

The 15 things that surprised me most when I started out as an independent group leader.

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Abstract

When advancing through the ranks of a (traditional) academic career, when we progress past the postdoc stage, we suddenly find ourselves as leader of a group. Although this new role is exciting and satisfying, there are also many aspects that we have not had the chance to properly prepare for – sometimes because we are not aware of *what exactly* we should prepare for.

In the present manuscript, we have collected a few examples of unforeseen details that might serve as a *vademecum* for other present or future newly-minted Principal Investigators. It might also be inspirational for policy-makers who want to identify relevant fields for professional development targeted at young group leaders.

Introduction

The transition from postdoc to Principal Investigator (PI) is a crucial one, and certainly unique among the many transitions (high school student–college student, college student–grad student, grad student–postdoc) in an academic career. We can thus not build upon a vast reservoir of personal experiences during the beginning of this phase. Furthermore, although many major universities offer professional development centres, there is no overabundance of courses and seminars you can take to prepare for this step. In the best case, you have a good mentor, but also their advice is (almost by necessity) largely limited to their own experience.

In order to provide some hints as to what points you might consider yourself and as a guide for professional development offices, we decided to compile a list of the things that caught us off guard to a certain extent when we started our careers as independent PIs. Naturally, such a list is heavily skewed towards our experience and by no means representative, but we feel that these are recurring themes and sometimes easily avoided with a bit of preparation. Even if some of the points we make are rather obvious, it might be comforting for other young PIs to know that they are not the only ones encountering certain problems.

We have structured the points by grouping them into four categories: (i) The challenges of time management; (ii) points regarding personal development; (iii) dealing with students and co-workers and (iv) colleagues and the scientific community. Finally, we compiled some potential solutions and strategies that have been helpful for us and provide our ideas about improving some of the points raised.

I Time Management

(1) Little Science, More Administration. Everyone is aware that, as a PI, a lot of time will be devoted to tasks not directly related to science. It is surprising, however, how much the balance is shifted in favor of clerical things. A personal estimate is that around 95% of time is spent on administration, supervision and communication (including writing papers, grants and giving presentations). The transition is thus not easy: as a postdoc, directly being involved in research activity usually takes at least three quarters of the time.

(2) Number of Grant Applications. It is a truism that every researcher has to gather grant money. However, the sheer number of applications that have to be written (because many are rejected, cf. below) is much higher than expected. In addition, there is a wide variety of grant-giving institutions (which is good!), and it takes some effort to

navigate the different application processes. The total time you have to put into it is thus considerable.

II Personal Development & Self Conception

(3) *Graveness of Social Responsibility.* Getting grants is not just about funding your research or buying equipment for your lab. Hiring grad students and postdocs also carries a certain social responsibility, namely that you will do your best to provide adequate funding and remuneration in the future. Of course, there will always be times when money just runs out, but it should not happen and at least in the beginning one is not used to this.

(4) *Being a Lonely Scientist.* Though constantly working with colleagues and tutoring students, there is hardly anyone with whom you can discuss personal or private issues. Very likely, the transition to your group leader position was accompanied by a geographical transition, so circles of friends do not yet exist. Due to the fact that you are supposed to be a role-model you can not easily turn to your grad students. Nor is it without risk to turn to your faculty colleagues as they are potential “rivals in science” or future colleagues.

(5) *Being an Ill-defined Scientist.* As newly-born independent PI you are neither fish nor fowl. In case you did not switch institutions, people around you still have to accept your new role and this will also depend on your former position. Switching from colleague to PI can be a challenge for both sides, especially when you start to delegate tasks you used to complete yourself before.

This is not only true in your scientific but in your private life, as well. You constantly struggle to explain to your (non-academic) family that to not have a permanent contract and being underpaid is the “normal” (albeit unsatisfactory) situation. They tend not to understand the exceptionality of your situation and career choice, phrasing this in questions such as: “When will you be done studying and start to work?”

(6) *It's easy as long as you're winning.* Considering success rates at different grant agencies (e.g. ~35% in the “individual grants” category of the German Research Foundation DFG [DFG 2012]) it is perfectly clear that you will receive a rejection at some stage in your career. Dealing with rejections and the reviews that come with them needs some mental strength and faith in your own (scientific) abilities. “Endurance” is the word.

III Teaching, supervision and leadership

(7) *Giving a Good Lecture.* A good lecture is not just like a good research seminar or conference presentation. Students differ from your peers at research-based events inasmuch as they need to know *why* they have to learn what they learn. For anyone with teaching experience, this is a given, but if you come from a research-based institution, it takes some time to discover this basic truth. What is more, you have to boil down the material to a certain degree (especially for first years) so that students can understand what you are talking about. This can be a challenge, because we are used to discuss with peers where we can assume certain basic concepts to be known. Sometimes it can even be a bit like educating children: You tell only half the truth – or half a lie – in the beginning to make them understand sophisticated science in an easier way.

(8) *Complexity of Supervision.* It's easy, right? You tell a coworker what to do and off they go and execute your work assignments. But in practice, this turns out to be a complex and somewhat daunting task. The degree of supervision and the specific means employed can vary greatly from individual to individual. In the end, however, supervising students and seeing them grow is a source of pride and reward. After all, the German words *Doktormutter* and *Doktorvater* (Doctor-mother and -father) for your thesis supervisor reflect this fact and also the close relationship that you have with these persons. The trend, however, is towards less personalized relationships, especially in PhD thesis supervision, together with the idea to remove the strong dependencies inherent in a 1:1-supervision.

(9) *Self-sufficient Grad Students*. In our experience, dispensing with micromanagement and allowing a creative and self-dependent working atmosphere suits many students very well. It sometimes is positively surprising to see just *how* creative they can be when allowed to run freely. Of course, any sample of grad students is heavily biased and some colleagues report exactly the reverse. One should be aware, additionally, that some students need other, more regulatory, styles of supervision. Matching expectations of supervision helps.

(10) *Decisions, Decisions, Decisions*. A major driving force for many young researchers to start an *independent* career is the possibility to do exactly that – work independently and follow their own ideas. Naturally, this goes along with making decisions on your research direction, choosing a good place to conduct your research or decide on the grant call you want to try your luck with. What is less clear in the beginning is the myriad of decisions that others count on you to take now: be it administration, supervision, teaching or simply the color of your new lab benches. There will barely be time to get good advice on most of these decisions, yet they have to be taken.

(11) *Executive to Administrative Role*. If you are lucky (giving good lectures helps!), committed co-workers will join your group soon. This means you are usually designing projects for others to carry out. So you have to let go of your ideas and projects and trust that someone else can execute them in the way you envisaged (or maybe even better). Finding the balance between trust and control is a challenge here.

IV Peers & reviewers

(12) *Appreciating professional development*. Older generations of scientists tend to underestimate the value of professional soft skill education. Since they are the ones who will decide the success of your application there is a risk that they probably will not see that you had to put your nose to the grindstone to fit in the further education in your already scarce budget of time and might not value these experiences highly.

(13) *(Dis-)Similarity of YoungBunny & OldStager*. What is indeed cumbersome is that both seasoned PIs and young ones tend to face similar problems. However, the former will only tell you this after you have already climbed up the career ladder. It is an honor if they confide in you, but perfectly understandable if they do not, see *Lonely Scientist* above. It is up to us, then, to take the challenge and at least communicate openly with our mentees, which was also one of the motivations for this paper.

(14) *Support and Expectations*. Finding mentors and supporters is one of the major tasks in the early stages of an independent career. Fortunately, there are many senior people out there ready and willing to support developing researchers. Be aware, however, that their time is very limited and you still have to decide a lot without getting feedback on your ideas. Especially when it comes to funding, support tends to become scarce – “Get your own grants” is the usual advice (cf. *Number of Grant Applications*). Especially with respect to third-party funding, the standards are steadily increasing and expectations from senior faculty toward young colleagues are high.

(15) *The (Academic)World is Watching You*. You better stop picking your nose in public now – or you might find your picture on the Facebook page of one of your students. But it's not just the students who are curiously watching what the new kid on the block is doing. Colleagues (and rivals) are closely following your decisions and development, too. This is also positive since you want to become known and respected in your community, but you have to be aware of this fact and act accordingly.

What could be improved – some ideas for solutions and coping strategies

Build a network. The authors of this article met through a university-sponsored peer coaching group. In this group, young PIs discuss problems in a highly formalized way (Tietze 2003). This method to keep the group efficient was taught by a professional coach and sponsored by

the local Professional Development Office. Little did we know that it is exactly the formalized method that makes the group a highly efficient advisory panel. Although we all are at the same stage, getting multiple views of and emotional feedback to one's problem is extremely helpful.

Building a network is a solution especially for the experienced graveness of your social responsibility (3), your loneliness as a scientist (4), your ill-defined situation (5), and grant-rejections (6, 14). It is one of the best supports you can find. However, it is up to you to join or found it, find the right people and keep it running. Finding the right people can be rather easy, though, as most of your peers in a similar situation will be happy that you asked them.

Find mentors. As outlined above, many senior scientists have a genuine interest in young PIs. Try to find people you can trust in your institution and beyond e.g. at fellowship meetings or organizations like Scimanto.

Use professional development – if available. When becoming an independent PI, you are thrown in at the deep end. If you do not have an obvious mentor around in the person of your former supervisor, there is no one in your university who is likely to draft the next steps you should take and support you by advanced training. This was especially true during the last decades, but is hopefully about to change.

Certain problems can be tackled by using professional development. The authors attended courses on time management and delegation (1, 2, 3, 8, 10, 11), personnel management (8) or rhetoric and presentation (15). All of them will make you more efficient and are thus time well spent in our opinion. Keep an eye out for support at your university for grant applications, it might well be that there exists more help than you thought (6, 14). Not all professional education you can get is rewarding, though most is. However, just attending the courses will not solve anything. You have to realize the lessons in your daily life in the lab. Courses that force you to tackle a certain

problem during a period of time and reassess your approach are particularly rewarding.

When it comes to lecturing, the two nice side effects of a job well done are that (i) explaining facts that are hard to understand in an easy language is something you have to accomplish on a day to day basis for your publications and (ii) you can run your new ideas by an audience that is rather untouched, hence a good object for a "Kleistian" approach (students are more likely to ask the relevant questions and thus guide you [Kleist 1878]). That is why students can surprise you either way.

Self-Care & Reflexion. With regard to the number of grants you will apply for and possible rejections (2), try to be realistic and don't bite off more than you can chew. Of course, to do this, you need to reflect on your situation. Again, professional development courses might help. Maybe you need to reevaluate your attitude, both towards your own striving for perfection to always find the optimal solution (10) and towards your students to let them have a go on their own (9). Admittedly it is advisable to slacken the reins bit by bit to not experience a nasty surprise.

Why should anybody other than postdocs care about this?

The issues we have described might seem to serve just as a source of comfort for other young PIs. It seems thus questionable why anybody else should give a second thought about these problems. Yet, as we know from many personal communications, these are frequently occurring phenomena. Ultimately, they lead to loss of motivation, frictions with supervised students, delays in research, in short: inefficiency. This is a bad form of inefficiency, however, because it comes from and leads to negative psychological states (in contrast to many other perceived inefficiencies, such as going home early on occasion, which are associated with positive experiences and actually free up capacities for creative thoughts and processes).

We thus argue that it would benefit science at large and improve use of research resources if Universities, Funding Agencies and public institutions would start to offer leadership courses and mentoring and other schemes already at the postdoc level and on a much broader scale. Some institutions already do this, but the list is by no means exhaustive. In this way, individuals who want to go for an academic career path can get a jump-start and avoid many of the time-consuming pits that are open along the way. The time and money invested through these channels will avoid much more costly and time-consuming errors later on, throughout the rest of the academic career.

We hope that this manuscript might serve as a manifesto that will spur agencies and Universities to consider creating programmes that put an emphasis on the soft, non-scientific skills, which gain in importance as one continues to rise through the ranks. Hopefully, it will be read in this vein and not just as a documentation of our own inadequacies. We also would welcome any discussion and personal accounts that are communicated to us in the future.

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