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Supporting mental health and productivity within labs

Meghan A. Duffy,[1,*] Natalie C. Tronson,[2] and Daniel Eisenberg[3]
[1]Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI 48109, USA
[2]Department of Psychology, University of Michigan, Ann Arbor, MI 48109, USA
[3]Department of Health Policy and Management, Fielding School of Public Health, UCLA, Los Angeles, CA 90095, USA
*Correspondence: duffymeg@umich.edu
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Laboratories are the central workplace for academic scientists and can play a key role in supporting psychological safety, mental health, and well-being. We provide strategies to build inclusive structures within laboratories and support mental health for all members.

Introduction

Recently, mental health in the lab has begun to receive much needed—and long overdue—attention. Some of this has been spurred by data showing a high and rising prevalence of distress among scientists and trainees. Most of the data have focused on graduate students. A new systematic review estimated that 24% of PhD students show clinically significant symptoms of depression and 17% show clinically significant symptoms of anxiety, rates that are higher than those of the general population and similar to those of medical students and resident physicians (Satinsky et al., 2021). In a more recent survey of graduate students during the coronavirus disease 2019 (COVID-19) pandemic, the rates of depression and anxiety were even higher (Ogilvie et al., 2020). There are no comparable estimates from representative samples of postdoctoral researchers, research scientists, technicians, and faculty, but efforts to collect national data on faculty and staff in higher education have begun (Mary Christie Foundation, 2021). The pandemic has introduced new stressors and has increased the challenges of addressing these long-standing issues. At the same time, the pandemic provides an opportunity: with so much changed over the past year and a half (Box 1), and as labs reopen and reconfigure, what can we do to promote strong mental health and well-being in these environments?

We suggest four approaches based on available evidence and our own work, which includes researching student

mental health and directing the Healthy Minds Study (D.E.), leading the Task Force on Graduate Student Mental Health at the University of Michigan (M.A.D.), and running our own research groups (M.A.D., N.C.T., and D.E.) and laboratories (M.A.D. and N.C.T.). It is important to acknowledge that the evidence regarding mental health in academic settings has significant gaps, and there is a tremendous need for additional studies that evaluate the impact and effectiveness of different structures, programs, and interventions. Our recommendations focus on actions that individual lab members—students, faculty, and staff—can take. While institutional structures can strongly affect mental health and well-being (Satinsky et al., 2021), those are beyond the scope of this article.

A structure to support mental health and well-being in the lab

A lack of structure creates uncertainty, and, for many people, uncertainty can provoke anxiety and reduce well-being (Carleton, 2012). Fortunately, being part of a lab can provide important structure that helps promote mental health and well-being of lab members—provided that it is supportive and inclusive. Labs should create a general, high-level structure that supports all lab members by providing clear expectations, guidelines, and support for project planning; encouraging and respecting boundary setting; and promoting positive and supportive interpersonal interactions in the lab via strong mentoring relationships and a safe and collaborative lab culture (Figure 1).

1. Create lab guidelines and project plans

Labs should create general guidelines to help students understand expectations in terms of work and productivity (e.g., vacation policies, when members should be in the lab or office versus when they can work remotely, what constitutes sufficient progress) and communication (e.g., expectations for responding to emails, timelines for requesting reference letters, turnaround time for manuscript revisions).

Labs should use principles of inclusive design when developing lab guidelines, policies, and norms. Inclusive design recognizes that people will differ in their abilities and needs—that there is no average lab member—and that failing to factor in this diversity will lead to frustration, exclusion, and underperformance. Expectations should be established in a way that recognizes that some lab members will have chronic health conditions, including mental health conditions. For example, it should be possible for people to spend some time away from the lab during normal working hours so they can attend to health care needs (e.g., doctor's visits and therapy appointments). (For those interested in learning more about inclusive design, the University of Cambridge maintains an Inclusive Design Toolkit: http://www.inclusivedesigntoolkit.com/GS_overview/overview.html.)

In addition to having a general set of lab guidelines and expectations, lab members benefit from processes that help them identify exactly what to work on and when to work on it. Setting specific goals helps provide structure, leading to

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Box 1. COVID-19: What did we lose, what did we learn, and what should we keep?

The global COVID-19 pandemic has disrupted science—and, more importantly, lives—in countless ways. Focusing on some of the most direct effects on lab research, many labs were shut down or operating at reduced staffing, supply chain disruptions made it difficult to find essential lab supplies, and people were unable to access field sites to collect samples. At the same time, many people needed to figure out how to teach remotely, sometimes while also taking on significant additional caregiving responsibilities. And, of course, many people became sick, lost loved ones, or worried that they would.

As labs reopen and increase staffing, we need to focus on what was lost and reflect on what we learned. None of us chose to live through a pandemic but having done so does provide us with important perspective and a chance to be deliberate and thoughtful about the structures that we set as things reopen. Some specific things to consider include:

What connections between lab members were disrupted (or, in the case of new lab members, never built in the first place), and how can those be (re-)established? A sense of belonging is an important part of well-being.

For projects that got derailed: how can they be restarted? If the person who originally began them has moved on to a new position or otherwise cannot complete the project after the lab reopens, is there someone else who can restart the project? If so, what are the plans for authorship?

What aspects of remote work (or, more generally, work during the pandemic) were welcome? What aspects of lab life (or, more generally, pre-pandemic work) did people miss most? Reflecting on those can provide guidance on what structures from the pandemic to keep and what structures from before the pandemic to focus on re-establishing.

As others have noted, we have a once-in-a-lifetime opportunity to reset. We encourage you to use this restart as an opportunity to create structures and set boundaries that better support your mental health and that of all lab members.

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less uncertainty and greater productivity. Fortunately, there are a variety of means of achieving this structure. Mentoring plans both provide a basis for a strong mentoring relationship (discussed more in section 3 below) and are particularly useful for specifying short-, medium-, and long-term ambitions and developing specific goals. For this reason, the University of Michigan's Task Force on Graduate Student Mental Health recommended that the Rackham Graduate School set a normative expectation that all graduate students have an up-to-date mentoring plan. Other useful resources include individual development plans (IDPs) and goal-setting frameworks such as SMART (which aims to set specific, measurable, achievable, relevant, and time-bound goals) and OKRs (which focus on objectives and key results). Regardless of the specific framework used to set goals, it is important to consider whether they are realistic. Academics are prone to over-committing themselves, which promotes overwork, harming well-being and often productivity as well. For most lab members, it will make sense for them to work with the lab principal investigator (PI) to develop a mentoring plan and to set specific goals, perhaps with input from a dissertation committee. However, lab members can also work with each other on initial drafts and as they think through different options. For PIs who are pre-tenure, options for developing a plan

and specific goals include working with a formally assigned mentor, finding a supportive colleague, or even developing a self-mentoring plan. For everyone, it helps to have an accountability buddy with whom they check in regularly; a peer accountability buddy is likely to be less stressful than having a mentor in this role.

2. Encourage and respect boundaries

There is strong evidence that getting exercise, sleeping well, and having strong social connections greatly improve mental health and well-being. This means that in order to bring our fullest, strongest selves to our work, we need to spend time away from work—exercising, sleeping, being with friends, and doing things we love. However, lab sciences have a strong culture of workism (sometimes referred to as "workaholism"), where one's identity and sense of purpose are intimately tied to our research and work. Workism—combined with the ever-increasing demands of our jobs, a competitive landscape, and an ability to work in any place at any time—can make it difficult to give oneself permission to take time away from work. (Someone recently told one of us that they needed help with guilt management, not time management.) For these reasons, lab cultures must make it clear that it is not just okay to have interests outside of the lab—it is encouraged.

In addition to boundaries about work hours and expectations, there should

also be boundaries in terms of supporting fellow lab members. Ideally, lab mates help each other by expressing concern and connecting each other to resources that can support mental health and well-being. However, lab members should not be serving as informal mental health providers to one another.

Finally, there is a balance to strike in terms of information sharing. If someone shares some information about, for example, why they will be away from the lab for a few hours in the middle of the workday, that helps normalize taking breaks and attending to interests and needs outside the lab. At the same time, lab members should not feel they must explain in detail what they will be doing. Ideally, lab members should feel comfortable sharing information about their lives outside the lab, but not feel compelled to justify time away from work.

3. Develop strong mentoring relationships

Mentoring relationships are crucial in lab sciences. Mentoring can support the mental health of both the mentor and mentee—mentoring another person can be rewarding to the mentor and can help provide a sense of purpose, and the mentee can receive support and guidance that help them flourish as a scientist. Unfortunately, this is not always the case. Mentoring ranges along a spectrum from supportive and empowering, through tepid and mediocre, all the way to abusive and

harmful. In the latter cases, mental health can suffer dramatically; in the intermediate cases, mental health might not be directly harmed, but neither is it supported.

How do we encourage mentoring relationships that are at the supportive and empowering end of the spectrum? Mentoring relationships take work to build and maintain, and clear, consistent, and compassionate conversations are crucial components. Thus, helping lab members (both mentors and mentees, and recognizing that most lab members will hold both of these roles, often simultaneously) develop interpersonal skills will facilitate strong mentoring relationships, which support mental health. Focusing on communication skills—for example, by reading and discussing books focused on compassionate, crucial, and inclusive conversations—is likely to be particularly beneficial, as good communication skills provide a strong foundation for interpersonal relationships.

Not all mentees will need the same mentoring, and mentors should tailor their approaches to the needs of particular individuals and adjust over time as needs change. (Conversations held while updating mentoring plans provide good opportunities for re-evaluating and adjusting.) For example, a student who is just beginning or who is finishing might benefit from meeting more frequently than a student in the middle of their program, and, even for two students at the same stage, one might do better with more frequent meetings.

One person is unlikely to be able to fill all mentoring needs. Therefore, mentees should work to develop mentoring relationships with a variety of people—for example, a new assistant professor might

Figure 1. Structures that support mental health and productivity within labs
By creating a general, overarching structure that includes clear lab guidelines and expectations, setting and respecting boundaries, strong mentoring, and a safe and collaborative lab culture, labs can promote the mental health, well-being, and productivity of lab members.

reach out to one person for mentoring on teaching, another for mentoring related to proposal writing, and a third for mentoring on how to navigate departmental and institutional cultures. For graduate students, it is helpful for the PI to play a role in encouraging students in the lab to develop mentoring relationships with

other mentors, such as other faculty, more senior graduate students, research scientists, and/or people in non-academic careers. This might be through formal mentoring committees, informal introductions, or connections that help the student get advice on research, classes, teaching, and other aspects of academic life from other faculty in the department. Such mentoring relationships are helpful for everyone but can be particularly valuable for individuals from groups underrepresented in academia.

4. Promote a safe lab environment and collaborative lab culture
Maslow's hierarchy of needs specifies that safety is second only to physiological needs such as food and shelter (Maslow, 1943), and feeling safe is linked with lower stress, depression, and anxiety (Gilbert et al., 2008). There are numerous components of safety; some that are particularly salient in a lab environment are physical safety; psychological safety; safety from racism, sexism, ableism, and other forms of harassment and discrimination; safety to make mistakes and learn from them; safety to report results from experiments that don't work or that do not align with the dominant theory in the lab; and safety to ask questions and raise concerns.

Focusing on building a collaborative and supportive lab culture can support all of these types of safety, promoting mental health and well-being and allowing lab members to reach their full potential. A collaborative lab culture will require establishing connections between lab members and ensuring that the lab environment is not overly competitive. Seeking opportunities for lab members to collaborate on related projects—with

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Box 2. Reasons to invest in mental health and well-being

We hope that people will view mental health and well-being—their own and that of others—as worthy of investing time and effort simply because mental health and well-being are important in their own right. However, we know that it can help to have additional reasons too. Here are some other reasons to focus on improving or maintaining mental health.

Productivity: while some people believe that mental health and well-being must be sacrificed at the altar of productivity, research consistently shows a strong relationship between better mental health and higher productivity (Johnston et al., 2019). (For this reason, there is an economic benefit to investing in mental health and well-being for institutions [Eisenberg et al., 2009]; we suspect this applies at the lab-level as well.)

Increased ability to support others: on planes, we are reminded to put on our own oxygen masks before assisting others. Mental health is similar: if we attend to our own mental health, we will be better able to support others. (This explains why therapists often have therapists!)

Role model: not everyone will feel comfortable discussing mental health care with lab members, and that must be respected. At the same time, when people *do* feel comfortable disclosing mental health care to others in the lab, they help normalize receiving mental health treatment and focusing on well-being. They also might end up serving as a resource to others in the lab; we know several examples of lab members sharing therapist suggestions with one another and/or helping a lab mate take the initial steps toward receiving mental health care (e.g., scheduling an appointment at a campus clinic).

Developing skills/tools: insights gained (e.g., regarding personal tendencies) and skills developed (e.g., related to communication or handling stressful situations) while working on one's own mental health and well-being can help in professional situations, such as having a challenging conversation about authorship or giving a seminar at a large meeting.

Prosocial behaviors, which include supporting other lab members, help reduce the negative effects of everyday stressors on mood (Raposa et al., 2016).

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clear communication about different roles and plans for analysis and authorship—can help build camaraderie and strengthen the science. It is also important to listen to suggestions and concerns that are raised and address them to the extent possible (and, if it is not possible, to explain why).

Labs should encourage "job crafting," which involves tailoring one's position to focus on an individual's strengths and passions. Job crafting promotes resilience, thriving, and performance and improves social interactions and relationships at work (Berg et al., 2007; VanderWeele, 2020). It also allows lab members to work more effectively and efficiently and to find greater meaning and purpose in their work (Vander-Weele, 2020; Wrzesniewski and Dutton, 2001).

Measurement and accountability

As labs, programs, and institutions work to improve mental health and well-being, we encourage them to routinely measure the climate surrounding mental health and well-being, such as basic survey questions about whether lab members perceive the environment to be supportive of mental health. We emphasize measuring the climate—rather than mental health symptoms—because the climate is an outcome that is more realistic to modify (mental health is influenced by many factors outside the lab) and because focusing on symptoms could perversely lead to the exclusion of people experiencing mental health problems in order to show "progress" by that measure. It is essential that measurement and accountability involve people or groups independent from the lab, such as the graduate school, health and well-being center, or office for institutional research. This will help ensure that lab members feel safe answering honestly and that their responses will remain anonymous, which is especially pertinent for people who might be identifiable based on being the only member of a particular demographic group. Once the results are in hand, it is important to then reflect on what they indicate, to be transparent about challenges that remain, and to devise a plan to address those challenges. It is essential that these efforts are not simply lip service.

Conclusions

We encourage labs, as well as departments and institutions, to work to better support the mental health and well-being of all members. Individuals, labs, departments, and institutions should promote mental health and well-being because it is the right thing to do. Fortunately, doing so is also likely to promote productivity (Box 2); success in science does not require sacrificing one's mental health but, rather, is supported by strong mental health.

REFERENCES

Berg, J.M., Dutton, J.E., and Wrzesniewski, A. (2007). What is job crafting and why does it matter? (University of Michigan Ross School of Business).

Carleton, R.N. (2012). The intolerance of uncertainty construct in the context of anxiety disorders: theoretical and practical perspectives. Expert Rev. Neurother. *12*, 937–947.

Eisenberg, D., Golberstein, E., and Hunt, J.B. (2009). Mental health and academic success in college (B. E. J. Econom. Anal. Policy).

Gilbert, P., McEwan, K., Mitra, R., Franks, L., Richter, A., and Rockliff, H. (2008). Feeling safe and content: A specific affect regulation system? Relationship to depression, anxiety, stress, and self-criticism. J. Posit. Psychol. *3*, 182–191.

Johnston, D.A., Harvey, S.B., Glozier, N., Calvo, R.A., Christensen, H., and Deady, M. (2019). The relationship between depression symptoms, absenteeism and presenteeism. J. Affect. Disord. *256*, 536–540.

Mary Christie Foundation (2021). The role of faculty in student mental health. https://marychristieinstitute.org/wp-content/uploads/2021/04/The-Role-of-Faculty-in-Student-Mental-Health.pdf.

Maslow, A.H. (1943). A theory of human motivation. Psychol. Rev. *50*, 370–396.

Ogilvie, C., Brooks, T.R., Ellis, C., Gowen, G., Knight, K., Perez, R.J., Rodriguez, S.L., Schweppe, N., Smith, L.L., and Smith, R.A. (2020). Graduate student experiences of support and stress during the COVID-19 pandemic. https://www.montana.edu/covid19_rapid/updated %20NSF_RAPID_GraduateStudentExperiences_ Covid19_White_Paper.pdf.

Raposa, E.B., Laws, H.B., and Ansell, E.B. (2016). Prosocial Behavior Mitigates the Negative Effects of Stress in Everyday Life. Clin. Psychol. Sci. *4*, 691–698.

Satinsky, E.N., Kimura, T., Kiang, M.V., Abebe, R., Cunningham, S., Lee, H., Lin, X., Liu, C.H., Rudan, I., Sen, S., et al. (2021). Systematic review and meta-analysis of depression, anxiety, and suicidal ideation among Ph.D. students. Sci. Rep. *11*, 14370.

VanderWeele, T.J. (2020). Activities for Flourishing: An Evidence-Based Guide. Journal of Positive School Psychology *4*, 79–91.

Wrzesniewski, A., and Dutton, J.E. (2001). Crafting a Job: Revisioning Employees as Active Crafters of Their Work. AMRO *26*, 179–201.