Your Fitness Tracker’s Most Popular Metric Might Be Lying to You

7 MIN READ

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How wearables measure HRV is misleading. Here’s what experts say you should know about understanding your body’s stress and recovery.

Your fitness tracker is packed with data points, but one of the most talked-about, and arguably most misunderstood, is heart rate variability, or HRV. Touted as a key measure of your body’s stress, recovery, and overall health, your HRV, a measure of the space between your heartbeats, is also one of the metrics people use to calculate their “readiness scores,” revealing how well you can tackle your day and your workouts.

Yet, despite its popularity, the way most wearables measure and interpret HRV can be misleading, sometimes wildly so. Before you panic over a “bad” reading, it’s important to understand why your tracker’s HRV stat might not be telling you the whole truth, and how you can get a clearer, more reliable picture of your body’s readiness.

A low HRV has been associated with health problems ranging from **cardiovascular disease** to **anxiety disorders** to **headaches** and **diabetes**.

If your morning HRV readings look dire, stop stressing. (For starters, it only makes your HRV worse.) Both the technology your watch or ring measures your HRV, and the method by which it interprets the data, have some problems. To learn more about these issues, and to find a cheaper, more effective way to measure your HRV, I spoke with two experts:

• **James Navalta, Ph.D.,** associate professor of kinesiology and nutrition sciences at UNLV, where he researches the accuracy of wearable devices.

• **Joel Jamieson**, a conditioning expert who works with UFC fighters and pro athletes, and is the creator of the Morpheus HRV system.

Here's the lowdown on what HRV is, why it matters, and how you can measure yours in just a few minutes each morning.

What HRV Is, and Why It Matters for Longevity

When your heart's beating 60 times per minute, that's an average. Some beats may take 1.15 seconds, while others may take 9.85 seconds. The amount these vary **is your heart rate variability, or HRV**.

More small variability between the length of these beats is actually *good*. When you're under stress—psychological stress from a tough meeting, or physical stress from a workout—your heart beats become more regular … less varied. So if your HRV isn't varying enough when you're at rest, you're in a stressed state.

That's because low HRV is associated with more activity from the "fight or flight" part of your nervous system, also called your sympathetic nervous system. When the other part of your nervous system, called the parasympathetic nervous system, activates, your body is in a mode where it's recovering from stress.

Besides the diseases and conditions listed above, a low HRV has also been associated with shorter life for decades. A **1987 study** found that people who had a heart attack were more likely to die afterwards if they had a lower HRV. Another study **of 5,000 older people** found that those with higher HRVs were more likely to still be alive four years after the study.

The Problem with Your Fitness Tracker's HRV Measurement

You know those electrocardiogram (**ECG**) machines you've seen in a zillion hospital dramas? They measure your heart's activity by tracking its electrical signals. The average number of beats per minute is your heart rate. The time between each heartbeat is used to calculate your heart rate variability. This is the most accurate way to measure this HVR.

Your fitness-tracking watch or ring doesn't use an ECG to measure your heart rate or HRV. It **shines light** through your skin, and tracks blood flow based on the amount of the light that gets absorbed.

"That's where the difference is. Your watch is measuring pulse rate," says James Navalta, Ph.D., associate professor of kinesiology and nutrition sciences at UNLV, where he researches the accuracy of wearable devices.

The pulse rate, he says, isn't precise enough. It'll give you an idea of the variability, but not pinpoint it. If you move your arm, for example, the light measurement can be interrupted. Even the color of your skin can mess with how much of the light is absorbed, Navalta says.

How much less accurate is light versus ECG? In **one 2022 study**, "A Validation of Six Wearable Devices for Estimating Sleep, Heart Rate and Heart Rate Variability in Healthy Adults," a Whoop band was about 10 percent less accurate than an ECG. A Garmin watch that was tested only hit 60 percent of the ECG accuracy.

How To Get The Most Out of Your HRV Measurement

Newer watches and rings have been released since this study was conducted and published, and they *might* be more accurate on HRV (though **less than 5 percent**

of wearables have been studied for validation). Even if they are, says Joel Jamieson, there's a problem with the way these devices use and display HRV data: They measure your HRV all night, and display it as an average.

Here's why this matters: When your watch or ring uses HRV as part of your "readiness" for the day, it's suggesting whether or not your body is in a "stressed" state. When you're in this stressed state, the idea is that your body hasn't gone through the paraympathetic, or recovery, mode to help you come back from stressors in your life. But when your HRV is used as an average in this way, Jamieson says, you may have gone through that recovery period … and the average isn't displaying it.

"There's a big difference between your average HRV across eight hours, and what it is at any given point in time in the morning," he says. "If you had a glass of wine or two, or you did a workout in the evening, the first four to five hours of your sleep, your HRV is suppressed … It doesn't mean you didn't recover by the end of it. But it's going to skew the average dramatically."

What you really want, Jamieson says, is to know your HRV at the same time every day, the same way you'd measure your resting heart rate or your blood pressure. When tracking your blood pressure, you wouldn't measure it right after sleep one day, then after a big meal, then after a big workout. You'd measure it in the same conditions every day to reduce the impact of those variables on the number.

The same goes for your HRV: The number is more useful, Jamieson says, if it's a trend you can track at the same time every day, in the same conditions. Checking in on it as a single measurement in the morning, he says, will really show you how "ready" you are for the day to come.

A Better Way to Measure Your HRV

Start with the right wearable: Most fitness tracker are great at measuring one or two metrics, Navalta says, and for the rest … well, they're doing their best. **Navalta's**

advice is always to choose the wearable that specializes in the metric you're most eager to measure and track. For HRV, that's an ECG.

The good news is you don't need a hospital bed. Chest strap ECGs are cheaper than most other fitness trackers and employ the same technology you see on *Grey's Anatomy*. The **Morpheus**, which Jamieson created, uses a chest strap ECG, as do inexpensive options from Polar: The H9 strap is **less than $70**.

Once you've chosen your tool, you'll want to measure it in a daily routine instead of relying on the overnight average, Jamieson says. Measuring your HRV accurately takes just 90 seconds to 2 minutes. To get your most consistent measurement to track:

1. **Measure in the morning.** Ideally, you want to know how "ready" you are when you wake up. After you get out of bed and use the bathroom, take your HRV measurement sitting or lying down.

2. Sit totally still through the measurement. Try to breathe normally, and move as little as possible. Even **swallowing has been shown** to temporarily change HRV.

3. Don't drink anything until after you measure. Drinking water before an HRV measurement **has been shown** to change HRV for up to 45 minutes after drinking.

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