What it takes

Not long ago, Science Careers posted a widget—you can find it at http://scim.ag/1pw1aAF—that lets early-career scientists calculate the probability that they’ll someday become principal investigators (PIs), on the basis of a few standard publication metrics. The widget builds on work published 2 June in Current Biology (http://bit.ly/TAZQA8) in which the study’s three authors—all early-career computational biologists—used PubMed data to study the influence of some 200 factors on academic scientists’ career trajectories. Built by John Bohannon, a contributing writer for Science Careers, and David van Dijk of the Weizmann Institute of Science in Israel (the lead author of the Current Biology study), our widget employed a simplified model based on the same data set.

The Science Careers widget is less accurate than the full-bore model, but it has the virtue of focusing attention on a handful of the most important parameters. Just enter values for a few mostly familiar metrics, and the widget displays a graph of PI probability—the probability of eventually occupying the last-author position on a peer-reviewed article—versus the parameter of your choosing. That makes it useful for savvy early-career scientists planning their ascents to independence. If they use it that way, they’ll learn the following lessons:

1. Be male. The widget’s probability plot displays two lines: red for women and blue for men. The blue line is above the red line across the whole range of probabilities, no matter what variable you display on the ordinate. In the scenario I ran, a woman needed two extra first-author publications or seven extra middle-author publications to reach the same probability of becoming a PI as a man with an otherwise identical record.

2. Be selfish. Do you value collaboration? Too bad: In my testing, an extra first-author publication increased the odds of becoming a PI by 17%; it would take eight middle-author publications to get a comparable boost. So, think twice before giving away that prized first-author slot.

3. Be elite. According to our widget, the institution you train at doesn’t matter much—unless you’re at one of the top 10 universities in the Academic Ranking of World Universities. Then, it matters a lot. In one scenario, moving from the number one institution (Harvard University) to the number two institution (Stanford University) decreased the chance of becoming a PI significantly more than moving from the 10th institution in the ranking (the University of Oxford) to the 100th (the University of Freiburg).

4. Publish in journals with high impact factors. If you’ve signed the San Francisco Declaration on Research Assessment (http://am.ascb.org/dora/), or you just don’t think a metric designed for a journal should be used to evaluate individual scientists, avert your eyes: Journal impact factor has a strong influence on a scientist’s probability of attaining PI-ship. It’s apples and oranges, but to the extent that a comparison can be made, the influence of journal impact factor seems stronger than that of either the number of citations your most cited article has received or of h-index, which is meant to measure a scientist’s productivity and impact. You might say, then, that the impact factor of the journals you publish in matters more than your own personal impact factor.

None of these results is terribly surprising, but they are more than a little depressing. These four factors, all of which were found to be among the most important ingredients of academic career success, are at best indirectly linked—and at worst not linked at all—to rigorous, serious, and significant science. The real value of the PI-predictor widget, then, is not that it can help early-career scientists plan their careers; in fact, we should hope they don’t use it that way. Its real value, rather, is that it so clearly demonstrates the wide gap between science’s ideals and incentives. If we want young scientists to remain idealistic, then we need to figure out how to do a better job rewarding the things that really matter: discovery (often as part of a team) and solutions to society’s most compelling problems.

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