

# The Latest Thinking

## The Great Performance Debate

Is it innate talent or hard work that makes athletes great?  
Or is it something else?

**T**here's an old adage in boxing that a good big man will always beat a good little man. In a sport that measures skill pound for pound, it is axiomatic that greater inherent attributes will always win out. In fact, the belief that true greatness in any sport is the province of the genetically gifted athlete has been accepted and even cherished for a long time — and modern science, some would say, has confirmed the notion.

Since the mapping of the human genome was completed, scientists have linked more than 200 genes to physical performance. Studies have identified fragments of DNA that appear to influence the power of one's grip, the strength of a ligament, the capacity of muscles to grow, the volume of one's aerobic capacity or the propagation of fast-twitch muscle fibers. As the study of performance genes progresses, however, the links between them and actual performance get murkier.

In 2008, Yannis Pitsiladis, a biologist at the University of Glasgow, de-

cidated to see how many of the 24 genes associated with sprinting or endurance were present in the genomes of nine men who had held the world record in either the 100-meter dash or the marathon. Surprisingly, he found that based on those genes, the record-holders were in the genetic mainstream. When he analyzed elite Kenyan distance runners, he found that three-quarters of them were from a single tribe that makes up only 10 percent of Kenya's population. At first take, that would seem to indicate a genetic advantage, but again it was not so. When Pitsiladis compared the runners to a group of randomly selected Kenyans, he found little genetic difference. What he found instead were significant behavioral and environmental differences: The athletes were far more likely to be living at altitude in the Rift Valley and much more likely as children to have run several miles to school and back. Pitsiladis' work, along with that of others, clearly suggested that elite sports performance may not

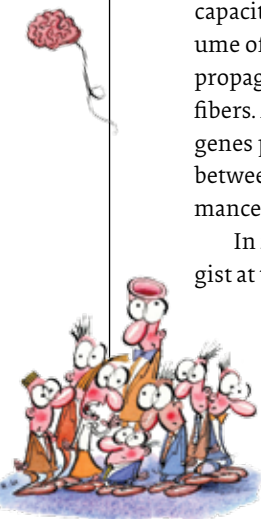
be based as much upon genetics as had been previously believed.

In recent years, a number of books and studies have aggressively questioned whether innate talent, as we commonly understand it, even exists. Malcolm Gladwell's book, "Outliers," drew the most attention. In it, he noted that a disproportionate number of elite Canadian hockey players were born in the first few months of the year. Gladwell explained that since youth hockey leagues determine eligibility by calendar year, those born in January and February are bigger and more mature than their cohorts and often misidentified as better athletes. "The kids born in those lucky months get a chance to work harder than their peers," said Gladwell. "They get three or four times as much ice time — and that's huge. The most important attribute is clearly work."

In his book, "Talent Is Overrated," Geoff Colvin similarly argued that talent is an ill-defined concept and there is little evidence that it has a

### THE TRUTH ABOUT GROUPS

When you feel your brain turning to mush in your next budget meeting, it might not be your imagination. It turns out small-group dynamics — such as jury deliberations, collective bargaining sessions, and cocktail parties — can alter the expression of IQ in some susceptible people. SOURCE: VIRGINIA TECH CARILION RESEARCH INSTITUTE





Patrick McDermott/Getty Images

cause-and-effect relationship to excellent performance. Daniel Coyle, author of “The Talent Code,” summarized the argument succinctly: “‘Natural talent’ is just code for ‘started earlier and practiced harder.’”

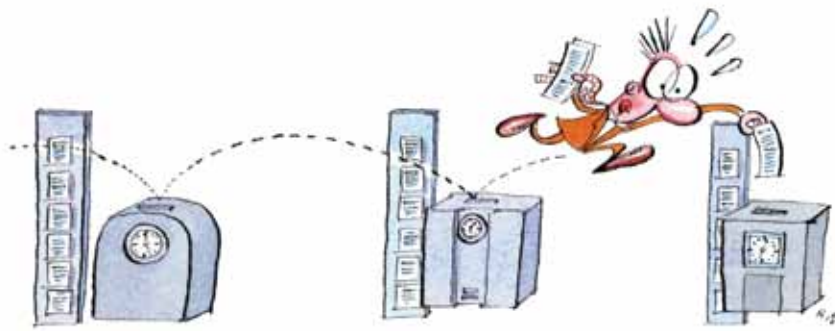
Gladwell, Colvin and Coyle all drew on the work of Anders Ericsson, a psychology professor at Florida State University whose work suggests that expert performance is rooted not in inherent attributes, but in acquired skills, knowledge and physiological adaptation to intense, deliberate practice. As Ericsson defines it, deliberate practice requires setting specific goals, focusing on

technique as much as outcome and engaging in endless, exacting repetition with continual feedback. Ericsson concluded that it takes 10,000 hours – roughly 10 years – of deliberate practice to become expert.

Mark Verstegen, CEO of Athletes’ Performance, a company that trains elite and professional athletes, agrees. His experience tells him that, beyond a physical baseline necessary to be a professional athlete, nurture always surpasses nature in its influence on performance – even for the most supremely gifted. However, current genetic research suggests that the line between nature and nurture is

less distinct than previously thought. Some athletic attributes once assumed to be entirely genetic may be underpinned by environmental factors, while others that appear to be entirely the product of hard work and willpower may have important genetic components.

Over the past two decades, for example, Heritage Family Study data have shown that a good deal of a person’s potential for improvement with training is genetically inherited, regardless of how hard they work. Other researchers have found that even the motivation to work is linked to genes that regulate dopamine, a



## SAY WHAT?

**Hustler (n.)** A person holding down several part-time, temporary jobs. Data suggests as many as 20% of Americans are underemployed or juggling multiple jobs. SOURCE: CNN

brain chemical involved in sensations of pleasure and reward. So, not only is physical potential to a great degree genetically determined, but so it seems is the capacity and propensity to improve with work.

Conversely, scientists in the growing field of epigenetics are learning that behavior and environment can affect genes — and in surprisingly short time frames. Cellular material that sits on top of the genome can govern the degree to which the gene exerts its influence. In prenatal development, these “epigenetic marks” are what determine the destiny of a given cell, whether it will become part of an eye, a taste bud or a toenail. But it has now been discovered that environmental factors such as social interaction, physical activity, diet and other inputs continue to trigger changes in the epigenome throughout life, allowing cells to respond dynamically.

“Genes do not act in a vacuum,” noted Bernd Heinrich, a biologist and national-class runner. “Genes are very plastic. They can be turned on or off. Look at a caterpillar and a butterfly. They’ve got the same genes. One flies, and one can barely crawl.”

Epigenetic changes are not evolution; they don’t alter DNA. But their governing tendencies can nevertheless be passed on. Some researchers are now considering the possibility that the physical and mental stressors introduced by so-called deliberate practice can initiate epigenetic changes that can “create” elite performance — perhaps even within a single lifetime. “How does the body respond to various training effects? The possibilities are seemingly endless,” said Steve Magness, a coach and scientific adviser for the Nike Oregon Project.

Studies currently under way should help clarify the link between epigenetics and sports prowess, but they will probably do little to illuminate the elusive nature of talent. Even the most ardent devotees of the “10,000-hour rule” concede there is a wide gulf between extreme proficiency and greatness. Greatness requires creativity, imagination, the willingness to take risks and the intuition to know when and how to do so. All the motivation and hard work in the world cannot create these attributes, but it can reveal them and hone them to a diamond-hard edge.

## Sports in

**E**arly in the 2011 film “Moneyball,” Peter Brand, a baseball neophyte with an economics degree from Yale, shakily offers Oakland Athletics general manager Billy Beane his iconoclastic view of how the team should be run. “Your goal shouldn’t be to buy players; your goal should be to buy wins. And in order to buy wins, you need to buy runs. Baseball thinking is medieval. They are asking all the wrong questions. Using the stats the way we read them, we’ll find value in players that no one else can see.”

The movie was based on Michael Lewis’s best-selling 2003 book of the same name, which told the true story of how Beane used smart and novel statistical analysis to gain unique competitive advantage with a payroll that was a fraction of his rivals’. Although Lewis’s book was groundbreaking, the phenomenon it chronicled seems quaint compared to the game-changing level of analysis being done today by nearly every team in every sport.

Not long ago, the proponents of sports analytics were considered less than credible by traditionalists who grew up making judgments on the basis of personal experience and instinct. But that has changed rapidly. At this year’s sixth annual MIT Sloan School of Management’s Sports Analytics Conference, 73 professional teams and 175 colleges were represented, all seeking insight from the best analytical minds about innovations, new re-