

SCIENCE

When It Comes to Success, Age Really Is Just a Number

By BENEDICT CAREY NOV. 3, 2016

The question hangs over the career of every ambitious soul: Is there still time to make a mark?

Charles Darwin was 29 when he came up with his theory of natural selection. Einstein had his annus mirabilis at age 26; Marie Curie made big discoveries about radiation in her late 20s. Mozart's Symphony No. 1 in E flat: 8 years old.

For years, scientists who study achievement have noted that in many fields the most electrifying work comes earlier in life rather than later. After all, younger people can devote their life to a project in a way that more senior people cannot, and young stars attract support, mentors and prestigious appointments.

Now, a big-data analysis of scientific careers appearing in the journal *Science* finds a host of factors that have nothing to do with age or early stardom. It is, they suggest, a combination of personality, persistence and pure luck, as well as intelligence, that leads to high-impact success — at any age.

“The bottom line is: Brother, never give up. When you give up, that’s when your creativity ends,” said Albert-Laszlo Barabasi, who with Roberta Sinatra led a team of researchers who conducted the analysis. Both were physicists at Northeastern University in Boston. Dr. Sinatra has since moved to Central European University in Budapest.

Previous work had found that a similar combination of elements lay behind the

success of very top performers in a variety of fields. The new study illustrates that the same forces are at play at all levels of a discipline: the student, the young professional, the midcareer striver and beyond, to those old enough to wonder if their hand is played out.

“It’s very impressive, what they’ve done, the size of the sample,” said Dean Simonton, a distinguished professor emeritus at the University of California, Davis, who did not contribute to the study. “I have looked at the upper end of achievement; they have gone bottom-up, and found similar results” applying to an entire profession, he said. The same relationships, Dr. Simonton said, emerge in a broad variety of work, including music composition, film, psychology and technical invention.

The research team began by focusing on career physicists. It ransacked the literature going back to 1893, identifying 2,856 physicists with careers of 20 years or more who published at least one paper every five years — widely cited findings rated as “impact” papers — and the team analyzed when in a career those emerged.

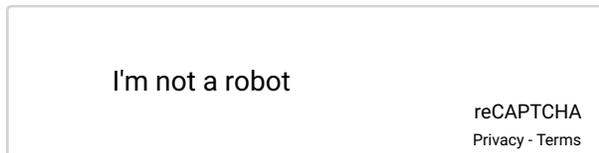
Sure enough, the physicists were more likely to produce hits earlier rather than later. But this had nothing to do with their age, the analysis found.

It was entirely because of productivity: Young scientists tried more experiments, increasingly the likelihood they would stumble on something good. “It’s not the age or order of the papers that matters,” said Dr. Barabasi, who wrote the study with Dashun Wang, Pierre Deville and Chaoming Song, as well as Dr. Sinatra. All have appointments at Northeastern.

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That is to say: keeping productivity equal, the scientists were as likely to score a hit at age 50 as at age 25. The distribution was random; choosing the right project to pursue at the right time was a matter of luck.

Yet turning that fortuitous choice into an influential, widely recognized contribution depended on another element, one the researchers called Q.

Q could be translated loosely as “skill,” and most likely includes a broad variety of factors, such as I.Q., drive, motivation, openness to new ideas and an ability to work well with others. Or, simply, an ability to make the most of the work at hand: to find some relevance in a humdrum experiment, and to make an elegant idea glow.

“This Q factor is so interesting because it potentially includes abilities people have but may not recognize as central,” said Zach Hambrick, a professor of psychology at Michigan State University. “Clear writing, for instance. Take the field of mathematical psychology. You may publish an interesting finding, but if the paper is unreadable, as so many are, you can’t have wide impact because no one understands what you’re talking about.”

The startling thing about this Q property, the researchers said, is that it remains constant over time. Contrary to common assumption, experience does not significantly raise a person’s ability to make the most out of a given project. “It’s shocking to think about,” Dr. Barabasi said. “We found that these three factors — Q, productivity and luck — are independent of each other.”

The researchers gathered career data from other scientific fields and found that the same relationships held up.

Pulling these results together, the study concluded that hit papers were a product of Q, the person’s particular strengths, and luck: that is, finding an important project that flares to life in the furnace of precisely those abilities. A match

of scientist to experiment or, more broadly, of writer to subject, musician to composition, of the dancer to the dance.

So it is that highly productive people may never hit the charts, and high Qs may spend a career feeling thwarted. “The composition of this Q quality, whatever you call it, is likely to vary in different fields,” Dr. Simonton said. “That’s why you can see people who are highly successful in one field switch careers and not do so well.”

One important factor often does increase with age, in many endeavors: status, and with it the freedom to take risks, said Frank Sulloway, a psychologist at the University of California, Berkeley.

“Jean-Baptiste Lamarck was 57 when he first published on the subject of evolution in 1801, and he was 66 when he finally published his great book ‘Philosophie Zoologique’ in support of the theory of evolution,” Dr. Sulloway said in an email. “This example seems to fit with my argument that one needs to take into account the social context of a given theory as well, as controversial theories tend to be published when scientists are older and have more intellectual ammunition and reputational status to back them up.”

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