It's all in the mind - how an athlete wins head-to-head competition

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Dr Jo Corbett with a race participant in front of the virtual race course

We've all seen the moment an athlete pushes themselves at the last second to try and win a head-to-head race, and now a sports scientist has discovered how they do that.

Dr. Jo Corbett from the University of Portsmouth has found the secret to that winning burst lies in the exhausted athlete's brain tapping into the body's anaerobic energy stores.

The results showed that even when an athlete had reached physical fatigue they were still able to dip into stored anaerobic energy. The anaerobic energy system provides energy in the absence of oxygen and is used for fast, powerful bursts of energy.

Dr. Corbett, a senior lecturer in applied exercise physiology from the Department of Sport and Exercise Science, conducted a study to find out what exactly triggers a cyclist to go faster when they are competing against someone head-to-head.

In his study, published in the *Journal Medicine & Science in* Sports *& Exercise*, sportsmen racing against someone else managed to find an extra burst of energy that increased their performance by 1.7 percent. At top level sport this can be the difference between winning or being unplaced.

Dr. Corbett said: “Most sportspeople know they perform harder and better when they are competing, but until now we didn’t know precisely why.

“We’ve found out that an athlete is able to dip further into their anaerobic energy reserves in order to beat their opponent.

“Whenever you do exercise you’re likely to think ‘how much am I willing to hurt myself?’ and there’s usually a point which holds you back because you don’t want to do yourself irreparable damage. But when racing someone head-to-head the athlete’s brain can manipulate this signal and keep on going.”

Participants were instructed to complete a 2000 metre cycle in the quickest time possible, in front of a computer screen showing an avatar of themselves doing the ride on a virtual race-course. They had to repeat this exercise on five different occasions.

On the final occasion the cyclists were told to race against another individual behind a partition whose avatar was also being projected onto the same virtual race course in front of them. Despite thinking they were racing someone else – participants were in fact competing against their own previous best time.

Out of 14 cyclists participating 12 of them performed significantly faster in the final race - when they believed they were competing against an opponent. They finished with a burst of speed to ensure their victory and the average speed of most increased from 38.4km/h per hour to 39km/h. Dr. Corbett said: “In each race the participants cycled vigorously until they were completely exhausted but it was only in the last race, when they were unknowingly competing against themselves, they were able to race even harder.

“When an athlete finishes exercising they are almost always left with a physiological energy reserve but our results show that head-to-head competition provides the motivation to tell the brain to eat into a greater part of this reserve.”

Provided by University of Portsmouth

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