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By Data Obsessed

By [GINA KOLATA](#)

MY husband, son and I were about to go for a bike ride. We had heart rate monitors. (We got them years ago.) And we had bicycle computers, little devices that track your speed, average speed, mileage, time and revolutions a minute. But now we were trying out the latest gadget for the data-driven workout - power meters. These used sensors in the hub of the rear wheel to calculate how many watts of power we put out. They also gave us all the other data we might want - heart rate, maximum heart rate, average heart rate, revolutions a minute, time, speed and average speed. And after a ride you can upload the data to a computer and see color-coded graphs of your performance.

It's mesmerizing to see your power output. Stephen Madden, the editor in chief of *Bicycling* magazine, who assiduously uses a power meter himself, warned us not to get too obsessed.

"Don't be a watt weenie," Mr. Madden said, explaining that some people get so focused on their wattage that all the fun goes out of riding.

Too obsessed? Is it even possible? The world of exercise is increasingly being shaped by data, with bicyclists, who have perhaps the most tools to monitor themselves; runners who time themselves and monitor their heart rates and sometimes use global positioning sensors to measure their speed and distance; and moderate exercisers who clip pedometers onto their belts to measure the number of steps they take each day.

Many tools are very new. Heart rate monitors have been around for years, but have only recently been linked to GPS systems or power meters. And now companies are offering Web-based tools to make it even easier for people to track their efforts.

Just six months ago Nike introduced an updated Web site allowing runners to get a customized training program, a schedule and a way to document every variable in their exercise sessions - heart rate, distance, pace (with a pace calculator), weather and route. The company said 11,000 runners use it each week.

The year-old MotionBased Technologies Web site provides athletes and ordinary exercisers a place to store and analyze data from GPS-monitored workouts. (Minimal data storage is free and more elaborate storage costs \$11.94 a month.) By word of mouth the company has attracted 10,000 users, said Clark Weber, one of its founders.

And Carmichael Training Systems, a six-year-old online company started by Chris Carmichael, Lance Armstrong's trainer, has signed up more than 10,000 cyclists and other athletes. Subscribers transmit their workout data, and coaches prescribe training programs. The cost is \$39 to \$499 a month, depending on how much coaching is wanted and how much data is transmitted. At least a quarter of subscribers opt for more elaborate data monitoring, said Kevin Dessart, the company's marketing director. What you do with workout data depends on your goals.

Riders in the Tour de France use power meters to assess their fitness level as they train for a peak power performance during those three weeks in July when it traces its way around France.

As for wannabe athletes, said Michael Berry, an exercise physiologist at Wake Forest University, "if you want to start improving your fitness level and being competitive, then you have to target how intense your exercise is." That needs data.

He elaborated: "The only way to improve is to work harder. And the best way to know if you're working harder is to be able to monitor your work, whether it be via a power meter or a heart rate monitor."

Some, like Grant McAllister, 35, a professor of German at Wake Forest, said that monitoring changed his life.

"I got my first heart rate monitor in 1997," he said. An amateur bicycle racer, he used it to see how much effort he was putting out. The higher the heart rate, the greater the effort. Like many others, he found that his heart rate monitor became a gateway to a data obsession.

Mr. McAllister's next device was a bicycle computer. "I feel completely naked if I don't have some type of computer on my bike now," he said. Two years ago he saved his money and bought a \$700 power meter, the cheapest he could find. Now he uses it on every ride, sends his data to Carmichael Training Systems and is a transformed rider.

"It's given purpose to my training," Mr. McAllister said.

Matt Canter, an owner of Ken's Bike Shop in Winston-Salem, N.C., who competes against Mr. McAllister in local races, said Mr. McAllister used to be a good but not an outstanding racer. Now that he has been training with a power meter, Mr. Canter said, "He just kills everybody."

Others monitor their performance to motivate themselves and burn more calories.

Steven Guy, 52, a business consultant in Pottstown, Pa., took up exercise last year, when he joined a weight-loss study that had subjects follow a diet and work out at least moderately most days. Mr. Guy wanted more. He wanted to use exercise to speed his weight loss and to keep the pounds off. So he decided to bike, run and jump rope.

Last Valentine's Day his wife bought him a heart rate monitor, and he began keeping track of his every effort. A heart rate monitor is a narrow elastic band with a plastic sensor in front. You strap the band around your chest, and the sensor transmits electrical signals to a special watch on your wrist that displays your heart rate in beats a minute.

Mr. Guy's monitor came with a chart telling what a person's maximum heart rate should be. Maximum heart rates normally fall by about a beat a minute

each year. No one knows why. The formula used for the charts says a person's maximum heart rate is 220 minus age, which would make Mr. Guy's maximum 168 beats a minute.

But exercise physiologists have long known that such charts are not accurate for some exercisers, and Mr. Guy's own experience shows the chart does not work for him. He has raised his heart rate to 175 during a burst of effort.

"There is large variability in the maximum heart rate," said Steven Blair, the president and chief executive of the Cooper Institute, a nonprofit research foundation that studies exercise and fitness. "For one 35-year-old woman 170 might be her maximum heart rate. Her friend the same age might be able to reach 195. That's just genetic variation."

Mr. Guy, however, had a nagging worry: Is it dangerous to push your heart rate too high?

"Nope," Dr. Blair said. "You can't hurt a healthy heart with exercise."

If you get your heart rate close to its true maximum, you feel so depleted that you automatically slow down. Just as you can't hold your breath until you die, you can't drive your heart rate up until your heart gives out.

Now, a year after he began his program, Mr. Guy has lost 25 pounds. Best of all, he said, he ran a 10-kilometer race on the Fourth of July, the first time in 15 years he was able to race that distance. The secret, he said, was monitoring and recording his training.

On the other hand, said Edward Coyle, an exercise physiologist at the University of Texas at Austin, the kind of person who keeps track of mileage and effort with a GPS-based system or who obsessively straps on a heart rate monitor for every exercise session is frequently the kind of person who can do more harm than good with monitoring. Too often, he said, people look at their heart rate and want to get it higher, higher, higher, or they want their power meter readings to soar day after day.

"For people who are motivated and data-driven, they believe that more is better, but that's not the case," Dr. Coyle said.

To improve or even to continue exercising injury-free people must deliberately slow down on days after hard workouts.

"One of the most important ways a heart rate monitor or a power meter is used is when you need to take a day easy," Dr. Coyle explained. And you say to yourself that "you won't let your heart rate go above 130, no matter how much you want to pick it up."

Then there are people who have no race or training program in mind but only want to reassure themselves that they are doing the recommended amount of moderate exercise. They simply want to get adequate physical activity.

That describes Ingrid Woods, 58, who lives in Mill Valley, Calif. She puts on a pedometer every morning and takes it off at night to see how many steps she has taken. She got the device about a year ago "just out of curiosity," she said, when she heard that people should take at least 10,000 steps a day to be fit. She likes to keep checking on herself, she likes to see the data, and by now it has become a habit. "This is just what I do," she said.

Data-driven workouts are not for everyone. Not everyone wants to set a new personal best or train to see how fast she can be. And it is not necessary to monitor and record steps, heart rate, speed and power if your goal is ordinary fitness, Dr. Blair said. Some, in fact, find monitoring abhorrent.

Dr. Clifford Rosen, 55, a physician at the Maine Center for Osteoporosis Research and Education, runs every day but does not use a heart rate monitor and does not keep training schedules or logs. As a scientist, he said, he has enough of data in his work life.

"I measure everything else," Dr. Rosen said. "I tell myself this is one thing I don't have to measure."

And, he said, he is none the worse for it.

"I've run five marathons," Dr. Rosen said. "I'm in really good shape."

After our ride with the power meters, we knew that we loved them. It had been a hot day with drenching humidity, conditions that make the heart rate soar. But power output is different. Power is power, no matter what the weather. And power never lies. The meters are expensive though, my husband said. Should we really buy them?

Of course, I told him. "Think of the pleasure."

1. Pedometer

Clipped to your belt or waistband, the device counts your steps. If you calibrate the length of your stride, it can also gauge your distance. This is the Sportline 345, \$29.95.

PROS Pedometers, which cost \$10 to \$40, are routinely used in weight-loss programs. (People are advised to clock at least 10,000 steps a day.)

CONS There is no way to review a previous workout with some pedometers, like this one. So you need to keep a separate log.

2. GPS Monitor

By pinpointing your location with a Global Positioning System sensor these devices measure speed, distance and pace during a workout. A heart rate monitor is usually included. Left, the Garmin Forerunner 301, \$324.98, lets you download your exercise history to a computer (PC only).

PROS GPS is a convenient way to measure speed and distance on foot or on a bike.

CONS The watch can be bulky. Clouds can diminish accuracy.

3. Power Meter

Cyclists use power meters to record power output, pedal revolutions, speed, time and distance. The meter here, CycleOps PowerTap Pro, \$899.99, is installed onto the bike's back wheel, and the data screen, is attached to the handlebars. Most meters let you upload data to a computer.

PROS Power meters simply measure the power you generate.

CONS They cost \$700 to more than \$3,400.

4. and 5. Heart Rate Monitor

These monitors, which cost \$60 to more than \$400, track heartbeats a minute by transmitting electrical signals from a sensor on a chest strap to a special watch. This monitor, the Polar F11, \$159.95, can create a customized training program with a heart rate to aim for during each workout.

PROS They can be used during any form of exercise.

CONS Chest straps must be wet to work properly.