

Insomnia is a gross feeder. It will nourish itself on any kind of thinking, including thinking about not thinking.

—Clifton Fadiman, former chief editor, Simon & Schuster

## ENGINEERING THE PERFECT NIGHT'S SLEEP

*“God, what a beautiful beach. Calm. Translucent turquoise water. I should really go back to Thailand. I wonder what time it is in Thailand. But . . . why is there a mangy German shepherd on my beach? Orange collar. That makes no sense. Kind of looks like John’s dog. Actually, I owe John a call. F\*ck. Did I put his birthday party in the calendar? Birthdays and clowns. Clowns?! Why the hell am I thinking about clowns?!?”*

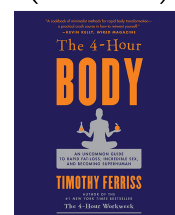
And so my internal monologue continues until 3:00, 4:00, or even 6:00 A.M., rotating through images, ideas, commitments, anxieties, and fantasies.

This mental slide show is combined with perverse sleep yoga: sometimes the twisted-into-a-pretzel posture, sometimes lying on my back like Dracula in mock-paralysis, and always ending in the fetal position with a pillow or arm between my knees. Fetal position never works, but I continue to try it, like a full-bladdered dog scratching at a door that never opens.

I have insomnia. Horrific “onset” insomnia.

My father and my brother are the same. It’s not

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because we're stressed out, necessarily, it's not because we're not tired. It's because we just can't freaking fall asleep.

So, in the interest of finally getting a good night's rest and helping others with insomnia, I tried everything from folk remedies to smart drugs, from light therapy to fat loading.

Now I can say that I *had* chronic insomnia.

## The Hidden Third of Life

Is good sleep a simple matter of length, the longer the better?

If you've ever needed a nap after sleeping too much, you know it isn't that simple. Let's look at the problem through an easier question: what is bad sleep?

- Taking too long to get to sleep ("onset" insomnia, my major problem)
- Waking too often throughout the night ("middle" insomnia)
- Waking too early and being unable to get back to sleep ("terminal" insomnia)

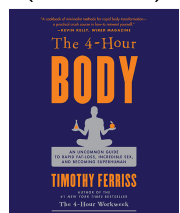
The challenge for a self-tracker is measuring things when drooling into a pillow. I could record the times when I got into bed and when I woke up, but I couldn't pinpoint when I fell asleep, much less what happened while asleep.

Taking courses like "Biology of Sleep" at Stanford University didn't fix my insomnia, but the academic searching did help me formulate more specific questions, including:

- For memory consolidation: how much REM sleep am I experiencing?
- For tissue repair: how much delta-wave sleep am I experiencing?
- For both of the above: am I experiencing sleep apnea?

The problem with testing these in a proper sleep lab (the test is called a polysomnogram) is that you generally have at least 22 wires attached to you to measure brain activity (EEG), eye movements (EOG), skeletal muscle activation (EMG), heart rhythm (ECG), respiration, and sometimes peripheral pulse oximetry.

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Guess what? No one can sleep in a weird lab with 22 wires attached to them on the first night. So the data are terrible. But let's assume you try. The second night, you come in after an all-nighter and crash within minutes like a post-sugar high two-year-old. Double-bad data.

To really test and tweak things under realistic sleeping conditions, I would need a pocket-sized sleep lab.

That didn't happen until 2009.

## My First F\*cking Sleep Lab

JULY 2009

"You should try what Brad Feld used. He has some gadget to measure your sleep," offered one of my friends.

This caught my attention. I had been bitching about my insomnia after another horrible night's sleep, and I'd also been meaning to reach out to Brad.

Based out of beautiful Boulder, Colorado, Brad is a venture capitalist and angel investor famous for (1) his incredible track record and (2) dropping F-bombs on business panels.<sup>1</sup> Exhibit A: He was one of the few initial backers of Harmonix Music Systems, which he helped raise \$500,000 in financing. They bled money for almost 11 years. A fool's errand! Then, in 2005, it had a small (sarcasm) video game success called "Guitar Hero." It sold in 2006 to Viacom/MTV for \$175 million.

Brad's contrarian decisions often follow an elegant logic that others only pick up on well after the fact.

If he had found a tool for sleep analysis, I wanted to know all about it.

## Of Motion and Waves: The Tools

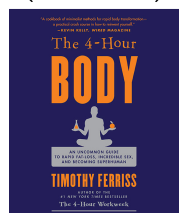
Brad's obsession ended up being the Zeo. It would be my first legitimate, next-generation sleep gadget.

Then I added more gadgets.

In the subsequent four months of testing, I also used heart-rate monitors, thermometers, continuous glucose monitors, two movement-detection

1. Not to be remiss, investor Dave McClure gives Brad a run for his money.

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devices (FitBit and WakeMate), and video recording of sleep movement. Often all simultaneously.

I looked like a comatose Robocop.

Both WakeMate and FitBit, worn on your wrist during sleep, use motion-sensing technology (accelerometry) similar to what's found in a Nintendo Wii controller. The data are interpreted using actigraphy algorithms, which are used to determine whether someone is awake or

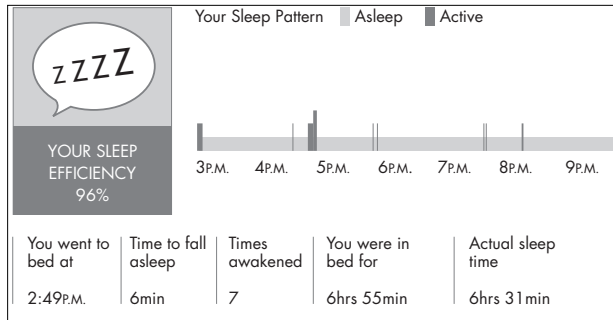
in one of the various stages of sleep. WakeMate features an alarm clock that can be set to wake you during specific “arousal points” in REM sleep (ostensibly to minimize grogginess) up to 30 minutes before a chosen wake time.

The Zeo, in contrast, uses a headband that measures electrical patterns generated in the brain. It also has an alarm clock intended to wake you during periods of most elevated brain activity to minimize grogginess.

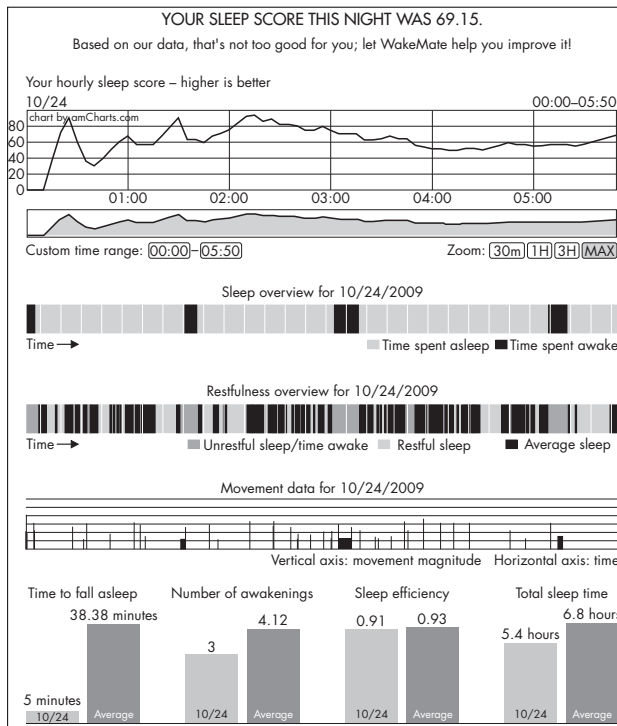
The first attempts to track and fix things were not encouraging.

For both accelerometer devices, time to fall asleep—the critical problem of “onset” insomnia—did not appear accurate. Despite claims to the contrary, it didn’t appear that the accelerometers could distinguish between simple lack of movement and sleeping. I tested this by watching television for 30 minutes, remaining as perfectly still as possible before attempting to sleep. My “sleep” started roughly when I started watching TV.

The first good news came a week later: the intelligent alarms, Zeo and WakeMate, seemed to reduce groggi-

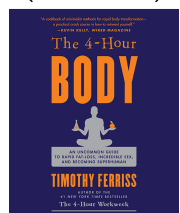


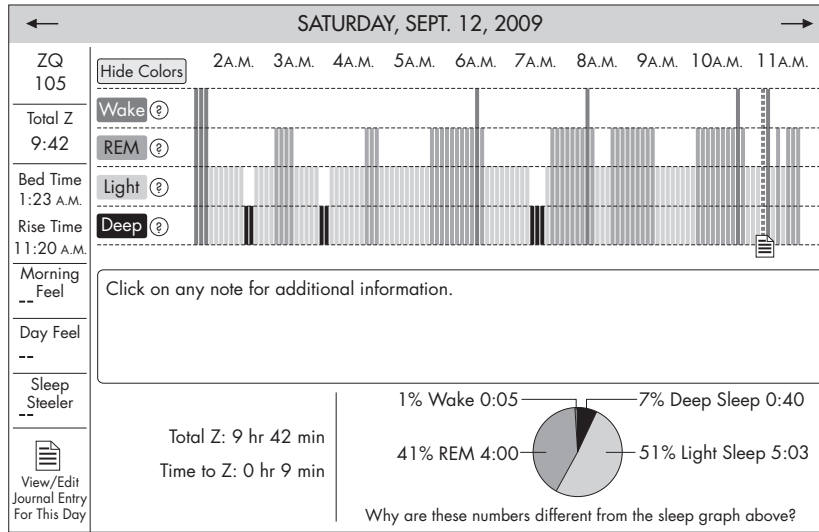
FitBit



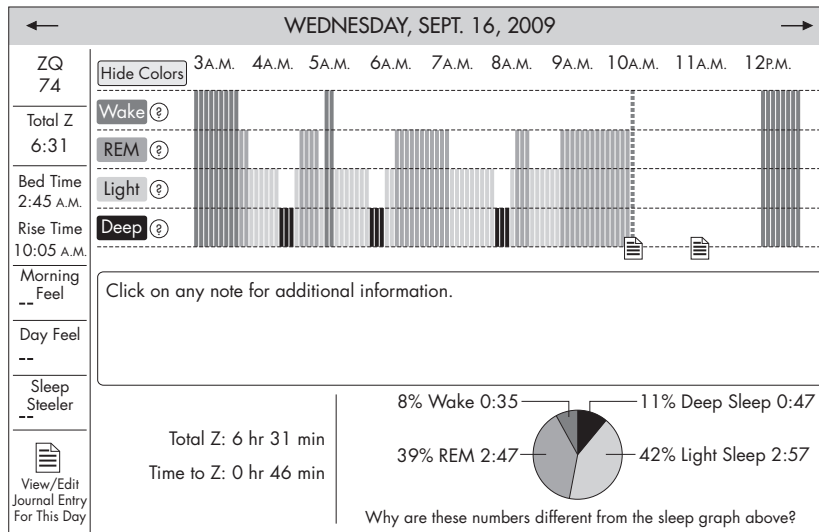
WakeMate

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Zeo—Good Sleep Example



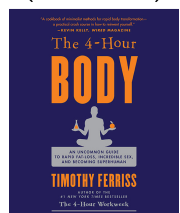
Zeo—Bad Sleep Example

ness. I was less bastardly in the morning and could think without two cups of coffee. Placebo or true cause and effect, the “smart alarms” seemed to help. This was an improvement, but I needed better sleep, not just better wake times.

This is where the Zeo really became valuable.

I began with a trial period of answering a subjective question each

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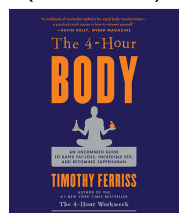
morning and assigning a number: do I feel like shit (1–3) or do I feel awesome (8–10)? Nebulous answers between 4 and 7 that would skew interpretation were logged but ignored. In both extreme ranges, I then looked for patterns. Thanks to the continuous glucose monitoring, I also had food logs to use.

Here are some of the initial findings:

1. **Good sleep (8–10) was most dependent on the ratio of REM-to-total sleep, not total REM duration.** The higher the percentage of REM sleep, the more restful the sleep. The higher the REM percentage, the better the recall of skills or data acquired in the previous 24 hours. Higher-percentage REM sleep also correlated to lower average pulse and temperature upon waking.
2. **I could increase REM percentage by extending total sleep time past nine hours, or by waking for five minutes approximately four and a half hours after sleep onset.** One waking of 5–10 minutes, approximately four and a half hours after sleep onset, dramatically increased REM percentage. It seems that one waking is not necessarily a bad thing, at least when intentional.
3. **Taking 200 milligrams of huperzine-A 30 minutes before bed can increase total REM by 20–30%.** Huperzine-A, an extract of *Huperzia serrata*, slows the breakdown of the neurotransmitter acetylcholine.<sup>2</sup> It is a popular nootropic (smart drug), and I have used it in the past to accelerate learning and increase the incidence of lucid dreaming. I now only use huperzine-A for the first few weeks of language acquisition, and no more than three days per week to avoid side effects. Ironically, one documented side effect of overuse is insomnia. The brain is a sensitive instrument, and while generally well tolerated, this drug is contraindicated with some classes of medications. Speak with your doctor before using.
4. **The higher the percentage of deep-wave sleep, the better your subsequent physical performance.**

2. It is therefore called an acetylcholinesterase inhibitor. The -ase of acetylcholinesterase indicates it breaks down the preceding molecule.

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5. **More than two glasses of wine within four hours of sleep decreases deep-wave sleep 20–50%.** Even four glasses *six* hours beforehand did not appear to have this effect, so the timing is crucial. Conversely, taking 15+ drops of California poppy extract appeared to increase deep-wave sleep up to 20%.
6. **Eating two tablespoons of organic almond butter on celery sticks before bed eliminated at least 50% of the “feel like shit” (1–3) mornings.** Ever wonder how you can sleep 8–10 hours and feel tired? The likely culprit: low blood sugar. Make a pre-bed snack part of your nutritional program. One to two tablespoons of flaxseed oil (120–240 calories) can be used in combination with the celery-and-almond-butter to further increase cell repair during sleep and thus decrease fatigue. Flaxseed oil tastes like a mixture of raccoon urine and asparagus, so—if you opt to include it—I recommend pinching your nose while consuming it, per Dr. Seth Roberts, whom we’ll meet later.

## Turning Off Monkey Mind

Next, I moved on to the biggest problem: getting to sleep in the first place. No matter how theoretically restful my sleep should be, based on Zeo results, more than 30 minutes of onset insomnia negated it all.

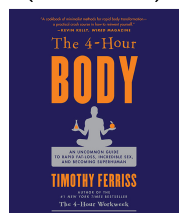
What follows are the changes and tools that had the largest effects on time-to-sleep. Some of them are more convenient than others. I excluded drugs<sup>3</sup> from testing, and if a given improvement couldn’t be replicated at least three times on consecutive nights, it was omitted.

### TEST 67–70° AS YOUR BEDROOM TEMPERATURE.

This was the variable I experimented with the most while in Nicaragua for my medical tourism adventures (coming up later), and it was also the variable that had the most consistent effects. Specifically, using a single bedsheet at a room temperature between 67°F and 70°F produced the fastest time to sleep. Warmer temperatures never worked, but as low as 65°F would work equally well *if* I wore socks to keep my feet warm. If you can’t

3. Except melatonin in one case.

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control the ambient temperature, testing socks of different thicknesses is the easiest variable to change for tweaking heat loss.

Ideal temperature is highly individual, and each person will have a narrow range, so experiment to find your own.

#### EAT A LARGE FAT- AND PROTEIN-DOMINATED MEAL WITHIN THREE HOURS OF BEDTIME.

I discovered this unintentionally while tracking testosterone changes. Consumed within three hours of getting under the sheets, meals of at least 800 milligrams of cholesterol (four or more large whole eggs) and 40 grams of protein produced dramatically faster time-to-sleep scores than meals of lower volume or lower protein and fat. Eating two rib-eye steaks, each about three-quarters of a pound, had the strongest tranquilizer-like effect.

#### USE LIGHT CUES – THE PHILIPS goLITE.

I bought this high-end blue-light emitter for a friend who suffers from seasonal affective disorder (SAD)—aka mild to severe depression during winter months.

He already owned the same device, so I began to use it as a replacement for coffee first thing in the morning. I set it to the side of my laptop, pointing at me for 15 minutes at about a 30-degree off-center angle (if noon is my laptop, pointing at me from 10 A.M. or 2 P.M.). That evening, my time to sleep was less than 10 minutes for the first time in weeks. I was able to replicate the effect four nights out of five.

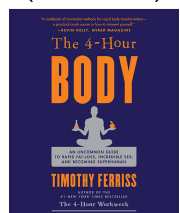
Though most often used for jet lag or winter depression, I've found the goLITE to be singularly most useful as a corrective sleep tool, even if I wake up late and need to go to bed at a normal hour. Battery life is long and, at the size of a small square book, the goLITE is portable enough to fit in a carry-on travel bag.

#### TAX THE NERVOUS SYSTEM WITH ISO-LATERAL MOVEMENTS.

Exercise is commonly recommended to improve sleep.

The problem for me was that results were unpredictable. I might exercise for 20 minutes and fall asleep in 10 minutes, or I might exercise for two hours and fall asleep in two hours. There was no repeatable cause and effect. It seemed like a coin toss.

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This changed when I began to incorporate iso-lateral (one-arm or one-leg) resistance training. I logged faster to-sleep times after 8 out of 10 training sessions. The more complex the stabilization required, the shorter the to-sleep time. To experience this effect for yourself, do a single session of pre-hab testing from the “Pre-Hab” chapter.

#### TAKE A COLD BATH ONE HOUR PRIOR TO BED.

The Japanese have longer average lifespans than most other nationalities, including Americans, whom they beat by more than four years. One explanation researchers have proposed is that the regular *ofuro*, or hot bath at bedtime, increases melatonin release and is related to mechanisms for life extension. Paradoxically, according to one of the Stanford professors who taught the sleep biology class I took circa 2002, cold is a more effective signaler (aka *zeitgeber*, or “time giver”) for sleep onset.

Perhaps the ofuro effect was related to the subsequent rapid cooling? Not eager to kill my swimmies with hot baths, I opted for direct cold.

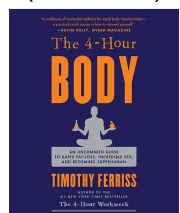
I tested the effect of combining shorter-than-usual 10-minute ice baths with low-dose melatonin (1.5–3 milligrams) one hour prior to sleep. The ice bath is simple: put two to three bags of ice from a convenience store (\$3–6) into a half-full bathtub until the ice is about 80% melted. Beginners should start by immersing the lower body only and progress to spending the second five minutes with the upper torso submerged as well, keeping the hands out of the water. (See “Ice Age” for other approaches and benefits.)

It was like getting hit with an elephant tranquilizer. Best of all, this was true even when melatonin is omitted.

#### USE AN ULTRASONIC HUMIDIFIER.

The Air-O-Swiss Travel Ultrasonic Cool Mist Humidifier is incredible. It is small enough to fit in a jacket pocket (1.3 pounds), and its water source comes from any convenience store: a plastic water bottle turned upside down. The ultrasonic technology uses high-frequency vibrations to generate a micro-fine cool mist, which is blown into the room, where it evaporates into the air. This device is my go-to combination with the goLITE, especially after seeing how well it eliminates sinus problems while traveling. It also dramatically reduces facial wrinkles, which was an unexpected but pleasant side effect.

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The Air-O-Swiss humidifier comes with a transcontinental travel AC adapter and exchangeable plugs that can be used in both the United States and Europe. My only complaint: it emits a stylish (but distracting) blue glow, so you'll need an eye-mask if you're light-sensitive like I am.

#### USE A NIGHTWAVE PULSE LIGHT.

The NightWave was introduced to me by a good friend named Michael, who also has severe onset insomnia.

During my testing, he started ranting and raving about this tiny device, a slow-pulsing light the size of a cigarette pack that helped him get to sleep in less than seven minutes. Dr. James B. Maas, Weiss Presidential Fellow and professor of psychology at Cornell University, is one of several researchers who have endorsed it.

From the NightWave website:

*NightWave projects a soft blue light into your darkened bedroom. The “luminance” of the light slowly rises and falls. Lie with eyes open and synchronize your breathing with the blue wave as its movement becomes slower and slower. After a short time [the cycle Michael used was seven minutes long], NightWave shuts off and you roll over and fall asleep . . . unlike sound machines, the soft light does not disturb others.*

It does work, but I found it less consistent than Michael did (his hit rate was near 100%). I now travel with the NightWave but use it as a supplement to the goLITE when needed.

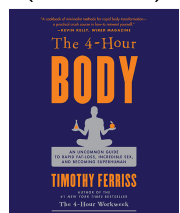
#### RESORT TO THE HALF MILITARY CRAWL POSITION.

Lie on your chest with your head on a pillow and turned to the right. Both arms should be straight by your sides, palms up. Now bring your right arm up until the top of your right elbow is bent at 90 degrees and your hand is close to your head. Alternative hand placement: the right hand is under your pillow and under your head. Next, bring your right knee out to that side until it is bent at approximately 90 degrees.

This is a last resort that works for one simple reason: you can't move.

It's like a self-imposed papoose, which the Inuits and other cultures

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have used to calm infants by immobilizing them. To toss and turn from the half military crawl position, you have to first lift your entire body off the bed. Less fidgeting means faster sleep.



## TOOLS AND TRICKS

**F.lux** (<http://stereopsis.com/flux/>) It's possible that your computer screen is what's keeping you awake. F.lux is a free computer application that dims your computer screen when the sun sets. In the morning, it makes the screen return to its default sunlight-like settings.

**California Poppy Extract** ([www.fourhourbody.com/poppy](http://www.fourhourbody.com/poppy)) This extract from the California poppy acts as a mild sedative, and I found it to increase my percentage of deep-wave sleep.

**The Zeo Personal Sleep Coach** ([www.fourhourbody.com/zeo](http://www.fourhourbody.com/zeo)) Brad Feld's favorite sleep device. The Zeo uses a headband that measures electrical patterns generated in the brain and can wake you at a point of elevated brain activity. It was the only recording device that offered usable data and that consistently reduced grogginess.

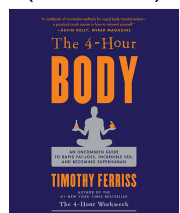
**Philips goLITE** ([www.fourhourbody.com/golite](http://www.fourhourbody.com/golite)) This light is most responsible for my sub-10 minute sleep times after decades of futile effort. I'll usually set it to the side of my laptop for 15 minutes a day. Battery life is long, it's portable enough to take in a carry-on bag, and it can also replace your morning coffee if you give yourself 2–3 days to adapt.

**NightWave** ([www.fourhourbody.com/nightwave](http://www.fourhourbody.com/nightwave)) My friend Michael found that the NightWave (a slow-pulsing light the size of a cigarette pack) was a permanent fix to his sleeping problems. I travel with the NightWave and use it as a supplement to the goLITE.

**Air-O-Swiss Travel Ultrasonic Cool Mist Humidifier** ([www.fourhourbody.com/humidifier](http://www.fourhourbody.com/humidifier)) This device is my favorite pairing with the goLITE. It improves both time to sleep and depth of sleep, not to mention skin and sinus health.

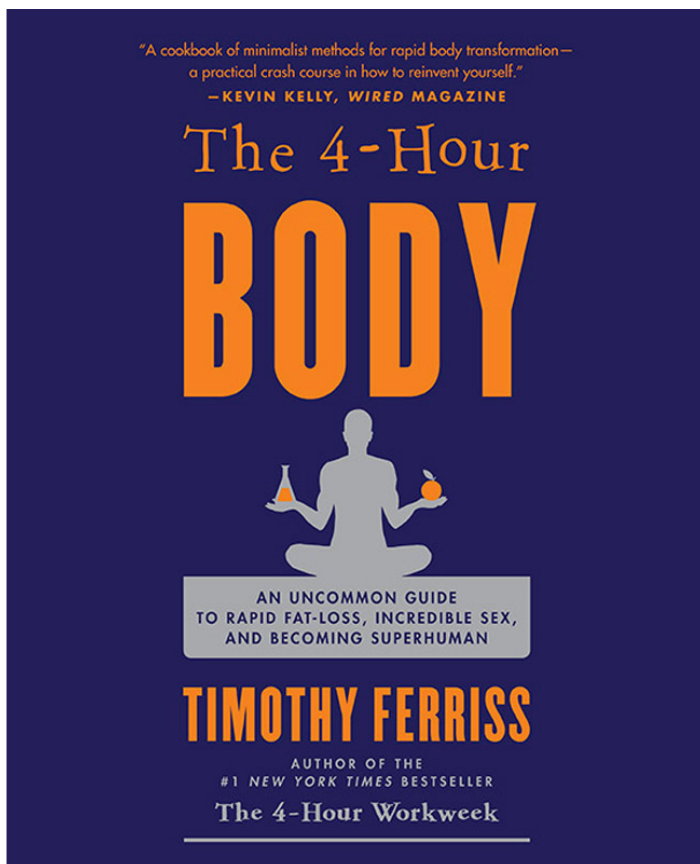
**Sleep Cycle iPhone Application** ([www.lexwarelabs.com/sleepcycle](http://www.lexwarelabs.com/sleepcycle)) The Sleep Cycle alarm clock analyzes your sleep patterns and uses the iPhone's in-built accelerometer to wake you when you are in the lightest sleep phase. This has been the #1 paid app (\$0.99) in many countries, including Germany, Japan, and Russia.

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**“Lucid Dreaming: A Beginner’s Guide”** ([www.fourhourbody.com/lucid](http://www.fourhourbody.com/lucid)) Lucid dreaming, as clinically demonstrated by Stephen LaBerge of Stanford University, refers to becoming conscious during REM and affecting dream content. To facilitate lucid dreaming, I have used huperzine-A to increase REM percentage.

Lucid dreaming can help you accelerate skill acquisition, improve sports performance, and reactivate “forgotten” languages. This article is a concise step-by-step how-to guide for beginners.



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