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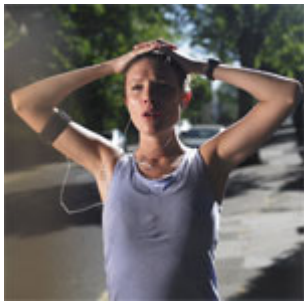
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How Exercise Boosts Your Brainpower

Karen Asp

Women's Health



You know that logging miles on the treadmill can give you a trim body, but adding more cardio to your life will also ratchet up your smarts, boost your productivity, rev your energy, and turn you into an unstoppable success machine. Even one 30-minute cardio session pumps extra blood to your brain, delivering the oxygen and nutrients it needs to perform at max efficiency.

Cardio also floods the brain with chemicals that enhance functions such as memory, problem solving, and decision making. And new research has found that this kind of exercise may even cause permanent structural changes to the brain itself.

"Cardiovascular health is more important than any other single factor in preserving and improving learning and memory," says Thomas Crook, Ph.D., a clinical psychologist and memory researcher. "You're working out your brain at the same time as your heart."

And the mental mojo you get from cardio isn't limited to making you smarter. It also has the power to lower your stress levels and shake you out of a funk. It's no coincidence that so many high-achieving women—from Madonna to Condoleezza Rice—share the cardio habit. Here's how it works.

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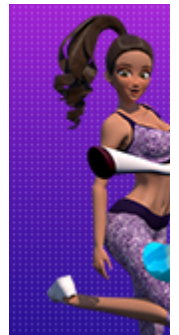
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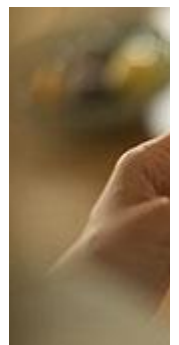
Your Brain on Cardio

Anyone who has ever tackled a StairMaster has a pretty good idea of what happens to your body when you break a sweat. But here's what's going on in your head at the same time: All that extra blood bathes your brain cells in oxygen and glucose, which they need to function. The more they get, the better they perform.

Every muscle you move also sends hormones rushing to your brain. There, they mix with a chemical called brain-derived neurotrophic factor, or BDNF, which plays a role in brain cell growth, mood regulation, and learning. "BDNF is like fertilizer for the brain," says John J. Ratey, Ph.D., a clinical associate professor of psychiatry at Harvard Medical School. "Without it, our brains can't take in new information or make new cells."

Exercise has another vital role: It signals the release of several key hormones, including serotonin, the famed mood booster; dopamine, which affects learning and attention; and norepinephrine, which influences attention, perception, motivation, and arousal. This exercise-induced chemical cocktail has a powerful impact. "By elevating neurotransmitters in the brain, it helps us focus, feel better, and release tension," Ratey says.

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Experienced regularly, all that rushing of blood and hormones primes your brain to grow. In one study, researchers scanned the brains of people who exercised for one hour per day, three days a week, for a duration of six months. They discovered an increase in the size of the hippocampus, the part of the brain that controls memory and learning. Working out literally bulked up the study participants' brains, allowing them to perform better at tasks that require concentration and recall — two talents that come in handy if, say, you do your own taxes or tend to forget passwords.

"Exercise improves attention, memory, accuracy, and how quickly you process information, all of which helps you make smarter decisions," says Charles H. Hillman, Ph.D., an associate professor of kinesiology and community health at the University of Illinois at Urbana-Champaign.

The Mental Advantage

People who exercised during their workday were 23 percent more productive on those days than they were when they didn't exercise, says a recent study from the *International Journal of Workplace Health Management*. And the majority of the study participants (72 percent) did aerobic workouts.

A pulse-pounding workout acts like a cup of coffee (minus the jitters): Your heartbeat picks up, your circulation increases, you're filled with energy, and your thinking becomes clearer and sharper. What's more, a study published in *Brain and Cognition* found that after just 30 minutes of doing an easy half-hour bike ride, subjects completed a cognitive test faster than they did before exercising... and just as accurately. And the brain-boosting effect lasted for at least 52 minutes after the ride.

Use this cardio-induced clarity to your advantage by timing your daily sweat sometime before you punch the clock, on your lunch break, or prior to a demanding task like a big meeting (just don't skip the post-workout shower!).

Boost Your Memory

If you suck at remembering names, lay off the sudoku and feed your brain some exercise. In a study published in *Perceptual and Motor Skills*, women performed 20 percent better on memory tests after running on a treadmill than they did before exercising. They also increased problem-solving abilities by 20 percent.

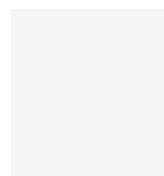
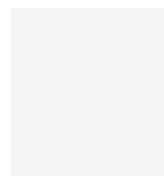
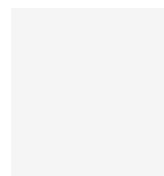
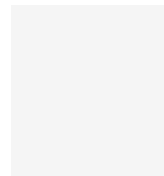


The Best Fit



10 Ways to I Workouts

Trending



The intensity of your workout makes a difference too. A study in *Neurobiology of Learning and Memory* found that people learned vocabulary words 20 percent faster after intense exercise than after low-intensity activity. Those who did more-demanding exercise had a bigger spike in their brains' levels of BDNF, dopamine, and epinephrine afterward. So the more you challenge your body, the more your gray matter benefits.

Sweat More, Stress Less

The reason you feel better after taking a kickboxing class may have more to do with your mental state than how many punches you landed. According to a study presented last year at the American College of Sports Medicine's annual meeting, exercise can improve your outlook. After riding a stationary bike for 20 minutes at moderate intensity, a group of 18- to 25-year-olds reported an immediate positive change in mood. While the study didn't measure endorphins, it's known that your body can release the euphoria-inducing chemicals during exercise.

What's a bit harder to explain is that their mood lift lasted up to 12 hours. Scientists may have a clue though. Preliminary research presented at the annual meeting of the Society of Neuroscience found that when the brains of rats were studied after the rodents had been subjected to stress (made to swim in cold water), those that had been allowed to run beforehand reacted less to the stress than those that hadn't. In the critters at least, the new brain cells created by exercise appeared to help them resist stress. In other words, exercise — a "positive" stress — effectively rewired their brains to help them better deal with less pleasant stress. Researchers say the same may be true of humans.

Here are some [quick tips](#) to help you stress less.

Capitalize on Cardio

Will any old way of raising your heartbeat also raise your success meter? Moderate-intensity cardiovascular exercise — such as pedaling a bike, walking briskly, or anything where you're breaking a sweat but can still carry on a conversation — shows promise in lab studies.

It takes at least 30 minutes of cardio three times a week to yield results, says Arthur F. Kramer, Ph.D., a professor of psychology and neuroscience at the University of Illinois at Urbana-Champaign, based on his studies on cognition and exercise. And if you can build up to daily cardio sessions, recent studies show that you may boost BDNF in your brain

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more rapidly than if you work out every other day. But it still might take a while to build the kind of brainpower that buffers you against stress.

After a few months of a regular cardio habit, gradually increase the intensity of your workouts to boost your mental returns. "Add a few vigorous efforts like running or interval training to your weekly program," Ratey says. Or try alternating between your usual routine and some workouts that are mentally challenging, such as dancing or tennis, a few times a week. Activities like these require coordination, which engages several areas of the brain at once — it's the mental equivalent of doing a pushup to work your entire upper body versus a biceps curl that targets only one muscle.

And if you happen to take a break from regular exercise, even for up to two weeks, no worries. Your brain has a molecular memory, which helps it churn out high levels of BDNF after just two days of hitting the elliptical again.

If a few hours a week on the treadmill ultimately helps you think quicker, make better decisions, and climb the ladder at work, your sweat will have literally paid off.

Protect your heat: Crank up your workout with [cardio](#).

5 Surprising Things A Workout can Help You Do

1. OVERCOME CRAVINGS.

The next time you hear a candy bar calling your name, try taking a hike. In one recent study published in the journal *Appetite*, subjects who took a brisk 15-minute walk decreased their cravings for chocolate by 12 percent. Just be sure to choose a route away from the vending machine.

2. LOSE THE MUFFIN TOP.

Obvious, right? A study in the journal *Obesity* found that just 80 minutes of cardio a week slowed weight gain and stopped participants from gaining visceral fat (the dangerous kind inside the abdomen that's been linked to diabetes and cardiovascular disease) a year after weight loss.

3. QUIT THE CANCER STICKS.

Research shows that 10- to 15-minute sessions of aerobic exercise trigger changes within the brain that help defuse nicotine cravings in smokers. What's more, a separate study

found that cardio activity can also make smoking-related images less likely to grab smokers' attention.

4. KEEP YOUR SIGHT.

People who ran 1.2 to 2.5 miles a day had a 19 percent lower risk of developing age-related macular degeneration, while those who ran more cut their chance by 42 to 54 percent, according to a study from *Investigative Ophthalmology & Visual Science*. Vigorous activity may also decrease cataract risk.

5. REDUCE YOUR BREAST-CANCER RISK.

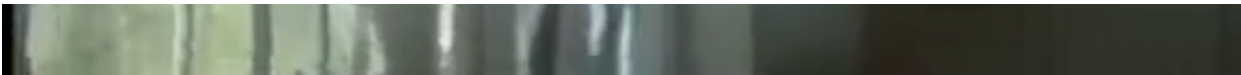
Women who did either moderate exercise for 2.5 hours or vigorous activity for 75 minutes a week cut their chance of dying from breast cancer by a third, according to a study from *Medicine & Science in Sports & Exercise*. Women who did about twice as much cardio lowered their risk by 55 percent.

Can Dumbbells Make You Smarter Too?

New research says they do.

A recent study published in the *Journal of Sport & Exercise Psychology* found that people who did moderate- to high-intensity strength training showed a significant increase in how fast they processed information. "Doing a combination of aerobic and resistance exercise may offer the brain the biggest benefits," says study coauthor Jennifer L. Etnier, Ph.D., an associate professor of kinesiology at the University of North Carolina at Greensboro.





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