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Getting to No: The Science of Building Willpower

By [Jeffrey Kluger](#) Monday, Mar. 05, 2012

Pity your prefrontal cortex--the CEO and chief justice of the bedlam that is your brain. It's the prefrontal that has to reconcile the artiste of your right hemisphere with the logician of your left, the tough guy of your hypothalamus with the drama queen of your anterior cingulate cortex.

The battle between your noble lobes and your ignoble ones isn't even close. Eating and sleeping are vital for the survival of the species, so evolution arranged for them to be irresistibly pleasurable. Acquisitiveness is important too, so shopping and gambling carry kicks of their own. As for smoking, drinking and taking drugs, they have no survival value, but they don't need to, since they sidestep evolution and pick the chemical locks of the brain's pleasure centers directly.

The higher brain isn't completely unarmed in this fight. Indeed, it has one very powerful resource on its side: willpower. We work that willpower muscle every day--and like any muscle, it often goes weak. Also like a muscle, however, willpower can be strengthened.

"Our brains operate at three levels: I will, I won't and I want," says psychologist Kelly McGonigal, author of *The Willpower Instinct* and a professor at Stanford University. "For many of us, the I-want part wins."

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It's no wonder we get fatigued from the effort. Just deciding what to eat in the course of a day requires us to make 227 discrete choices, according to McGonigal. And food is only part of it. Every block brings a store that's designed to make you buy. "We're living in a world that is constantly tantalizing the reward centers in our brains--retail, phones, computers," says McGonigal. "Short bursts of dopamine that come from things like e-mail make it hard to focus on long-term goals."

But if willpower is elusive, it's also "trainable and cultivatable," according to Roy Baumeister, a psychologist at Florida State University. "The simple truth is that the brain evolved from the back to the front," says Baumeister. "The back is the wanting part, the front is the restraint part, and they're both with us all the time." The goal of this rising band of willpower researchers is to make peace between back and front.

It's All in Your Head

The I-want foot stomping of the lower brain may be trouble now, but it was not designed with moderation in mind. Human beings emerged in a world in which resources were highly limited and there was no percentage in reflecting too much on whether and when we availed ourselves of them. "It's a very adaptive system," says social neuroscientist Todd Heatherton of Dartmouth University. "You see an attractive food, you eat it."

Very broadly, when the midbrain--particularly the nucleus accumbens--lights up, it indicates a desire on the rise; activity in the dorsolateral prefrontal cortex, situated at the top forward portion of the brain, indicates an effort to control that impulse. Ideally, the dorsolateral wins, but a lot of things can prevent that.

In one particularly revealing bit of research, cognitive neuropsychologist Reza Habib of Southern Illinois University teamed up with Mark Dixon, an addiction specialist, to peek inside the brains of problem gamblers and compare them with those of casual and nongamblers. When the subjects were inside the fMRI scanner, Habib and Dixon showed them images of slot machines displaying one of three results: a win, a loss and a near miss with, say, two cherries on the center line and a third just below it. "Near misses are inserted into slot-machine cycles to keep you hooked," Habib says. "They cause you to think, Oh, I'm getting close!"

In games of chance, close means nothing, and the rational brain knows that. But the lower brain is another story. When problem and nonproblem gamblers witnessed a payoff, both groups registered reward in the pleasure centers. A loss caused the cautionary regions of the higher brain to light up in both. When it came to a near miss, though, the groups parted ways: the nonproblem players processed it as a loss, while problem players experienced it as something like a win.

The Best Intentions

If it's clear that we all occupy different spots on the willpower continuum, it's much less clear why. The first place to turn for an answer is our genes. Few psychologists doubt that the fundamentals of our temperament are set at birth; we're factory loaded for introversion or extroversion, coolheadedness or temper, so why not willpower--or the lack of it? "I wouldn't bet against a **genetic piece to willpower**," says Baumeister. "Impulsivity data show a pretty good hereditary component, for example."

But environment, as always, plays a role too, and in ways that go beyond the habits you pick up at home. All species are good at reading the larger world into which they're born and determining if it's a safe one, in which moving slowly and taking care will pay dividends, or a dangerous one, in which it pays to grab what you can. Robert Kurzban, an evolutionary psychologist at the University of Pennsylvania, cites studies of neighborhoods torn by gang violence, where people have shorter life expectancies and make their decisions--about smoking, drinking, sex, criminality--accordingly.

"If you're in an environment in which patience is rewarded, you're likelier to put off reward than people who have shorter to live," he says. "They pursue a fast-life strategy." In other words, they never develop a willpower muscle because, really, what's the point?

Of course, the brain is not actually a muscle, apt as the analogy seems, so what makes it behave like one? One thing may be glucose--the brain's fuel of choice--with willpower rising and falling along with our glucose levels. In a 2010 study at the University of South Dakota, investigators recruited 65 undergraduates and had them participate in a classic delayed-gratification game, offering them the chance to roll dice and win either \$120 that day or \$450 that they couldn't have for 31 days. Many of the typically cash-strapped students decided an immediate payout was more valuable than a larger one later. But one thing helped them defer the reward: subjects who had consumed sugary sodas before the experiment were likelier to pick the later \$450 than those who had drunk artificially sweetened sodas.

"The brain is always monitoring its resource levels," says McGonigal. "If sugar is rising, we feel like we can defer indulging ourselves. In other studies, investigators control people's willpower as if with a joystick by putting them on a glucose infusion and regulating it up and down."

Not everyone agrees that this how neural metabolism works. The brain does need a lot of glucose, but like a computer, it can run many programs at once, and willpower is not a very costly one--it requires the sugar equivalent of less than half a Tic Tac per minute, says Kurzban. "The glucose model is metabolically implausible," he argues. "The brain isn't a hydraulic system that needs a constant pressure; it's an information-processing system. If your browser's running slowly, you don't check your battery."

Getting in Your Own Way

Even as the **glucose model** is being debated, psychologists agree on a few other, less technical phenomena that can sabotage willpower. Take the **what-the-h*** effect**--which is exactly what it sounds like. You're on a diet, you have a bit of ice cream, and then--what the h***, the day's a loss anyway--you might as well finish the whole pint. There's a lot of what passes for thinking in this, which makes it hard not to blame yourself after a binge is done. But you may be less responsible than you think.

One paradoxical way to contain cravings is what McGonigal calls **mindfulness**, which is a lot less squishy than it sounds. Studies of smokers in fMRI scanners have shown that trying to deal with an urge through brute resistance exacerbates the problem, with the lower brain effectively going from orange alert to red. People who instead acknowledge their feelings and nudge them back in line with deep breathing or other relaxation exercises can calm their brains faster. "Acceptance doesn't have to mean endorsing the feelings," McGonigal says.

Another willpower booby trap is known as **the halo effect**. You go to the gym and sweat for an hour, then you go out to lunch. You've been good, so why not get some fries with that sandwich? The flaw in your thinking is as basic as arithmetic: burning off 400 calories and gobbling 500 does not add up. But the halo effect doesn't care. The mere concept of behaving virtuously--even if you haven't actually done so--may be enough to give you the license to indulge.

Another perceptual sleight of hand involves what psychologists call future-self continuity--and what Jerry Seinfeld once described as **Tonight Guy vs. Tomorrow Guy**. Tonight Guy can go drinking as late as he wants, because getting up in the morning is Tomorrow Guy's problem.

