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### What's Your Heart-Rate Variability? It May Be Time to Find Out

HRV monitors are spreading as a way to get more out of workouts and relieve stress. Data on heart-rate variability is being used in training by athletes from the elite to the weekend warrior. PHOTO: ISTOCKPHOTO/GETTY IMAGES

By Charles Wallace

Every morning, as soon as he wakes up, Iñaki de la Parra, an endurance athlete from Mexico, uses a heart-rate monitor he straps to his chest and an app on his smartphone to measure the tiny variations in the intervals between his heartbeats.

Like a growing number of athletes, Mr. de la Parra uses these measures of his heart-rate variability, or HRV, to help tailor his workout regimen—with high variability indicating his body is prepared for strenuous exercise and low HRV signaling that his body would benefit from a lighter workout or a break.

Since he started using HRV measurements to help guide his training a year and a half ago, Mr. de la Parra shaved five hours off his previous time in the Ultraman triathlon, winning the 2016 event by completing the 6.2-mile swim, 261-mile bike ride and 62-mile run in 22 hours, 34 minutes.

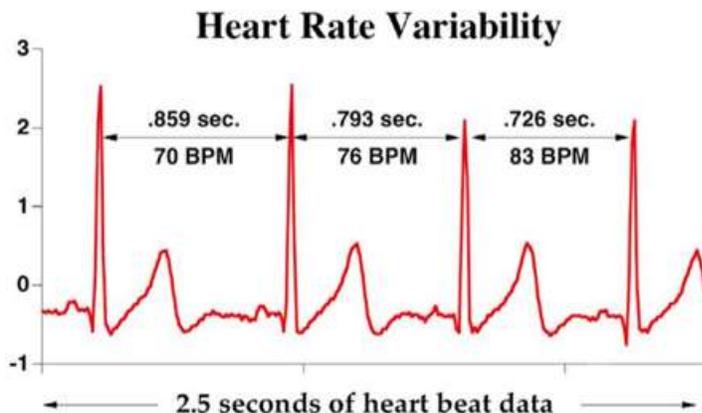
"HRV is a great tool that's really helped my training," he says.

Endurance athletes, however, aren't the only ones finding benefits from HRV data. Thanks in part to the availability of accurate heart-rate data on wearable devices, it's being used in training by soccer, basketball and football players, among others, from the elite to the weekend warrior. Psychologists are using it to train golfers and tennis players to control their heartbeats so they're calmer under pressure. And some see managing heart-rate variability as a way for non-athletes to deal with stress.

By learning how to control their respiration with slow, rhythmical breaths, people can temporarily increase their heart-rate variability, which some medical experts say can help lower blood pressure and reduce stress and anxiety. This technique has also been used to treat everything from stage fright to irritable bowel syndrome.

While your heartbeat might seem steady at any given time—whether your heart is beating fast because of strenuous activity or slower because you're at rest—there are actually tiny variations in the time between beats. That variability is due to the interplay of the two arms of the autonomic nervous system, the part of the nervous system that controls bodily functions, including the heartbeat, without a person's conscious direction.

Those two arms are the parasympathetic and the sympathetic nervous systems, says Lawrence Creswell, a cardiac surgeon in Jackson, Miss., who studies sports cardiology. "The sympathetic arm has to do with getting adrenaline flowing, revving up the heartbeat," Dr. Creswell says. "The parasympathetic autonomic system is the brakes and pulls down the heart rate."



Heart-rate variability is the small differences in time between beats. Greater HRV indicates calm—and also signals readiness for heavy workouts. PHOTO: HEARTMATH INSTITUTE

The balance between those two systems is in constant flux. After a hard workout, the parasympathetic system dominates as the body demands rest. This is associated with a decline in heart-rate variability. As the body gets the rest it needs, the sympathetic nervous system takes the upper hand, preparing the body for renewed activity. When that happens, heart-rate variability increases. Dr. Creswell says that in sports training, the idea is to have your heaviest workouts when your heart is most recovered—when your HRV is at its highest.

That number won't be the same for everyone. The range of HRV numbers differs from person to person. Alan Couzens, a Boulder, Colo., coach who trains competitive athletes, says it takes about a month of monitoring your HRV to establish a baseline before you can use it to determine your recovery status.

Mr. Couzens uses HRV data that athletes send him to help set their training schedules. On days when an athlete's HRV number is down, he orders up a light training day or, rarely, a day off—because low HRV is a sign that the body is still stressed, and pushing it too hard in that state might result in physical damage. "I think it's a good measure of the health of the athlete," Mr. Couzens says. "A drop in HRV often precedes injuries."

Doctors and psychologists, meanwhile, have been studying HRV as an indicator of physical and mental health, and how altering it can benefit patients. Richard Gevirtz, a professor of health psychology at Alliant International University in San Diego, says training people to raise their HRV is being used successfully to treat stress-related disorders like anxiety, gastrointestinal problems such as irritable bowel syndrome, and work issues like fear of giving a speech.

Dr. Gevirtz has developed a program that uses slow, methodical breathing to increase HRV. He says studies show that each individual has a different breathing rate, usually between five and seven breaths a minute, at which they obtain maximum HRV, which has a calming effect. The research has shown that breathing at that rate can raise a person's average HRV by 25% over time, he says.

An analysis of several peer-reviewed studies of heart-rate training using rhythmic breathing was published in March in the journal *Psychological Medicine*. It concluded that "HRV biofeedback training is associated with a large reduction in self-reported stress and anxiety."

Harry van der Lei, co-founder of the Hourglass Performance Institute in Atlanta, says training to control HRV with breathing can improve performance in golf, tennis and shooting—sports where performance anxiety can cause even seasoned pros to miss shots. "By increasing your HRV, you are increasing your stress-management capacity," he says.

Mr. van der Lei's company teaches golfers how to improve their HRV under conditions of pressure and stress such as tournaments. But he adds that while HRV training can enhance skills an athlete already has, it isn't a substitute for those skills.

Measuring HRV is simple. Several smartphone apps provide detailed HRV measures and tracking using data from wearable heart-rate monitors. Another alternative is an earlobe clip called Inner Balance, which plugs into a smartphone and displays HRV data on-screen.

There are also several apps people can use to train themselves to regulate their breathing to raise their HRV and lower stress and anxiety. Practitioners recommend 20 minutes a day of breathing practice to obtain the full benefit.

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