

Right Now

The expanding Harvard universe

BORN TO RUN

Theory of the “Marathon Man”

YOU'RE WATCHING the Boston Marathon, awestruck, as always, by the runners' strength, endurance, and determination. Mile after mile, the elite runners at the front calmly keep up a pace most of us couldn't maintain for a single lap around the track. Farther back, competitive though not quite world-class runners cruise the streets at more-than-respectable speeds. Pulling up the rear, back-of-the-packers come grunting and groaning, huffing and puffing, yet still covering each step of the 26.2-mile course. As you watch, one thought keeps noodling around in the back of your brain: human beings were never meant to run this far.

You might have to re-think that one. “There's good evidence to show that somewhere between 2 million and 2.5 million years ago, a suite of adaptations specific to running long distances did occur,”

says professor of anthropology Daniel Lieberman, who, together with Dennis Bramble of the University of Utah, is re-researching the idea that evolution has indeed left us well suited for the annual Hopkinton-to-Boston run.

This period marks the beginning of the genus *Homo*. The earlier line of hominids, the australopithecines, were bipedal, but in a much different way. Their short, blunt legs, wide hips, and curved toes left them better suited to climbing trees than lining up for a 10-kilometer race. With the advent of *Homo*, however, the adaptations began. The evidence in the fossil record suggests to Lieberman and Bramble that *Homo* evolved to go the distance. Consider the lower body. Legs increased in length, allowing longer strides, and became more tapered,

enabling them to swing more efficiently, like pendulums. Pelvises narrowed, decreasing the lateral sway of the body's center of gravity while moving forward. Long, thin Achilles tendons developed at the back of the heel—storing energy, then using it to spring off the ground. The plantar arch evolved: the mid-tarsal joint locks the foot on impact and then acts as a spring on the next step. According to Lieberman, each of these adaptations provided little in the way of energy savings when walking or even sprinting. It's only in distance running that their cumulative effects would have added up. In addition, the size of the hip, knee, and



Illustration by David Regan

ankle joints all increased, reducing the strain running placed on them by distributing the stress over larger surface areas.

At the other end of the body, the skull's shape also changed, causing its center of gravity to move back, balancing the head on the neck and allowing it to be held steady easily. The nuchal ligament, which also assists in holding the head still, developed in the back of the neck. An external nose developed, providing a chamber in which dry air could be humidified by mucous membranes, helping to stave off dehydration during

long bouts of exertion. Again, none of these adaptations seem beneficial while walking or sprinting.

Imagine the advantages such adaptations might have provided early hominids: the ability to cover long distances in search of food, or to hunt and wear down otherwise swifter animals. It's easy to imagine our ancestors staring out at a flock of vultures circling in the distance, knowing that there was food on the ground and that the strongest runners, human or animal, would reach it first.

SOAR LIKE SOROS

Stars, Bulls, and Bears

PICTURE AN INVESTOR trying to decide which mutual fund will make the most of her retirement savings. As she reads prospectuses, the fine print and pie charts begin to blur before her eyes and all funds start to sound the same. She might choose based on reputation or past performance—although, as every prospectus warns, “past performance is no guarantee of future results.” Furthermore, track records say little about start-up funds that could be winners. To buy one of these unproven funds is, in essence, gambling.

For evaluating funds that are relatively new, “the existing methods are basically useless,” says assistant professor of business administration Randolph Cohen. That's important because, according to the financial data firm Lipper Inc., 55 percent of all diversified and sector equity funds in the United States are five years old or younger.

The standard methods for rating mutual funds by their performance records date from the 1960s, and have had only minor modifications since then. Now, Cohen and Joshua Coval, associate professor of business administration, along with Ľuboř Pástor of the University of Chicago, have developed an algorithm that compares the decisions a fund manager makes with decisions made by all other managers, including those with proven

track records. Their formula shows that if a fund holds the same stocks as other funds with a history of doing well, it is in good company and is likely to perform well itself.

Because even new funds normally hold dozens of stocks, creating an abundance of data points, the researchers say their method allows a degree of statistical confidence four to eight times higher than a traditional results-based analysis, depending on how the traditional approach adjusts its performance measures for risk.

It's still too early to say if the Marathon Man hypothesis will attract support. “Up until now, all of the focus and research has been on understanding bipedalism and walking,” says Lieberman. “And once people start working on something, they tend to just keep doing it. But there really isn't any animosity to this idea in the scientific community. It just hasn't been thought about a great deal yet.”

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Coval compares the method to a game of blackjack. After just a few hands, it's impossible to tell which of two players is more skilled, because neither has won much money yet. But suppose there is a third player at the table who has been playing for a while and has amassed a huge stack of chips. We can compare the strategies of the first two players to the one used by the big winner. The more skilled player is probably the one whose strategy most resembles that of the man who has beaten the house so far.

To some degree, this all seems obvious. Why wouldn't any blackjack player try to copy a winner? Why wouldn't a fund manager buy the same stocks held by a fund that usually gets good returns? In

