

Beware survivorship bias in scientific careers advice

If you want fair careers advice, talk to those who left as well as those who stayed.

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A major flaw in much scientific and academic career advice is survivorship bias: a common logical error where we draw conclusions based upon those who have 'survived' a process because of their greater visibility than those who did not. Those who remain get to stay on their chosen career path and are there to advise the next generation of researchers on how to stay within their field.

As two postdoctoral researchers in ecology (DHB, DR) and a lecturer in learning and teaching (EK), we have seen many examples of worthy but "unsuccessful" colleagues who were forced to leave their research field against their wishes. On the flipside, we have also experienced many chance or unfair events that led to our own positions within the fields we work in.

Some of our success in academia came from hard work, grit and good judgement. But much of it came from decisions, luck and circumstances which never make it into careers advice. For example, DR has found job opportunities opened for her and friends through having drinks with senior scientists, and was invited to publish her first book '[Does It Fart?](#)' thanks to a completely unplanned [Twitter hashtag](#) (<https://www.theverge.com/2018/3/31/17181432/does-it-fart-animal-flatulence-book-science>). Chance experiences such as these are impossible to replicate, yet are key to many people's ability to stay in their chosen career.

At the same time, EK had to leave her original field of English Literature as she could not afford to stay in the insecure, low-paid teaching roles available. It is therefore important not only to know why some 'succeeded', but what pushed many more away. Assuming that all aspiring scientists and academics have similar circumstances to those who have 'survived' can only damage the prospects of the next generation, and leads to professions with far less diverse, representative staff than could have been the case.

Over the years numerous senior researchers have assumed we would be able to go without pay for an extended period of time during our research, including while living in one of the most expensive cities in the world. Sometimes we've had to argue our case and explain why we couldn't afford this; sometimes we've simply had to find different jobs. The ability to work without pay means the person taking it on has many advantages – financial security, boundless energy, a lack of caring responsibilities and of course no disabilities - which makes sense, because those giving advice to do so are also likely to have such privilege.

Another key area where survivorship bias impacts career advice is work-life balance. Those who got where they are by working long hours for little pay obviously had the ability to do so - and then they frequently advise others to do the same. After all, they did it, and on the face of it, they were successful as a result. However, simply working the longest hours can be a harmful strategy for some.

As the coronavirus pandemic has blurred the boundaries between ‘work’ and ‘life’ this issue has become even more prominent¹, yet those who are able to work long hours are typically a privileged minority – they don’t have disabilities that render them unable to work for long periods of time, they don’t have to leave the lab early to collect their children, and they don’t have to work a second job in the evenings to pay their rent.

While many circumstances in life may still be difficult or unfair, possessing the ability to devote so many hours to their career, sometimes without pay, represents an advantage that many others lack. In this way, survivorship bias in career advice becomes self-perpetuating. Those who survived because of privilege assume that those following them are in similar financial and social situations; and so those without that privilege are less likely to ‘survive’ and make it into a position from which they might be able to give less biased advice.

The closest many come to encouraging work-life balance is the common advice to ‘take a break’: perhaps between contracts, over holiday periods, or even simply avoiding work on the weekends. Survivorship bias plays out here as well, as this advice assumes recipients can afford to take time off against a pressure to publish or to stay above water financially. DR took a six-month break between handing in her PhD and beginning her postdoc but was only able to do so due to being in the privileged financial position of having savings, which came from publishing that book about farts - something that is not exactly easy to replicate for most PhD students.

While survivorship bias makes intuitive sense to most academics, it is rarely considered in the career advice we give. Papers even look at career outcomes of current scientists and conclude career setbacks are beneficial, without acknowledging that those exact career setbacks lead many others to leave the field altogether². Others will encounter barriers and setbacks beyond anything we have experienced, for example active discrimination, harassment³ or severe financial distress, with many leaving their fields as a result. It is important to understand where the advice that our communities pass on comes from, and that none of us are truly representative of all aspiring scientists. Every scientist has their own barriers to overcome, but we must beware extrapolating that because something was not an issue for us, that it is therefore not seriously problematic for those around us.

During this pandemic and its aftermath, relying on our past experience is more dangerous than ever: especially due to the documented ethnic, class and gender-based disparities of COVID in our communities⁴⁻⁶.

Those of us who are senior enough to be giving advice and setting expectations can enhance the quality and inclusivity of our working environments by speaking to our students and colleagues about the barriers they face to understand the factors that may be excluding people from progression. Those around you are almost certainly enduring different hardships and circumstances than you: make time in mentoring conversations to ask what ways forward would work for them rather than just recommending your own path. The fact that you overcame a barrier does not prevent it from unfairly excluding many others.

Seeking further mentorship for students that are from similar backgrounds and who faced similar barriers in their career can be particularly helpful in this regard. Frank but sensitive

conversations around these issues may feel awkward, but in helping us better understand how to support one another, may be key to reducing inequities in scientific careers.

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