

Evolutionary biology — This old man — Economist.com

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Younger women plus older men leads to older women and more children

AFTER the nagging question of why we are here at all, the one about why we age and die comes a pretty close second. The former is still largely the province of philosophy. For the latter, though, biology has several explanations, all of which revolve around a trade-off between longevity and the ability to reproduce.

Since those who cannot breed are, evolutionarily speaking, dead already, natural selection does not usually design bodies that outlive their own fertility. But it does sometimes. And one of those sometimes applies to humans: for women, who usually cease to be fertile in their mid-40s, routinely live until their 70s or 80s.

Part of the explanation is that a woman has not truly finished her reproductive work until her last child has reached an age at which he can fend for himself. This might get the average woman in a contraceptive-free society as far as her early 60s. But after that, something else is clearly happening. And two papers unveiled this week suggest what it is. The first of these papers, published in the *Public Library of Science* by Shripad Tuljapurkar of Stanford University and his colleagues, shows it could be a consequence of the universal pattern by which older men marry younger women. The second, published in *Biology Letters* by Martin Fieder of the University of Vienna and Susanne Huber of the Veterinary Medicine University in the same city, shows that this universal pattern is, evolutionarily, the most successful one that people can adopt.

Tearing down the wall

The observation that women should hit a “wall of death” after the menopause renders them infertile was made by Bill Hamilton, a British evolutionary biologist, in 1966. Clearly they don’t. But Hamilton failed to understand why.

Hamilton’s approach was purely abstract. He reasoned that harmful mutations which have their effect before the menopause (or, in the more sophisticated version, before the last child has fled the nest) will be eliminated by natural selection. Those that have their effect afterwards will not. They will thus accumulate without being winnowed out and will eventually be present in overwhelmingly lethal numbers.

Since then, what is known as the grandmother hypothesis has become popular. This suggests that women’s encounter with the grim reaper is postponed because they can perform for their grandchildren services similar to those they performed for their children. This is plausible. Indeed, it is backed by data. But it may not be the only cause, and Dr Tuljapurkar has come up with a purely genetic explanation of a sort that would have been dear to Hamilton’s heart.

Unlike women, men do not have their fertility cut off suddenly. Viewed as a sex alone, then, they should not face a wall of death. Rather, they should face a “slope of death” that rises as their fertility falls. Except, of course, that it takes two to tango. A man partnered with an infertile woman is, infidelity aside, as evolutionarily irrelevant as if he were sterile himself. He, too, should therefore hit the wall.

But, and this is crucial, because men almost always marry women younger than themselves, such reproductive irrelevance comes to them later in life. Indeed, if they remarry they can postpone it almost indefinitely. That means harmful mutations whose effects appear in old age can still be eliminated. And since a gene passing down the generations spends half its time in women, they get the benefit of this elimination as well. Hence no wall of death for either sex.

The question remains, though, why in human couples the man is almost always older. The usual explanation goes something like this: men prefer women who are young and therefore maximally fertile, whereas women prefer men who have proved themselves to be genetically fit (by surviving) and to be “good providers” (by accumulating status and material possessions). Both of those things take time.

That explanation might be true. But wherever the truth lies, the consequence should be an increase in fecundity that is related to the age gap. And Dr Fieder and Dr Huber found that there is.

They did so by studying the records of 11,000 adult Swedes. They compared the number of children an individual had with the difference in age between him and his partner, or her and hers.

Among those who had stayed with one partner during their reproductive lives, they found that the peak number of children was born to women with partners four years older than themselves. The most fecund men were those with partners six years younger. Clearly, in evolutionary terms, the age difference really is good for both sides. Toyboys, apparently, just do not deliver the goods.