

What does the evidence show?

SWEAT SCIENCE

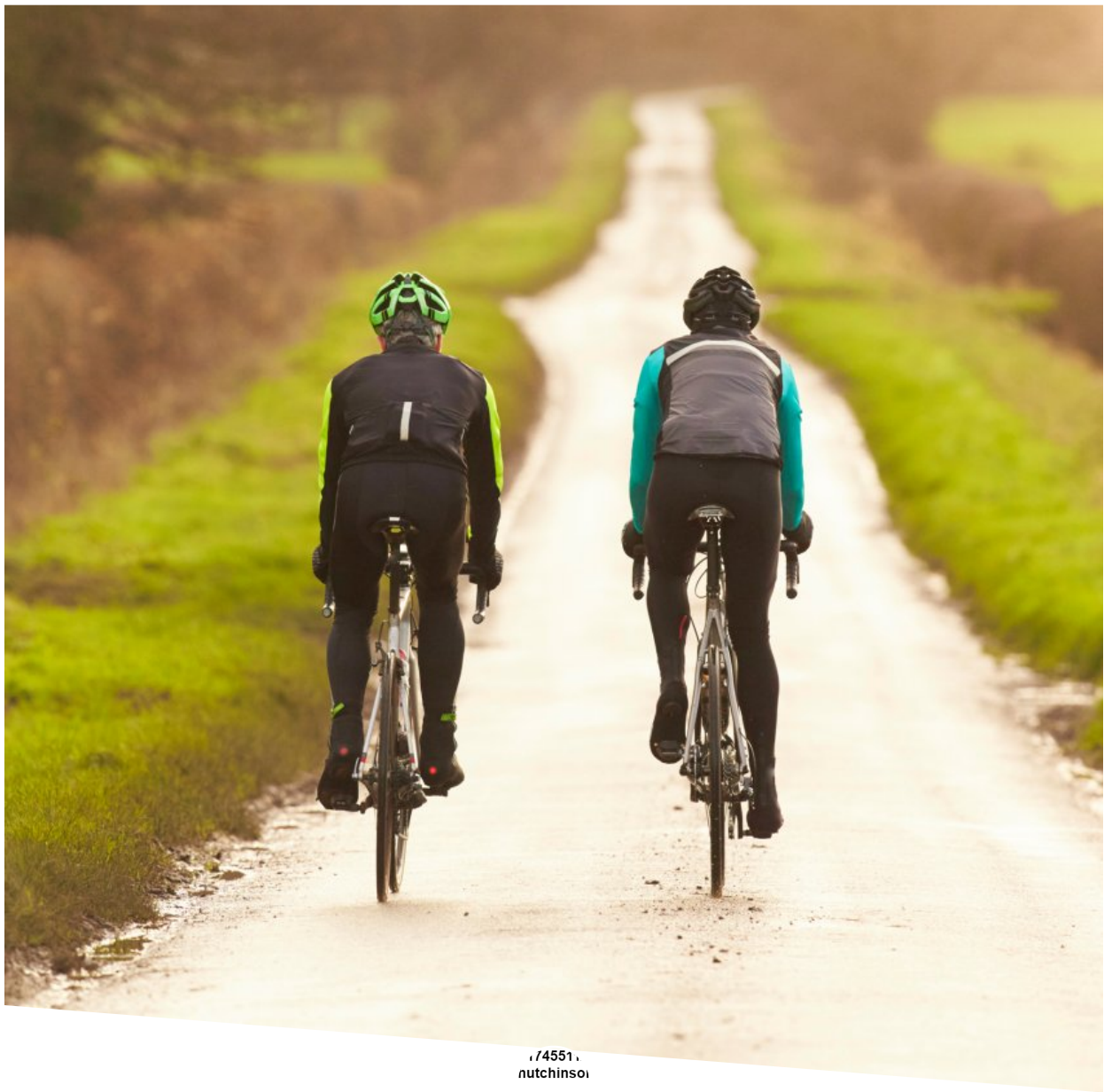
There's a Complex Connection Between Exercise and Anger

New research parses the different effects of exercise on anger as an emotion versus anger as a mood

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In my house, it's well understood that missed runs and snippy exchanges are causally related. That may seem obvious—after all, there are big piles of evidence about exercise's mood-altering power to reduce feelings like anxiety (<https://www.outsideonline.com/2324201/lifting-weights-helps-ease-anxiety-and-depression>) and depression (<https://www.theglobeandmail.com/life/health-and-fitness/article-can-a-regular-running-routine-replace-antidepressants/>). But, as a new study (<https://www.ncbi.nlm.nih.gov/pubmed/30768551>) in *Medicine & Science in Sports & Exercise* points out, there has been very little research on the links between exercise and anger. And that makes me very, very angry. (I've been injured and unable to run for a few weeks.)

Researchers at the University of Georgia decided to address this gap by showing a series of “emotionally evocative” pictures—soldiers firing at children, a Ku Klux Klan rally—to volunteers before and after a 30-minute “moderate-to-vigorous” bike ride (or, in the control condition, 30 minutes of sitting quietly). They assessed their volunteers' anger levels with questionnaires and by measuring brain activity with EEG electrodes. The results are more nuanced than I expected.

The first thing to note is that there's a difference between moods and emotions. This may seem obvious, but it's something I hadn't really thought about in this context, and it turns out there's a long and complicated academic literature (https://ekkekaki.public.iastate.edu/pdfs/ekkekakis_2012.pdf) arguing about the precise differences between the two. In broad strokes: moods tend to be longer-lasting, they are less strongly associated with an immediate trigger, and there's nothing you can measure in the brain that reveals them. In contrast, emotions are shorter, are a response to a specific triggering event, and are linked with consistent and measurable patterns of brain activity. You can be in an angry mood, and you can also experience anger as an emotion.

The Georgia study, which was led by former graduate student Nathaniel Thom (now at Wheaton College), started out by screening 430 students in order to select 16 men with a high propensity for getting angry. (This approach makes it more likely that you'll see significant changes, much like testing blood pressure meds on people who have high blood pressure.) During the picture-viewing, EEG brain activity and questionnaire responses measured the subjects' anger as an *emotion* in response to each scene. Before and after the sessions, they also completed psychological questionnaires to check whether the overall experience had put them in an angry *mood*, and whether that was affected by the presence or absence of exercise.

The results, which were first reported (<https://well.blogs.nytimes.com/2010/08/11/phys-ed-can-exercise-moderate-anger/>) at a conference several years ago, showed that the 30-minute bike ride did indeed have two positive effects on angry mood. The volunteers felt less angry immediately after the bike ride; and the post-exercise picture-viewing session was also less likely to put them in an angry mood. In other words, exercise both reduces your anger levels and helps immunize you against getting into an angry mood in the first place.

But when you consider anger as an emotion, the picture changes. Exercise had no effect whatsoever on the intensity of emotions reported during picture viewing—not just for the anger-inducing pictures, but also for pictures chosen to induce feelings of fear and pleasantness. And the EEG data also showed no difference in emotional intensity. Exercise may put you in a better mood, but—in this particular study, at least—it didn't seem to dull or prevent passing emotions.

It will take a lot more research to tease out these subtleties and figure out how generalizable they are. For now, it's interesting to see some apparent confirmation that exercise really can function as a sort of prophylactic against irritation—but not an all-powerful one. Even after a run, things that make you angry will still make you angry. Just remember that the transient emotion will pass, and your Zen-like post-exercise good mood will return.

My new book, Endure: Mind, Body, and the Curiously Elastic Limits of Human Performance, with a foreword by Malcolm Gladwell, is now available. For more, join me on Twitter and Facebook, and sign up for the Sweat Science email newsletter.

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