights in your home or apartment or even on your phone are bright enough to disrupt your sleep if you look at them too late at night or in the middle of the night.”

How much light, and why a window will not do it

The dose depends on where you live, how much tree cover you have, and how sensitive your eyes are, so he gives ranges. Clear day, minimal cloud: about five minutes. Sun peeking through cloud, or denser: about 10 minutes. Densely overcast or rainy: as much as 20 or 30 minutes.

Cloudy days are not an excuse to skip it. “On cloudy days, overcast days, you especially need to get outside and get sunlight. You just need to get more of it.” And he has a line ready for one particular objection: “Hate to tell you this, folks, but there is sun in the UK.”

None of it works through a windshield, a window, tinted or otherwise, or sunglasses. “It takes far too long. It’s simply not going to trigger the relevant mechanisms.” If weather or safety keeps you indoors, get near a window, but he files that under “the last, last resort.”

If you genuinely cannot get sunlight, because you live somewhere that goes dark for the winter, “or you live in a cave or some other small box that does not allow any natural light into it,” you need a replacement. Daylight simulators are expensive, so he points at cheaper things that get just as bright: ring lights sold for selfies, or an LED drawing tablet, one of which sits on his desk all morning.

For the numbers-minded, download a free light meter app and run his experiment. “Here’s what I suggest you do. Wake up in the morning, take Light Meter, point it at the brightest light in your home, and take a measurement, and what you’ll probably find is it’s about a thousand lux.” Point it at a cloudy morning sky and you get 5,000, 10,000, sometimes 90,000. Indoor light is concentrated over a small area, sunlight is diffuse, and the difference does not register.

He wants the habit at least 80% of the days of your life, with recovery rules attached. If you are bedridden for a day, get next to a window. If you are traveling or otherwise stuck inside, the next day you get twice the duration. “This is a slow, integrative mechanism.”

None of which should feel like a chore. Take your morning beverage outside, take the dog, which will already know to do this. “We human beings need to be told by podcasters and other people about the science that supports these kinds of practices. Our pets apparently do not.”

Sponsor break: Athletic Greens

Huberman pauses to acknowledge Athletic Greens, also called AG1, which he says he started taking in 2012, long before the podcast existed. It contains vitamins, minerals, probiotics, digestive enzymes and adaptogens, and he takes it once or twice a day to cover his nutritional bases. He singles out the probiotics because of the gut-brain axis, the two-way communication between cells in the digestive tract and the brain that helps control mood, immune function and hormone function. “Whenever somebody has asked me what’s the one supplement they should take, I always answer Athletic Greens.” At athleticgreens.com/huberman there are five free travel packs and a year’s supply of vitamin D3K2.

Cold water, exercise, and the thermostat trick that warms you up

Sunlight is the first lever of the morning. Temperature is the second, and the fastest way to pull it is cold water: a cold shower of one to three minutes, an ice bath, a cold tub.

The obvious effect is adrenaline. The less obvious one is that cold water warms you up. Your body runs a thermostat in the brain, and putting something cold on the outside makes it respond: “Ah, the external of my body is cold and therefore I’m going to heat up my core body temperature.” An ice bath does drop core temperature if you stay in long enough, but one to three minutes does the opposite. Cold also raises dopamine.

The other way to drive temperature up is to move. “I would say the best time to exercise, at least what the research points to, is immediately when you wake up in the morning or three hours after waking or 11 hours after waking. But that’s really getting down into optimization for sake of muscular strength and grip strength and it’s very hard to give a strict prescriptive.”

The practical version does not require a workout at all. A walk, a light jog, skipping rope, some calisthenics, layered onto the light. “These days, I skip rope for about 10 minutes or 20 minutes while looking at the sun,” he says, then takes a cold shower afterward. He thinks everybody should train five, six, maybe seven days a week. “For me, it’s six days a week, sometimes five, rarely is it seven.”

Delay your caffeine by 90 to 120 minutes

He likes caffeine. Coffee, espresso, yerba mate, specifically non-smoked yerba mate, because the smoked varieties appear to carry carcinogens. He also says plainly that if you are prone to anxiety or panic attacks and avoid caffeine entirely, that is fine.

For everyone else: “I highly recommend that everybody delay their caffeine intake for 90 to 120 minutes after waking.” He knows what he is asking. “However painful it may be to eventually arrive at that 90 to 120 minutes after waking, you want, and I encourage you, to clear out whatever residual adenosine is circulating in your system in that first 90 to 120 minutes of the day.”

Adenosine accumulates the longer you are awake and makes you sleepy, and caffeine does not remove it, it just occupies the receptor. “What you’ll do if you delay caffeine intake until 90 to 120 minutes after waking is you will avoid the so-called afternoon crash.” You may still get a dip; what you avoid is the massive one. And the crash has a second cost, because people come out of it grumpy or groggy, reach for more caffeine, and wreck that night’s sleep.

On the back end, keep caffeine under 100 milligrams after 4:00 p.m., or switch to decaf, with 3:00 p.m. or even 2:00 p.m. better as a hard stop. He knows he can drink a double espresso at 5:00 or 6:00 p.m. and, “quote, unquote, fall asleep fine,” and says that is not the argument. “There are terrific data, Matt Walker and I talked about this, and there are more and more papers all the time that point to the fact that caffeine intake late in the day,

after 4:00 p.m. that is, can really disrupt the architecture of your sleep. So you might think you're sleeping well, but you're not sleeping nearly as well as you could if you avoided caffeine in those afternoon hours."

One carve-out: if your workout is first thing and you want caffeine before it, take it. "I don't have a problem with that." You will pay with an early afternoon dip deeper than usual, because you are stacking the post-workout temperature drop on top of the end of the adenosine blockade. "So you're getting a kind of a one-two punch on your energy levels."

Food sets a clock too

Eating early feeds a biological clock mechanism that makes you more alert early. He does not do it himself, and generally eats nothing until 11:00 a.m. or noon, sometimes a protein shake, sometimes almonds, sometimes breakfast if there is a social reason for it.

He declines to litigate what to eat, calling that too nuanced for a sleep episode, but wants one variable added to those debates: volume. "If your gut is full of food, there's just a large volume of food in your gut, it's going to divert a lot of blood and other critical resources away from other organs of your body, in particular, your brain, and you're going to be sleepy after eating a big meal. So this is sort of a duh, but I think oftentimes in the discussions about what to eat for energy, people neglect to consider food volume as a strong parameter."

Meal timing is one of the inputs your circadian clock uses to predict tomorrow, which makes it a fast lever when the schedule breaks. "One of the quickest ways to shift your circadian clock and get onto the local schedule is to eat on the local schedule."

Three critical periods, and what belongs in the second one

The day splits into three critical periods. Period one runs from waking until about three hours after, or four, he allows, because "there are always those people that say, 'Wait, I wake up at 4:00 a.m. and the sun isn't out until 8:00 a.m.'" Everything above lives there. Period two covers the middle of the day into the evening. Period three starts around 6:00 or 7:00 p.m. and runs through the night.

On naps he is not neutral. “If you are a napper, and I raise my hand now, for those of you listening, I’m raising my right hand because I love naps. I’ve always loved naps.” These days it is usually not a nap at all: “I’ll just lie down, and I love yoga nidra, I love NSDR scripts, I love using the Reveri app,” almost every day, in the early afternoon when the sleepiness arrives.

Should you nap? He put the question to Dr. Matthew Walker on the podcast. It is fine to nap in the afternoon, but not so late in the day or for so long that it disrupts your ability to fall and stay asleep at night for your major sleep bout. Keep naps under 90 minutes, for reasons to do with ultradian cycles.

He gets the same reaction every time he says it. “All the non-nappers get really worried. Like, wait, am I supposed to nap? I don’t like naps. I wake up groggy. You do not have to nap. In fact, if you can make it through your whole day without napping, great, more power to you.”

Afternoon and evening exercise carries a clock cost. Intense training raises body temperature and delays your circadian clock, so you will want to sleep later and wake later. Train then if it is the only time you can, but do not pile caffeine on top to get through the session. Exercise in the first zero to four hours after waking mostly leaves the clock alone.

The second anchor: sunset light

Dr. Samer Hattar, director of the chronobiology unit at the National Institute of Mental Health, ran the experiments on light delivered at times other than morning, and found that late afternoon and evening sunlight is its own tool with its own job.

Five, ten, maybe thirty minutes of it as the sun descends inoculates your nervous system against some of the damage from artificial light later that night, and it gives you a second anchor. “Remember back to the beginning of the episode when I said your brain and your body and all your organs are locked inside this skin and this skull and they don’t know what’s going on in the outside world?” Morning light is one signal. Evening light is the other, telling your brain and body, “Hey, it’s evening. The sun is descending.” You do not have to stare, “although if you can catch a nice, beautiful sunset, go for it.”

Your eye tells the two apart by color, because the ratios of yellow and blue shift between a sunrise and a sunset, with oranges and reds added in the evening. “It’s an incredible mechanism,” he says. “If you haven’t noticed this already, you’ll really want to look for this. It’s really kind of fun and cool to look at.” The clock is not one thing either: it has morning oscillators and evening oscillators, and evening light talks to a different compartment.

Sunset viewing offsets some of the harm from artificial light between 10:00 p.m. and 4:00 a.m., not all of it. “So I don’t want to give people a pass here.” But if you know you are going to watch Netflix or study late, “definitely make sure you see that evening light.”

Critical period three: why a little light at night does so much damage

Avoid bright artificial light of any color between 10:00 p.m. and 4:00 a.m. In the evening and nighttime hours, he says, “it takes very little light, very few photons, in order to wake up your brain and body and to disrupt your circadian clock and disrupt your sleep.”

Any color includes blue. He has nothing against blue blockers, and says people find they relieve headache and eye strain, but the model behind them is wrong. “Even if you do wear them, you will find that if lights are very bright, doesn’t matter if it’s a blue light, a yellow light, or a red light, those bright lights will wake up your brain and body.”

Overhead lights are the worst offenders, because the neurons that wake your brain sit in the lower part of your retina, which views the upper field. That is “a beautiful adaptive mechanism” for catching sunlight from above, and at night it means an overhead lamp mimics the sun more closely than one at eye level. Run it in reverse during the day: at 2:00 or 3:00 p.m., when you want to be as awake as possible, crank the overhead lights up.

At night, dim them, and, as he puts it, “do like the Scandinavians do”: desk lamps or lights near the floor rather than overhead fixtures, screens dimmed as far as you can still read them, and only as much light as you need to move around safely. Better still, candlelight or moonlight, both of which feel bright and are not. A bright candle across a table is around three to 10 lux, against 100 to 1,000 for a desk lamp. “Of course, be cautious with open flame,” he adds, “but candlelight is fine.”

Worst of all is overhead fluorescent lighting, the supermarket and gas station variety, which will quash whatever melatonin is circulating. He admits to an extreme workaround. “I’ve actually put on sunglasses at night in order to avoid getting that bright light exposure at night.”

Samer Hattar is “absolutely obsessive about this light stuff,” and keeps his house dark from 9:00 p.m. to 5:00 a.m. “He lives in what I sort of joke is like a cave at night,” so dark “that you’d be lucky to be able to find a spoon in the kitchen.”

Hot baths, cool rooms, and the skin on your palms

A cold shower late at night is probably a bad idea, he says. A hot bath, hot tub or sauna is a good one. Same thermostat, run the other way: stay in no more than 20 or 30 minutes, then get out and take a warm or cool-ish shower, and your body compensates by dropping core temperature one to three degrees. Stay in much longer and you get the warming you were expecting instead.

That drop is not optional. “It’s like a gate that your body has to go through in order for you to get into sleep.”

Make your sleeping environment cool, if not cold, and drop it by at least three degrees. He uses an Eight Sleep mattress cover; a fan or an open window does the same job.

Then pile on as many blankets as you want. That combination matters because of glabrous skin, covered on the podcast with Dr. Craig Heller of Stanford’s biology department. “You have special portals, you essentially have ways of passing heat” in and out of your body, mostly through the palms of your hands, the upper half of your face, and the bottoms of your feet. A cool room plus blankets gives you a working thermostat: too warm in the night, stick out a hand or a foot. A warm room leaves you nothing to adjust.

Hence his position on socks. “I’m not a big fan of people putting socks on while they sleep, or I should say, I’m not a fan of putting socks on while I sleep,” he says, because socks cover a portal. Socks work for people who run cold and wake with freezing feet. But if you wake in the middle of the night, odds are you woke because you were too warm, and the fix is a colder room and bare feet.

Alcohol, THC, and CBD

“I would be remiss if I didn’t touch on alcohol and CBD and THC. I always get questions about these.” He notes that THC is illegal in many places, decriminalized or legal in others, with medical uses.

He does not drink, and not on principle. “I just don’t tend to enjoy it. One of the reasons I don’t enjoy it is if I drink alcohol, I simply fall asleep.” Which accomplishes nothing he wants, “because the sleep that one gets after drinking alcohol is greatly disrupted sleep. Hate to break it to you, but that’s the truth.”

Both alcohol and THC can help some people fall asleep and even stay asleep while making the architecture of that sleep worse than it would have been without them. He refuses the enforcement role. “I’m certainly not the substance police. That’s not my role. I’m just reporting to you the biology.” His test: if your sleep is not restoring you the way you think it should, or you are regularly relying on a drink or two or on THC to fall asleep, that is disrupting your total pattern of sleep.

He does acknowledge the data on the anxiety-lowering effect of some of these compounds, THC and CBD in edible form especially, which is why they help people whose sleep problem is really an anxiety problem.

The sleep stack: magnesium threonate, apigenin, theanine

“I always say behavioral tools first, then look to nutrition, then, if necessary, look to supplementation, and then, if still necessary, look to prescription drugs obviously prescribed by a board certified physician.”

If the behavior is already dialed in and you still cannot sleep, the core stack is three compounds:

- Magnesium threonate, 145 milligrams
- Apigenin, 50 milligrams
- Theanine, 100 to 400 milligrams

Alone or in combination, he says, many people find the stack “allows them to get really drowsy and fall asleep, sleep really deeply, and they feel much more refreshed the next day and they don’t have a grogginess to them.” Take them 30 to 60 minutes before bed, ideally when you have not eaten for about three hours, though some nights he gets home at 9:00 p.m., eats a big meal, takes the stack and sleeps anyway. “Nobody’s perfect. Certainly I’m not.”

You do not need all three, and you may need none. “For some people, the dosages of any one or several of the supplements I mentioned will be zero.”

About 5% of people find magnesium threonate wrecks their gut. If that is you, stop. “The proper dosage for you, in other words, would be zero milligrams.” Separately, some people who do great on magnesium threonate and apigenin find that theanine, even at 100 milligrams, produces dreams vivid enough to wake them up. They drop theanine and keep the rest.

Then the standard caution, with a justification you do not usually get. Talk to your physician before adding or removing anything. “I don’t just say that to protect us. I say that to protect you.”

All of this he prefers to melatonin, and the objection is dosage. Melatonin is a hormone you make yourself, and it does help people fall asleep, but the amounts in most commercial products are far greater than anything your body produces. That matters because melatonin also interacts with other hormone systems, testosterone and estrogen among them, including in the puberty system in children. Occasional use for jet lag is “probably not” a problem, he says, then goes further: “I would even say no.” Chronic use, especially in kids, is where he sees trouble.

Glycine, GABA, and the case for inositol

On top of the core stack, he rotates two additions.

Every third or fourth night he takes two grams of glycine and 100 milligrams of GABA alongside the stack, which he says greatly enhances his ability to get into sleep. He keeps it to every third or fourth night for a reason he cannot explain. “If I take it too often, I find that the entire sleep stack doesn’t work quite as effectively.”

The other addition, and the newest material in the episode, is myo-inositol, which he thinks will be of particular use to people on a low-carbohydrate diet, people fasting before sleep, or anyone avoiding food close to bedtime who then has trouble falling asleep. Every other night, 900 milligrams, never on the nights he takes glycine and GABA.

It speeds up falling asleep, and it changes what happens when he wakes in the night. “If I wake up in the middle of the night, which I often do to use the bathroom, I find it very, very easy to fall back asleep.” On the nights he skips it, getting back down takes more work, which is the complaint he hears from a lot of people.

During the day he says it leaves him calmer, and he is careful about how far he takes that: “I don’t really know how to say this except in subjective terms, to feel a bit more buffered against or resilient against stress events.”

NSDR, Reveri, and getting back to sleep at 3 a.m.

The behavioral tools are also rescue tools, and his two are NSDR and self-hypnosis.

The Reveri app was built on peer-reviewed clinical and non-clinical research by his colleague David Spiegel, associate chair of psychiatry at Stanford. He did not take an ad from them, and says so before quoting a price. “They didn’t pay us for an ad read. I’m just telling you what they told me so that I can accurately report what it costs to use Reveri.” At the time of recording, \$14.99 monthly, \$99.99 yearly, or \$249 for lifetime access, on Apple only. He thinks that is modest next to supplements or a run of bad nights, but for anyone it is out of reach for, NSDR and yoga nidra scripts are on YouTube at zero cost. Dim the screen if you are starting one late at night.

When he wakes in the night, he gets up, uses the bathroom, keeps the lights as dim as possible, and gets back into bed. If sleep comes, good. If not, he opens Reveri’s fall back asleep hypnosis. “99 times out of a hundred, I’m back asleep within minutes and I don’t wake up until morning.”

Eye masks, earplugs, and elevating the bed

Eye masks do improve your ability to stay asleep, with two conditions: not too tight, and the room cool enough. An eye mask covers the upper half of your face, one of your three heat exchange surfaces, so cover it in a warm room and you will wake up hot. He only uses one in a bright environment or on a plane.

Earplugs split people. They block noise that would wake you, but some people hear their own heartbeat and get a humming in the head. “For me, they’re no good. For some people, they really enjoy them.”

Elevating your feet, with a pillow or by raising the foot of the bed three to five degrees, can deepen sleep through glymphatic washout, the circulation of fluid in the brain at night. One caveat reverses that advice: if you have acid reflux, having your ankles above your heart makes it worse, so raise the head of the bed instead.

Sleep apnea, nose breathing, and taping your mouth shut

Sleep apnea is bouts of suffocation or lack of oxygenation during sleep, associated with cardiovascular problems, sexual dysfunction and cognitive issues. “Sleep apnea is bad.”

It is particularly common in people who are very heavyset, which he says can come from obesity and can also come from carrying too much muscle. “A lot of people who are carrying too much muscle will actually have sleep apnea without realizing it.” A lot of them end up on a PAP device, the apparatus that looks like a snorkel or dive mask.

Provided the apnea is not too serious, many people can relieve themselves of it, and his tool for that, which he thinks helps everyone, is nose breathing. The case for it was covered in James Nestor’s book “Breath: The New Science of a Lost Art.” Unless you are breathing hard from exercise, or talking, or eating, breathe through your nose. In sleep, he calls it a superb idea.

His method for training it is to tape your mouth shut at night. “You heard me right. Put some medical tape over your mouth and force yourself to nose breathe during sleep.” It also stops snoring in most cases.

If that is too hard at first, train it during low-intensity cardio, using tape, a mouthful of water you do not swallow, or a mouthpiece. It is hard going at first, and over time people find they can stay calm and still generate real effort on nasal breathing alone, because the sinuses are plastic and the passages widen with use. “You’re not going to get giant nostrils. Don’t worry about it.”

If your partner tells you that you gasp on your back, or if “you’re that person on the plane with your mouth hanging open and drooling and your mouth breathing,” his verdict is “terrible, terrible, terrible for health reasons and other reasons.” Tape the mouth and learn to be a nose breather.

Weekends, sleeping in, and compensatory sleep

The tool that touches the most people is the weekend. Stay out late and you can allow yourself an extra hour. Do not take four. If you normally sleep eight hours and wake at 7:00 a.m., 8:00 a.m. is fine after a late night; sleeping until 11:00 or noon in the name of catching up is not. Hold your wake time within an hour of normal and take an afternoon nap instead.

The counterintuitive half is the caffeine. On the morning after a short night, groggy at 7:00 a.m. and wanting coffee immediately, that is precisely when you should wait the full 90 to 120 minutes. “Caffeine especially disrupts what’s called compensatory sleep.” Move your wake and sleep times around, then add caffeine to paper over the sleepiness, and you damage the daytime naps you would use to recover along with the architecture of your early morning sleep.

The better move on those days is NSDR or Reveri, with the caveat he attaches himself: there is no complete compensation for lack of sleep, only things that partially offset it.

Temperature minimum: the two hours that let you move your clock

“Your body doesn’t know the difference between flying to a new time zone and getting woken up in the middle of the night.” So the last tool applies to parents of young children and shift workers as much as to travelers.

Take your typical wake time, whether by alarm or naturally, and subtract two hours. That is your temperature minimum, the point in the 24-hour cycle when your body is at its lowest temperature.

“Your temperature minimum is not a temperature. It’s a time within your 24-hour cycle.”

Wake at 7:00 a.m. most days and your temperature minimum is 5:00 a.m. Adjust if you wake at 5:00 or at 9:00.

The rule comes in two halves. Bright light, exercise or caffeine in the two to four hours **before** your temperature minimum delays your clock, so getting up at 3:00 or 4:00 a.m., flipping on the bathroom lights, making coffee and heading to the airport pushes you later. “It’s as if you put your clock on hold for a little while and then let it start again.” The same inputs in the hours **after** it, along with a snack or just socializing, advance your clock instead. In the 7:00 a.m. example, that means 5:30, 6:00 or 7:00 a.m., and you will want to go to bed earlier and wake earlier.

So if you are flying somewhere you will need to sleep and wake earlier, spend the day or two before you leave forcing the phase-advancing activities into the hours after your temperature minimum. Flying the other way, do them before it.

The same logic converts a night owl into an early riser, and he says it is pretty easy. Take a week. Each night go to sleep 30 minutes or an hour earlier, each morning set an alarm 30 minutes or an hour earlier, and then, even in the groggy state, run the morning block: exercise, sunlight, bright artificial lights if the sun is not up, breakfast even if you are not hungry. He rates that deliberate early alarm a potent way to advance the clock, and points to research showing gains in cognition and physical performance for early risers, especially night owls who shift themselves.

Shift work and red light

For shift work he defers to a dedicated episode on jet lag and shift work, but gives one rule. Stay on the same shift for two weeks at a time. Rotating on a swing shift, three days nights, three days days, three days nights, he calls detrimental and “horribly challenging for your brain and body.”

There is also a tool for anyone who has to be genuinely awake in the middle of their sleep cycle: feeding a baby, caring for someone, or getting up at 3:00 a.m. for an exam. Use red light if you can. It has been shown to let people see what they need to see and act safely, and it does not seem to disrupt the healthy, normal cortisol rhythm. He calls it an advanced tool many people will not have access to, names Joovv and KOZE as sources, and says he has no affiliation with either. For shift workers trying to stay awake all night and sleep all day, though, this is not the answer.

The part that is free

He closes by pointing at cost. The supplements and some of the digital tools cost money, and he would rather you got the behavior right first: timing of exercise, timing and type of light, temperature, food, caffeine. Almost all of it is free.

“I promise that if you start to implement some, or ideally, all of these tools, the quality of your sleep will increase tremendously.” And if you are picking one thing in your life to work on, he has a candidate. “I can confidently say that sleep is really the thing to optimize.”

Where to find the protocols

He asks listeners to check out the sponsors mentioned at the beginning of the episode, which he says is the best way to support the podcast, and returns to the Momentous partnership: livemomentous.com/huberman, for the single-ingredient formulations discussed across episodes, shipped internationally, so listeners can build a protocol at their own dosages.

Protocols and summaries are free at hubermanlab.com through the Neural Network Newsletter, along with past issues including Toolkit for Sleep and Deliberate Cold Exposure. He signs off the way he always does. “Thank you for your interest in science.”