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Here's More Bad News About Death

February 9, 2012, 2:37 pm

By Tom Bartlett



The older you get, the more likely you are to die. You probably knew that. What you may not know is that the mathematics of mortality were calculated in 1825 by a self-taught British actuary named [Benjamin Gompertz](#), who found that your odds of dying double every eight years. This grim fact now carries his name (the Gompertz Law) and is used by researchers who study aging and by insurance companies when they're figuring out if you're a good bet.

In 1939 a study led by Major Greenwood, a [well-known statistician and epidemiologist](#), noted a small but intriguing exception to the Gompertz Law. When we get very old—say, past 85—our odds of dying stop increasing at the same exponential rate. It's not that the odds go down; it's still better, death-wise, to be 21 than 91. But once you reach a later stage of life, the rate plateaus, an effect known as mortality deceleration, which makes it sound as if we've been speeding toward oblivion our entire lives and then, toward the end, we ease our foot off the gas pedal.

Mortality deceleration is a concept you'll find mentioned throughout the research literature, in textbooks, on Wikipedia. Along with the actuarial evidence, there is support in the animal kingdom as well: Mortality deceleration [has been observed](#) in yeast, nematodes, and fruit flies. Multiple theories exist to explain mortality deceleration in people. A biological mechanism might be at work, or maybe the most senior senior citizens aren't taking as many risks as the less aged. Centenarians don't do a lot of [kiteboarding](#).

A new paper, though, finds that mortality deceleration for human beings is a myth. The husband-and-wife team of [Leonid Gavrilov](#) and [Natalia Gavrilova](#), at the University of Chicago's [Center on Aging](#), have re-crunched the numbers, examined the assumptions, and found that it's not the case. The mistake was likely to have been caused by mixing sets of disparate data (combining, say, groups of people with different mortality rates) along with the tendency to exaggerate the ages of really old people. They relied on only documented ages of deceased people, using the Social Security Administration's Death Master File, a resource that lists longevity information for nearly everyone who has passed away since 1980, and is housed, I imagine, in an enormous crypt flanked by gargoyles.

Once they filtered out the less-reliable statistics, mortality deceleration went away or became negligible. In short, the Gompertz Law still applies. Death isn't tarrying. Instead it's coming ever more rapidly.

Unless you're a nematode.

(The paper, "Mortality Measurement at Advanced Ages: A Study of the Social Security Administration Death Master File," was published in the *North American Actuarial Journal* and can be found [here](#). Here's the [author's blog](#) with an interesting Q&A about the study. Here's a [great post](#) on the Gompertz Law. The image of the grim reaper comes from [this Web site](#), which will teach you how to draw it if you're looking to waste time before your certain demise.)

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profdrsoandso 1 month ago

Death, where is thy sting?
Owww.. oh, right. There it is.

9 people liked this. [Like](#)



victorl 1 month ago

"Unless you're a nematode"
... or *Turritopsis nutricula*. (see CHE May 2, 2010 [article by Nina Ayoub](#))

[Like](#)



11272784 1 month ago

The Nematodes...wasn't that a psychedelic band around 1969?

6 people liked this. [Like](#)



Valentino Martinez 1 month ago

When you get past 60 years of age, as I have, the drama of the coming end seems to find its way to the heart of the matter--that that remote thought that the end of me is really quite near.
Not only is it a sobering thought it is a motivating thought that what always mattered to me matters even more now.

16 people liked this. [Like](#)



Socratease2 1 month ago

That idea of "death deacceleration" may have been an unchallenged mathematical/statistical finding for a while but seems that a 5 year old could have told you that sounds wrong. It takes really smart people to act that confused.

2 people liked this. [Like](#)



darccity 1 month ago

Solutions:

1. Cryogenic freezing (worked for Woody Allen)
- 2a. Suspended animation during space flight, like they do in all the movies (caution: don't wait we must to abandon Earth following global climate change or nuclear war -- spaceships will be full).
- 2b. Space travel near speed of light so we age much less rapidly (like Charlton Heston in Planet of the Apes). Or use an infinite probability machine to visit the restaurant at the end of the universe
3. Do a Logan's Run to the surface if your hand ever starts glowing (avoid ray gun fire though)
4. Transfer your consciousness to a robot or computer to become immortal (Star Trek episodes)
5. Reincarnate, coming back in a more favorable time and existence if karma is favorable
6. Have slaves build a pyramid with a secret chamber
- 7a. Switch to a religion with the true deity and follow its dictate so you can spend eternity in heaven
- 7b. Switch to a religion whose messiah is due during your lifetime (consult actuarial tables, scriptures, and prophets or alternatively use introspection to realize that a messiah is sure to come during your lifetime). Then follow step in 7a above and follow the shining path to the rapture
8. Build a time machine and travel far enough into the future to when they have cures for aging
9. Late in life, move to Sweden, learn language, master the game of chess, and get cast in a movie (not involving dragon tattoos). Then play Death for your life. Tip: be wary of the Nabbakov Gambit and don't let the Grim Reaper distract you with discussion of existential philosophy.
10. Determine if you are already immortal. Wrong way to test: stab yourself in heart and see if you die. Right way to test: notice that you've never died before, so you could be immortal. Continue testing each year. Empirically, you notice that test on yourself never observes a dead response. Not so for your scientific control group: other people your age. Notice the control group dying off and at an increasing rate but you never do (don't ever believe doctors who say you are dying -- they don't realize you are immortal). Of course the Social Security data is flawed because we know from Twilight Zone (also retold in Star Trek and Highlander) that immortals simply change the IDs and relocate whenever their current spouses age too much.

28 people liked this.



Guest 1 month ago

I'm just now reading *The Last Mortal Generation: How Science Will Alter Our Lives in the 21st Century*, first published in 1999 by the Australian polymath Damien Broderick. His account hooked me with the notion that senescence may not be inevitable, but "a sentence botched by a DNA spelling mistake."

There's a lot to be said for the notion that, as a species, we've only begun to mature psychologically and intellectually about the same time the grim reaper comes knocking on our door.

2 people liked this.



EllenHunt 1 month ago in reply to Guest

It's true, what you said. But having some background in the area, I think that Damien is blowing smoke. Or DNA program unfolding is a one-way program that was never intended to do anything but run out. Getting immortality, or even very long life (500 - 1000 years) out of it will be very difficult.

We know how to make cells immortal, that's easy. It's called cancer. Keeping the whole organism alive for far too long is a very different trick requiring a lot of cell death.

3 people liked this.



Guest 1 month ago in reply to EllenHunt

EH: >a one-way program that was never intended to do anything but run out.>>

Intended by whom?

I don't speak for him, but Broderick can blow smoke with the best of them, for sure. The first sentence of his now 13-year-old text is a quote (epigraph) by Roger Gosden: "No one but a crank would say that a cure for aging is just around the corner." And elsewhere:

"scepticism is understandably more prevalent than optimism." He goes on, discussing S. Jay Olshansky at U of Chicago, to say: "Olshansky argues that so many of us now live far beyond our reproductive years because the rugged engineering built by evolution into the species is bolstered, but only up to a point, by technology's protective environments. We are like race cars: not _designed_ to fail, just not fashioned for extended operation."

My own academic background is in rhetoric (a discipline with no content), but I have an insatiable appetite for popularizations of contemporary science. Why do non-cancerous entities live such various "normal" life spans: from a summer's day to three years, to 20, to 120, to those ancient turtles Galapagos around their island?

We often hear the statement that human DNA is, like, 98% the same as that of chimps, but I want to know how similar we are to Mayflies and turtles. If I could rewind my own bio-program, I would start my professional life over as a specialist in common knowledge.

Like



EllenHunt 1 month ago

Ahem. Mathematical purist chirping in here. The statement "The older you get, the more likely you are to die." is not correct. Your odds of dying are always 100%, no matter what age you are.

The older you get, the more likely you are to die in the coming year (or some other defined time span) is correctly stated. Yes, I know we mostly all understand the difference, but these things bug me. A "Monk" character trait, like my being bothered by those postmile markers on the road which are never at even multiples.

11 people liked this. Like

Type your comment here.



darccity 1 month ago in reply to EllenHunt

That's why it is called a mortality RATE! Or to mix rates with eventual outcome, "Nothing is certain but death and taxes." You are taxed each time interval or for each purchase or activity (though loopholes can exempt you). But since a huge proportion of people who've ever lived are currently alive, eventual death of all today (and as yet unborn) requires a world where "androids dream of robotic sheep" to posit (rewatch Blade Runner for the context).

Like



dank48 1 month ago in reply to darccity

Actually, as the error-message haiku (and I wish I knew the author) points out,

Three things are certain:
Death, taxes, and data loss.
Guess which has occurred.

And the seven billion or so of us now living are not a "huge proportion" of the hundred billion or so *Homo sapiens sapiens* who have lived. It's a popular but erroneous UL that most people who've lived are still alive.

I could be wrong, but I think the question is whether androids dream of electric sheep. And it seems to me that, while my interest in the play is as strong as ever, as various people I care for step from the stage, the production--however randomly written in reality--sometimes *seems* to have been written so that, when it comes time for my own exit from the scene, I just won't mind all that much.

Like



11182967 1 month ago

The usual explanation for mortality deceleration has been that beyond a certain age the major "non-aging" causes of death--combat, auto accidents, sudden heart attacks, and even many cancers have been "out-lived," and thus there is nothing much left to die from except "old age" (I've survived neurosurgery at age 21, a major wreck at 41, and prostate cancer at 56, eg). But a little thought suggests that it has been modern medicine rather than some natural process which enables more of us to live to that old age and, particularly, to linger, often horribly, once old age arrives.

Further, the proportion of persons who die at a particular old age must surely increase as people age beyond a certain point: ie, the odds of a person dying at age 105, given the relatively small number of such people, must surely be higher than the odds of a person dying at age 80. This too would seem to be in part a function of modern medicine. Even the most devoted practitioners and family members are unlikely to try to keep the 105-year-old alive, no matter how sound her underlying health, by using all available extraordinary measures. But even a healthy 80-year-old is likely to get a "healthy dose" of life-saving or life-extending medical assistance.

Actuarial analysis like the Gompertz Law describes, however accurately, an end result. The interesting stuff, however, is what leads to the results.

Like



Nicholas 1 month ago

Here's an idea: stop trying to prolong life in nematodes and start trying to do it for people!

2 people liked this.

Like



leonid_gavrilov 1 week ago

Greetings,

You can meet the authors of this study, listen their lecture, ask your own questions and participate in discussions this Tuesday, March 13, in Chicago.

<http://longevity-science.blogs...>

Shorter weblink:

<http://tinyurl.com/Longevity-L...>

What: Lecture by Gavrilov & Gavrilova "Mortality at Advanced Ages" (session A4) with subsequent Discussion

When: Tuesday, March 13, 2012, 1:45 p.m. - 3:00 p.m.

Where: Chicago, Illinois (Blue Cross and Blue Shield of Illinois, 300 East Randolph Street), room Train 3

Logistic details:

<http://www.chicagoactuarialass...>

and

<http://www.chicagoactuarialass...>

For those who are interested, the meeting will be followed by informal discussion, which will become increasingly informal by 5:15 p.m. (cocktail reception) and even more so later by 5:45 p.m. (dinner).

Hope to see you at this meeting!

If you can not come to Chicago at this time, and would like to have a similar event at your organization, feel free to contact the authors at:

gavrilov@longevity-science.org

1 person liked this.

Like

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