For Aging Runners, a Formula Makes Time Stand Still

By DAVID LEONHARDT

For hundreds of runners, the New York Marathon on Sunday will bring the same dispiriting experience. Setting out to beat a personal best established when their legs were years younger, they will fall short and become convinced that they simply did not run a good enough race.

Dr. Ray C. Fair knows the agony, and he has a soothing explanation.

Dr. Fair is a professor of economics at Yale best known for devising a mostly accurate formula to predict winners of presidential elections. He is also the finisher of 17 marathons and counting, and he has turned his social scientist's eye to a question that many a serious runner has considered: how can you keep racing against yourself long after you can no longer catch yourself?

His answer comes in the form of the most enjoyable research paper he has written, he said, and a chapter in his recent book, "Predicting Presidential Elections and Other Things" (Stanford University Press, 2002). Studying world records for runners all the way up to 92 years old, Dr. Fair has developed tables that try to track the body's physical deterioration and set an ever-moving target.

If a 56-year-old finishes the race on Sunday in four hours, 10 years after having run it in 3 hours 45 minutes, for instance, she can know that she is aging no more quickly than the world's fleetest runners.

"I'm right now at the age where things are getting worse in a bigger way," said Dr. Fair, 61, using colloquial language to describe the increase in second derivatives on his chart. "But there's always something to shoot for. It keeps you young, psychologically, even when you're not up there in the front anymore."

Having been published in The Review of Economics and Statistics, Dr. Fair's work has an academic credibility rare in matters of sport. But his tables are also part of a growing effort to help runners track their times over a lifetime.

In 2001, the New York Road Runners Club began posting on its Web site (www.nyrrc.org) "age graded" times that it calculates for all racers. Finishers in the marathon on Sunday will be able to look up the equivalent of their time for somebody at the peak running ages of the 20's and 30's. A five-hour finish, after all, is much

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more impressive for a 70-year-old than for a
30-year-old.

The New York Marathon's adjustments
come from World Masters Athletics, the
governing body for many adult track meets.
The group made an early effort at adjusting
times when it published a set of tables in the
late 1980's. It plans to release a second
revised version of the tables in the next year, said
Norman M. Green Jr., chairman of the Masts-
ers Long Distance Running Committee of
USA Track & Field.

The new tables will include adjustments
for women that are based on their times,
rather than on men's, as is the case with the
current tables.

Dr. Fair became interested in the topic
in the 1980's, when he realized that the
national circuit of masters races, open to
men older than 40 and women older than 35
and divided into age divisions, had created
enough data for him to perform the calcu-
lations. He studied the tables published by the
masters group and decided to approach the
problem with the same rigorous technique,
known as regression analysis, that is at the
heart of much economic research, he said.

A few years earlier, in 1987, he broke
two hours in a marathon for the first time,
2:55:45 in Philadelphia, and he wanted to
know his chances of doing so again.

"I was combining my statistical knowl-
dge with the fact that I was getting older
and running slower," Dr. Fair said.

The answer, he found, was that he had a
surprisingly good chance to do so. The mas-
ters records showed that the world's best
runners lost just a minute or so a year in
their 40's.

Two years after Philadelphia, however, he
strayed slightly from his predicted path,
finishing the New York Marathon in 3:01:45,
and he has remained off the pace since then.

"After I finish a race," he said, "all my
friends ask me, 'Are you on your regression
line?' And I'm not quite on my regression
line."

But he said he thought that the reason
might have more to do with his weaknesses
as a runner, as well as a chronic thigh
injury, than his weaknesses as an economist.
Other athletes who have used the tables
have been able to keep up with their predic-
tions.

John Pistel, a fund-raiser for Amherst
College, had not competed in the long-jump
in more than 30 years when he decided to
take up the sport again in 2000. As an
undergraduate at the college in the late
1980's, Mr. Pistel set the school record,
which still stands, of about 24 feet.

An Amherst economist who knows Dr.
Fair gave Mr. Pistel a version of the tables
for the event. His best effort as a 52-year-old
was seven feet shy of his Amherst record
but almost precisely what Dr. Fair's table
for the event predicted.

"The reasons the body slows down are as
numerous as they are obvious. The heart
can no longer pump blood at the same rate,
and the lungs cannot put oxygen into blood at
the same pace," noted Dr. Edward G. La-
katta, chief of the Laboratory of Cardiovas-
cular Science at the National Institute on
Aging. Tissues cannot extract oxygen from
blood as efficiently, and cells are not as good
at using oxygen after they receive it. Bones
and joints deteriorate as well, Dr. Lakatta
said.

For marathoners, the process often be-
gins to affect results shortly after 30. It
continues at a steady pace through the 50's,
and accelerates after that.

"There is a point," Dr. Green said,
"when there is a sudden decline."

Dr. Fair found it to be the age of 60,
which is roughly consistent with a long line
of medical research. From 60 to 70, mar-

An accurate measure of
fitness: moving the bar to
take age into account.

runners lose almost as much time as they
did in the 25 years from 35 to 60. Middle-
distance runners deteriorate faster at first,
but they do not slow down as much as
runners in their 60's and 70's, he said.

Underlying all the research, of course,
is an assumption that ordinary people — or
at least ordinary marathon runners — age
at the same rate as elite athletes.

If that is not the case, Dr. Fair's tables
and the masters tables would be setting the
bar at the wrong place for most people.

Scientists have yet to agree on an
answer, however.

"This is something people have argued
a lot about over the years," said Dr. Roy J.
Shepard, an emeritus professor of applied
physiology at the University of Toronto who
has written widely on aging and exercise.
"My own view is that very top people do age
a little less rapidly."

Those athletes, Dr. Shepard said, are
more likely to keep themselves in peak
physical condition and less likely to become
injured performing a given activity.

Dr. Lakatta at the National Institute on
Aging comes from the opposite camp. The
gap between cardiovascular systems of top
athletes and other people in their 20's is
greater than the gap when the two groups
reach their 60's, he said.

Either way, though, the age-adjusted
tables offer a simple test for athletes who
would otherwise have little way to compare
their results over decades: are they keeping
up with the very best performers in their
event?

For Dr. Fair, the standard has switched,
from 3 hours to 3 hours 20 minutes, accord-
ing to his tables. He will have his next crack
at it on Nov. 23, at the Philadelphia Marath-
on.
Running the Numbers

These tables, developed by the economist Dr. Ray C. Fair, allow runners to continue racing against themselves even as they age and slow down. Using the fastest marathon times ever run by people of a given age, Mr. Fair calculated an "age factor" for every age after 35, which is the last time many people are able to set a personal best.

If a 50-year-old woman ran a marathon in 4 hours when she was 35, she multiplies:

4 HOURS \times 1.098 = 4.392 HOURS

To convert to minutes: \(392 \times 60 = 23.52\).
So her goal is \(4:23:30\).

If she beats that time at age 50, she is actually running a better race than she did 15 years earlier.

Because the body appears to slow down at a different pace for shorter distances, Mr. Fair created a separate table for the middle distances, those from 400 to 10,000 meters.

Runners cross the Verrazano-Narrows Bridge at the start of the New York Marathon.