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Being Realistic about the Academic Funnel

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Abstract
The more you're in, the more it's obvious: Though many students of biomedical disciplines plan to go for an academic career, there's a funnel-shaped distribution over the involved career stages. Recent data from the United States underlines the high drop-out rates at each level and even lead to a wake-up call being published in Nature. An attempt to consolidate the numbers is presented here aiming to allow a realistic view on individual career perspectives. Finally, a strategy to repress arising fears to keep the personal academic dream alive is presented: being realistic and knowing one's risks and chances.

Keywords: academia, career, drop-out rate, tenure position

The PhD factory is booming though frequent calls for drastic reforms (Taylor, 2011). More and more academics are available for the job market, especially in rapidly growing economies (Cyranoski, 2011). Countries like China impress with an annual growth rate for awarded PhD degrees of around 40 percent. But do they really impress? Some degrees are low quality, training periods are in general too short, and quality control seems absent very often. Still, booming industries in emerging markets are absorbing enough fresh PhDs to keep the unemployment rate of science PhDs still low.

Which positions do all the fresh academics take up? Also the United States report a drastic increase of PhDs awarded in the medical and life sciences over the last decades (Cyranoski, 2011). Obviously, not all of them make their way to a position in academia, as this would inflate the academic system in a rather short period of time (Alberts, 2014). Recently, a wake-up call has been posted on Nature (Polka, 2014). Graduate students should educate themselves and others about academia's dim job prospects. But is the future of young academics really that gloomy? Is it time to flee to higher salaries in industry (Zambetti, 2013) to escape academic depression just now?

According to statistics of the United States National Institute of Health and the United States National Science Foundation less than ten percent of graduate students make their way to a tenure-track position in the United States (NIH). Even smaller numbers are reported for the United Kingdom (RSC). Currently, the United States count 86,000 PhD students of biology (ASCB). The system requires a net influx of 16,000 fresh students per year that will undergo approximately seven years of studies with a drop-out rate of 37%. Thus, around 9,000 PhDs in biology are awarded every year.

Seventy percent of newly graduated PhDs stay in the academic system for one or more postdoc positions, whereas thirty percent say good-bye to academia. Thirty percent of postdocs work in more than one laboratory in total for on average for years (Powell, 2012), thereby forming a labour force of 37,000 to 68,000 postdocs in the United States. The uncertainty in that number seems to nicely reflect their standing in academic environment.

After several postdoc years their final distribution on the job market is fairly even: 25,000 continue their way in academia without a tenured position, whereas 29,000 are tenured. So at least 15 percent of PhDs have a tenured position already six years after their graduation, which is relatively low compared to 55 percent in 1973 (Cyranoski, 2011) but at least a fair share. What do all the other former postdocs do? 22,500 work in research positions in industry, 7,000 for the government. 24,000 work on science-related jobs, whereas 17,000 do non-science jobs after all.

Indeed, overall less than ten percent of students entering PhD studies will finally head their own research groups, but are other outs that bad? Yes, considered that 53 percent of students envisage an academic career at the begin of their career (Sauermann, 2014). No, considering the decrease of attractiveness of this career path over the years at university. The more you get to know university itself and the associated university politics, the less you want to become part of the game yourself.

Being part of the system personally at least ensures an informed choice for future steps. Thus, checking career status and future odds for the desired career pathway at each single stage is highly recommended in a more and more uncertain academic world. What are my odds of getting to the desired level? What are my risks on the way? What is my current stage in the academic funnel? Would I be unhappy with a non-tenured university position or with a research position in industry? What could I win on the other hand at university? I am convinced that knowing the statistics and facts of the current academic world should allow life science students to decide on their future career independently without the need for external wake-up calls.

I personally received my last wake-up call when entering my home university being directly confronted with drop-out rates in the first lecture I ever attended. Our professor literally forced us to count through the rows of prospective students to give us a real feeling of success rates for Chemistry studies. Nevertheless, being part of the majority predicted to drop out of Chemistry studies just motivated me even more to follow that way. Maybe that's the spirit still letting me pursue the (maybe naïve) academic dream. Having the chance to lead my own research team one day outweighs all the risks on the way by now. As I'm trying to make my way through the academic funnel, a third of my colleagues already gave up before PhD, another thirty percent of the remaining at postdoc level. In a realistic view there are several more hurdles on the way to a tenured position upcoming. Realistic numbers should allow to find independent conclusions – and maybe wake up postdocs not aware of all the obstacles hidden within the academic dream. Thus, I recommend anyone pursuing a personal academic dream to critically evaluate the current situation, follow actual success rates, and therefore draw appropriate conclusions.

On my expected long way through the academic funnel, I will have the chance to work on several professional skills (Marquez, 2014). Especially, the skill “endurance” should be helpful for a future group leader position (Kolb, 2012). Additionally, I would add “basic statistics” as increasingly crucial skill for current students in the life sciences on all levels: on the one hand to judge their personal odds of overcoming the academic funnel, on the other hand to allow for critical analysis of their applied methodologies. As I experienced for the field of Computational Chemistry, each discipline has to live with its own limitations and statistical uncertainties (Kramer, 2014). Awareness facilitates realistic judgement and will help to increase scientific quality.

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