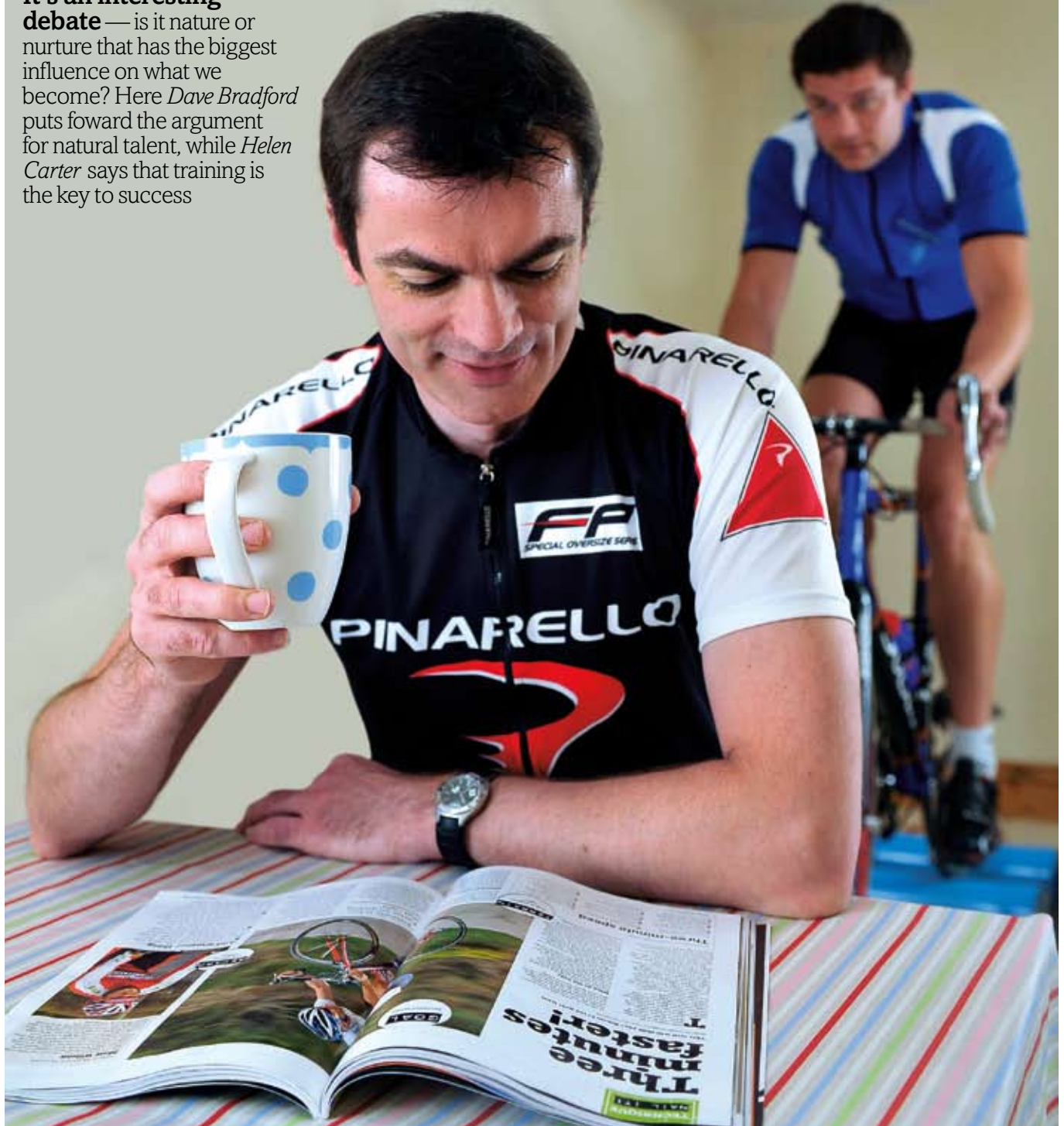


Is talent overrated?

It's an interesting debate — is it nature or nurture that has the biggest influence on what we become? Here *Dave Bradford* puts forward the argument for natural talent, while *Helen Carter* says that training is the key to success



Practise, practise, practise... and you'll still be beaten by the cyclist who has better genes than you, writes *Dave Bradford*. You've probably observed many times, and with much frustration, that certain training mates put in less work than you, yet achieve the same or better results. When you're out labouring on the bike in the pouring rain, they're sitting, feet up, in front of the telly. But when it comes to a race, they win every time. You realised long ago that they were just 'naturally' better. Well yes, and now science is finally beginning to prove it and show us why.

The theory that 'talent is overrated' (ie that practice makes perfect) does not apply to endurance sports such as cycling and running. Success in long-distance athletic endeavours, unlike in skill-based sports like golf or tennis, does not rely on fine motor control and precise hand-eye coordination. For us cyclists, practice does not make perfect. Instead, you need the right physique and a good heart and set of lungs. These are determined by your DNA. This 'DNA makes destiny' retort to 'practice makes perfect' is no longer a mere theory; scientists have established that genetic factors account for approximately 50 per cent of athletic variation in performance. To believe that you can 'be the best' through training alone is to cling to an old, outdated myth. There is no such thing as a level playing field.

VO2 maxed out

Do not despair. Every individual is genetically different; we are not yet faced with having to compete against clones of Alberto Contador (except in pre-race nightmares, perhaps). The paradox is that we are, in terms of genetics, virtually identical: 99.9 per cent of the human DNA sequence is common to all. Our genetic differences, of which there are hundreds of thousands, and which determine whether or not we're suited to particular sports, are contained within the 0.1 per cent remainder.

The most obvious genetically-determined characteristics affecting athletic performance are height and physique. For a cyclist who specialises in climbing, the advantage of having a slight, compact frame requires no explanation. Equally, a sprinter needs a muscular build (with a preponderance of fast-twitch muscle fibres) — another characteristic

that is substantially determined by genetics. OK, so your body type is self-evident, and you can choose a sport to match your build, but what about the hidden traits bequeathed to you by genes?

The most important determinant of endurance performance is cardiovascular fitness: how efficiently your blood, heart and lungs deliver oxygen to your muscles. It is well-known that one of the most important markers of cardiovascular health, VO2 max — the body's maximal rate of oxygen uptake — is largely determined by genetics. Your VO2 max is written in your DNA; yes, you can improve it by training, but only by a relatively small amount. Most people are able to 'tune up' their VO2 max by only 10-15 per cent; if yours is naturally low, there isn't much you can do about it.

Gene genius

A recent study at the Pennington Biomedical Research Center, in Louisiana, studied the genomes (complete genetic makeup) of 473 healthy white volunteers. It made a breakthrough discovery by identifying specific fragments of DNA responsible for receptiveness to exercise.

The volunteers were put through a five-month exercise programme. Some became much fitter with correspondingly improved VO2 max, while others barely responded at all. The only consistent difference between the two groups was in their genes: 21 snippets of DNA (from 300,000 examined) separated the improvers from the non-improvers. Those with 19 or more of these segments of DNA improved their cardiovascular fitness three times as much as those who had nine or fewer. One particular fragment, located on a gene called ACSL1, appeared to be responsible for as much as six per cent of the difference in response. If you don't have

these potent segments of DNA, you're at a major disadvantage — and no amount of hard training will get you back on equal terms.

It is not only your VO2 max that is determined by genetics, but also the size and efficiency of your heart, the concentration of oxygen-carrying haemoglobin in your blood, as well as blood volume and blood pressure. Studies have shown strong inheritance patterns with regard to the structure of the heart and coronary arteries. The structure of the heart plays an important part in determining its stroke volume, which is an important factor for aerobic

"Your VO2 max is written in your DNA. You can improve it by training, but only by a small amount"

IN THE GENES

The idea that we can all make it to the top ranks of sport through hard work and dedication is a myth. The scientific consensus is that half the variation between individuals' abilities is due to genes



Let them eat cake: leave the stodge for the natural athlete

performance. Another significant physical attribute is the relative proportion of slow and fast-twitch muscle fibres — also determined by genetics. A predominance of slow-twitch fibres are advantageous for endurance athletes, as this type of muscle has been shown to have a greater capacity to consume and utilise oxygen. If you have a high proportion of fast-twitch muscle fibres, your body is better equipped for short, explosive bursts of speed rather than long-distance efficiency — and training for endurance will not reverse your natural make-up.

“Having the right genetics is the single most important factor in successful sports performance,” says sports physiologist Nick Tiller. “Our genes predispose us to a body

type and physiological make-up that suit particular types of sport, and largely dictate the level at which we will be able to compete. The hard truth is, physical and psychological preparation will take you only so far.”

Sources

1. ‘The genetic basis of human athletic performance’ by Giuseppe Lippi, Emmanuel J Favalaro, and Gian Cesare Guidi from *The Journal of Applied Physiology*.
2. ‘Genomic predictors of maximal oxygen uptake response to standardized exercise training programs’ by Bouchard C, Sarzynski MA, Rice TK, Kraus WE, Church TS, Sung YJ, Rao DC, Rankinen T from *The Journal of Applied Physiology*.

Training not just talent equals success

Helen Carter, of PBSscience.com, writes: The idea of a ‘natural athlete’ is one we’re all familiar with, but despite the strength of the idea that some people are genetically better at some things, the ‘nature v nurture’ debate in the scientific community has found it difficult to untangle the controlling influences of talent. While studies on twins separated at birth show control of physical and even sociological characteristics to be by genes, whether they grow up the same is dependent on the environment. Twins born underweight may look very different 40 years on if one does a desk job while the other becomes a labourer.

Talent for sport may be no different. Geoff Colvin has looked at what it takes to become the very best in a chosen field in his book *Talent is Over-rated*. “There is in fact a path leading from the state of our own abilities to that of the greats,” suggests Colvin, before qualifying that: “the path is extremely long and demanding, and only a few will make it to its end.” We often refer to someone as ‘naturally talented’ or even ‘genetic freaks’ but the missing link between talent and greatness is practice.

The phrase ‘practice makes perfect’ is nothing new. It is estimated that 10,000 hours’ practice are needed for champion performance. According to Colvin, it is the time spent practising deliberately that is the crucial element. To summarise:

- The practice/training session must be designed specifically to improve your level of performance.
- The practice must be repeated a lot.
- Feedback on results should be continuously available.
- It is highly demanding mentally and physically and not much fun!

The amateur golfer visits the driving range and buys a bucket of balls,

drops one down on the mat, picks a flag that equates to the distance he knows he can match with the club he has in his hand, takes aim, bam: drops next ball on mat and repeat — a bucket of balls later, he walks off to the first tee feeling self-righteous. Contrast that with the pro: they decide the aspect of the game they want to focus on, eg the drive. They look to the flag furthest away, select their driver, place a ball down on a tee. They stand behind the ball, visualise the shape of the shot, line up, practice swing, take the strike, and they watch the ball land. Performance is assessed, and they address the issues needed based on the visual feedback.

TV winner: no one’s talented enough to take it this easy



Half and half: talent and training both play a role

DIFFERENT STROKES

Your muscular make-up will influence which types of activities you do well in. If fast-twitch muscle fibres predominate, explosive power sports are your best bet; slow-twitch types will be better at endurance sports

How can we look at deliberate practice (DP) in sports like cycling when performance is not hugely determined by skill? The correct mental approach is one important aspect of this. Take an example close to people’s hearts in the winter months — turbo-training. All kinds of strategies are used during turbo sessions — listening to music, watching films, reading books — and for endurance base building this is probably fine.

But is this DP? How specific is listening to music during sessions when this is against the rules in racing? Bottom line, without any sort of training, you’re not going to get fitter! But, when we consider research that details how the best performers ‘associate’ rather than ‘disassociate’ from bodily sensations, is it best to distract and entertain ourselves? Bodily signals are important, even in the form of fatigue or pain. We have a fundamental choice — ‘go through the motions’ in a training session OR practice with ‘deliberacy’.

Try to be the best you can be (...and what’s so bad about that?)

Some people are too terrified to accept that their genes determine their athletic potential. They prefer to perpetuate that you can make it to the top through hard work and perseverance alone. That’s just not true. The characters who win Olympic gold medals are those who combine near-ideal genetics and hard work. The rest of us make the most of the hand that nature has dealt us.

Why should it be upsetting to realise that you do not possess world-class sporting genes? Few people take up sport believing they are exceptionally gifted; the ones who are simply find out through taking part — ditto the ones who aren’t. By the time you’re fully grown, it’s usually fairly obvious: if your talent is not yet shining through, you’re unlikely to make it to the top. Whether that’s because of below-par genes or just because you didn’t work hard enough, who cares? The outcome is the same: you accept it and take up amateur sport, competing for the love of it, against yourself and people of similar ability.

In non-professional sport, competitors come in all shapes and sizes, from all backgrounds, with an extraordinarily wide array of personal advantages and disadvantages — social, financial, psychological,

biological, geographical, you name them. Having good genes is not the only way to get ahead, and there is far greater scope in sub-elite sport for capitalising on individual strengths — to win through wit and willpower. The key is to disregard the things you cannot change (your genes) and focus on the things you can (almost everything else). You cannot rewrite your genetic code but you can train harder and smarter, mix with inspirational figures, learn to think more positively, eat and drink sensibly, etc. That’s what sets us apart as humans: we’re not restrained by our nature; we’re able to subvert the natural order by making smart choices.

“A well-structured training programme and good nutrition, plus the right temperament and attitude, will see you excel beyond your nearest competitors time and time again,” says Nick Tiller. “At the highest level, genetics are an athlete’s greatest ally, but that doesn’t apply to the rest of us. If your goals come from within, such as setting personal bests and achieving individual targets, they will provide all the motivation you ever need. If you want to win coveted trophies and beat everyone else, then you’d better hope you are genetically blessed.”