10 Simple Rules for a Supportive Lab Environment

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Abstract

■ The transition to principal investigator (PI), or lab leader, can be challenging, partially due to the need to fulfil new managerial and leadership responsibilities. One key aspect of this role, which is often not explicitly discussed, is creating a supportive lab environment. Here, we present ten simple rules to guide the new PI in the development of their own positive and thriving lab atmosphere. These rules were written and voted on collaboratively, by the students and mentees of Professor Mark Stokes, who inspired this piece. ■

INTRODUCTION

In academia, there is a constant progression of individuals into new careers and roles. For many, one of the most challenging is the transition to principal investigator, or PI, as this involves undertaking additional leadership and managerial responsibilities, while simultaneously developing an independent program of research. Many opinion pieces about this transition have focused on negotiation, acquiring funding, or teaching (Martin, 2022; Tregoning & McDermott, 2020; Pain, 2018; McAlpine, 2016; Scheiffele, 2002), but have overlooked one of the most important aspects of a PI's new role: creating a supportive and positive lab environment (although note Madan, 2021; Chaudhary & Berhe, 2020; Ruben, 2020; Maestre, 2019, which cover focused topics about the lab environment). Inspired by Professor Mark Stokes, who modeled these characteristics and goals in his own lab, we, his students and mentees, attempt to capture here what makes a lab not only successful, but also a place for emerging scientists to thrive.

METHODS

To reflect the motivation of this piece and model inclusivity, current and former trainees of the Stokes lab were asked to submit at least one "rule," along with a short description. In total, 27 rules were initially submitted by 13 individuals. Related rules were amalgamated during an editorial preprocessing step before the final 18 were put to a democratic vote. Co-authors selected their favorite 10 rules, which then underwent further compilation, editing, and revision. The results are presented below, clustered by theme (not necessarily popularity).

THE TEN RULES

1. Encourage Critique But Not Competition

Discussion of scientific ideas and projects is often critical to their success. The best laboratories have a culture that encourages anyone to contribute opinions on an emerging study via both formal and informal forums. Inquisitiveness should be encouraged, particularly asking questions and contributing without fear of appearing uninformed or unintelligent. In this process, any feedback given should be constructive, focused on improving the research, and never include personal attacks, "point-scoring," or demonstrating intelligence or superiority. There is increasing recognition that a competitive scientific environment might have unwanted negative outcomes, including lack of reliability (Tiokhin, Yan, & Morgan, 2021), and that a more

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collaborative environment promotes progress (Fang & Casadevall, 2015). Ultimately, the culture of science overall is unlikely to be modifiable by a single PI, but within a lab, members should grow within an environment of mutual respect, support, and celebration—not competition. This includes celebrating all lab members' successes. The lab leader should set this tone, both implicitly and explicitly, by, for example, laying out these expectations in a lab manual (Aly, 2018).

2. Model "Failure" and Celebrate Honesty

Don't pretend you never applied for the grant you didn't get, and don't pretend you didn't submit that paper to six journals before it was accepted. Being honest about the academic system and culture allows junior scientists to have a more realistic understanding of the environment they are operating in, and makes it less debilitating and isolating when they experience these "failures" for themselves (Parkes, 2019). One approach a PI could adopt would be to share a "failure CV" with trainees (Landau, 2017; Stefan, 2010), which includes all the rejections alongside the traditionally noted successes.

Modeling failure also applies to mistakes within day-to-day research, which are inevitable in the difficult pursuit of trying to make sense of the world. It could be an EEG cable that should have been plugged in but wasn't, or a bug in the analysis code that invalidates weeks of hard work. A supportive lab celebrates the moments when people find mistakes and correct them: moments in which people act to make their science more accurate, robust, and replicable. The same is true when experiments produce inconclusive results. A supportive lab prioritizes honesty and integrity above flashy findings.

3. Be Approachable

Allow trainees time and space in meetings to discuss what matters to them, be that science, work-based issues, or future career paths. A lab will run more smoothly if trainees feel able to disclose problems early: It will be much easier to pre-emptively readjust timelines and deadlines than to reshuffle things after a situation has become unmanageable. Similarly, their career trajectory, which you hold in trust, will be facilitated by them knowing they can ask your unbiased advice and that you are happy to offer it. As a PI, you're often best placed to advise your trainees about job applications, career paths, and interviews. Let trainees know that you'll offer practical support by sitting on mock interview panels and reading applications, and that if you don't know the answers you will try to find someone who does.

The most powerful mentor relationships reflect the long-term commitment made by a PI. These relationships do and should persist long after the scientific work has been completed, and are frequently most impactful at that time. It's a sign of a good lab if former trainees reach out to share some good news or ask for advice 10, even 20, years down the line. Critically, this rule applies even when the sought advice doesn't align with the PI's own career goals: The best mentors will offer supportive advice, even when it has no benefit for them, or is actively harmful in the short term (e.g., a member of the lab wants to leave for a better opportunity).

4. Facilitate Communication and Ensure There Are Minimal Barriers to Asking Questions

Communication is critical for a team to work effectively and efficiently. Trainees will need answers to big as well as small questions, and it is often easier to ask for direct help in person rather than over e-mail. What's more, useful ideas and creative thinking are more likely to arise over an informal and relaxed conversation or at the coffee machine than during formal (on-line) meetings or e-mails (Brucks & Levav, 2022; McAlpine, 2018).

Communication can be optimized in a number of ways: first, by ensuring lab members are physically present in the same space at known times/days (if possible, given pandemics, flexible/at-home working, and/or caring duties); second, through regular meetings with all lab members, individually and as a group; and finally, by setting up an inclusive on-line team communication platform that works for your needs. When in-person attendance is not an option, informal communication routes are invaluable.

Furthermore, communication shouldn't always be mediated by the PI. Just as in real life, on good on-line platforms, everyone should have an equal say, and those with relevant expertise should feel able to respond as easily as the PI. This will bind the lab as a team and avoid a many-to-one relationship between the PI and each lab member.

5. A Supportive Lab Is a Social Lab

A great way to establish yourself as an approachable lab leader is by holding social events; primates are social animals after all. These excursions should be relatively regular, so that they support the formation of a community, and could take the form of crazy golf, picnics, drinks, movie nights, walks, or barbecues.[1] Planned events should consider the inclusive needs of the lab members—be these cultural, religious, or caring responsibilities—so that everyone can enjoy something. After a while, the lab leader can (and perhaps should) make a graceful exit, leaving the socializing to others. This allows lab members the chance to bond among themselves, thereby increasing available support beyond what is on offer from the lab leader alone and facilitating good lab communication. Finally, the sociality of the lab need not fully depend on the PI, and lab members should be encouraged to be active in shaping their social culture.

6. Give Timely (and Constructive) Feedback

Some researchers are naturally good at this, and others might need to work on it, particularly the timing side. Often, even relatively short time delays have an impact on the careers of those more junior. For someone applying for a postdoctoral job, or a travel bursary, or a grant, even a few weeks' delay to that latest paper might make all the difference. This is even more critical when there are hard deadlines, such as for paper revisions, or thesis submissions. Work with your trainees to identify reasonable deadlines for you to send feedback (and stick to them), make sure they are aware of any upcoming leave or pinch points you have, and ask them to identify as early as possible anything that may have a tight turnaround.

When delivering your own feedback, don't neglect to mention the things that trainees have done well, or the progress they've made (note that there are many existing resources on good assessment and feedback, e.g., Ferrell & Knight, 2022). Supporting learning and development is not just about the things that can be improved on—and motivating those improvements—but about identifying the areas in which an individual excels. Finally, remember that nothing is certain in science: A trainee's great work may nonetheless yield disappointing results. Praise and encouragement are even more welcome in such cases.

And remember: Feedback is a two-way street. Soliciting feedback from your trainees will help you develop as a PI, and you should ensure that your trainees know their views are welcome.

7. Respect Others' Time and Expertise

All lab members bring their own expertise to the group, which can benefit the whole. Respecting every member of the lab is therefore critical and should not be underrated. There are two areas that are especially worth keeping in mind: respecting the expertise of trainees and respecting their time.

It is sometimes easy to dismiss the expertise of those who might not have your level of career seniority, but all lab members will bring different skills and experience, often in areas complementary to your own. Neglecting this fact can lead to micromanaging, while not trusting lab members with important tasks will lead to inefficient lab practices and create resentment. Instead, using these strengths, and sign-posting support within the lab, will enable problems to be solved more effectively and collaboratively. In addition, if a trainee's findings or theories differ from current consensus, consider the fact that they may be right. Trusting a trainee's sound logic over established thought is risky, but treating previous "established truths" with a healthy amount of skepticism may be what leads to scientific progress. Perhaps more importantly, your support can encourage trainees to think independently and trust themselves, as you trust them.

Similarly, respecting lab members' time will ensure each individual feels valued, as well as facilitating efficient progress. Don't be the PI who is constantly running late for meetings, canceling calls, or expecting others to reorganize their schedules to suit you. If you are occasionally late to meetings or miss deadlines, you should apologize and rectify the situation.

8. Have Career Conversations That Cover Both Academic and Nonacademic Paths, Prioritizing Individuals' Career Goals and Aspirations

Many people who begin on an academic path will ultimately pursue careers outside of academia. The narrative around this is often unhelpful: It can be painted as a "failure," or as a suboptimal choice. Although PIs by definition have chosen to stick it out (for now), this does not mean everyone else should. Research experience prepares people for a variety of interesting and impactful careers. Have open conversations that normalize nonacademic careers: Encourage lab members to share their ideas and plans, and discuss honestly the pros and cons of each path. Where possible, link trainees with past colleagues outside of academia. Signpost trainees to departmental and institutional career support services. And finally, remember that your best interests may not match your trainees'—rather than finishing a paper or writing a grant, they may benefit more from additional training opportunities or internships.

9. Keep Track of, Suggest, and Create (Tailored) Opportunities for Trainees

Great mentors help trainees identify appropriate opportunities and pursue them, while being mindful that some groups of people are less likely than others to put themselves forward. As trainees are likely to have different potential career paths, it is important to tailor these opportunities to their aims and goals. However, critically, everyone should be provided with the same level of opportunities. We might be unaware of some of the biases that lead us to give more opportunities or time to some trainees. To this end, keep a record of opportunities provided, like meetings, inclusion in projects or collaborations, conference support, and career support, and ensure budgets for trainees' research, travel, and conferences are equal and not contingent on performance, publications, or source/quantity of funding. When resources are scarce, try to prioritize underfunded students with departmental or institutional support.

10. Be An Advocate

It can be an uncomfortable position to be in, but PIs may be required to stand up for their trainees. Perhaps there's a reimbursement problem, or the trainee is experiencing inflexibility in an institutional system.

Perhaps relationships with co-supervisors need navigating if projects change or disagreements arise—whatever the issue, it's important to advocate for the trainee's needs. Although no one wants to be seen as a troublemaker in their institution, it's important to act as a buffer against these challenges. Actively trying to solve these problems, or explaining clearly why you can't if you know this is not possible, will show trainees you are on their side.

DISCUSSION AND CONCLUSIONS

It's incredibly exciting to start a new lab and to have the privilege of being able to guide and mentor trainees. However, it's a complicated process during which, at times, you will make mistakes and poor decisions. Getting feedback from trainees will help, but you will not get it right all the time, and should therefore cut yourself some slack. Most importantly, do not stretch yourself too thin. Growing a lab too fast too soon means you will be less able to implement the rules above at the same time as supporting your own well-being. You now have far greater financial and management responsibility than you're likely to have experienced before. This can feel overwhelming, particularly given that many new PIs, by virtue of the typical age at which they are recruited and the increased financial stability afforded to them, may be experiencing increased responsibility in other domains (e.g., caring for elderly relatives or young children, or getting a mortgage and buying a house). It's only possible to create a thriving lab if you have more to give than the mere survival of each academic term. A PI's ability to embrace these rules fundamentally depends on being part of an inclusive and supportive Department and University. We therefore conclude by proposing a final rule as an adjunct to the above: If possible, position yourself in a supportive environment, and make sure you yourself are also well supported.

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Diversity in Citation Practices

Retrospective analysis of the citations in every article published in this journal from 2010 to 2021 reveals a persistent pattern of gender imbalance: Although the proportions of authorship teams (categorized by estimated gender identification of first author/last author) publishing in the *Journal of Cognitive Neuroscience* (*JoCN*) during this period were M(an)/M = .407, W(oman)/M = .32, M/W = .115, and W/W = .159, the comparable proportions for the articles that these authorship teams cited were M/M = .549, W/M = .257, M/W = .109, and W/W = .085 (Postle and Fulvio, *JoCN*, 34:1, pp. 1–3). Consequently, *JoCN* encourages all authors to consider gender balance explicitly when selecting which articles to cite and gives them the opportunity to report their article's gender citation balance. The authors of this article report its proportions of citations by gender category to be as follows: M/M = .412; W/M = .059; M/W = .118; W/W = .412.

Note

1. Something Mark in particular excels at.

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