

ILLUSTRATION BY THE PROJECT TWINS

JUST A MINUTE... PHD STUDENTS VOICE CONCERNS ON MENTORING

In this second article to mark *Nature's* 2019 graduate survey, respondents call for more one-to-one support and better career guidance. **By Chris Woolston**

When Peter Butler started his PhD programme in physics at the University of Bristol, UK, he saw himself spending many hours at a whiteboard working on problems, with his supervisor by his side. Those long hours of togetherness never materialized. In that sense, he says, “I didn’t get what I expected.” However, he adds that his supervisor gave him plenty of good strategic advice and helped him to get published. And having to turn to other people for support was useful, he adds. “I had to act like a scientist.”

Butler was one of more than 6,300 graduate students worldwide who responded to *Nature's* fifth biennial PhD survey. These students had much to say about the state of mentorship at their institutions and in the scientific community. Their answers and free-text comments

made clear that they often aren’t getting what they expect, or need, from their supervisors. The full data set is available at go.nature.com/2nqjndw. One telling statistic was that nearly one in four said they would change their supervisor if they could start their programme again; the 2017 figure was similar.

The survey – created with Shift Learning, a London-based market-research company – had its bright spots. Overall, 67% of respondents said they were satisfied with their relationship with their supervisors, with 41% of those in Africa and South America saying they were very satisfied. Some are especially grateful. “When I started my PhD, I didn’t know about all of the possibilities,” says Marina Kovačević, a PhD student in physical chemistry at the University of Novi Sad in Serbia. Now, she hopes to run her own laboratory, a goal that her co-supervisors

encourage by letting her help to write proposals and take on other tasks of a lab leader. “She is truly one of the most devoted PhD students,” says one supervisor, Branislav Jovic.

But roughly one-fifth of respondents said that they were dissatisfied with their supervisor relationship, a disconnect that threatens their future as well as their present. “Students who are effectively mentored outperform those who aren’t,” says Ruth Gotian, assistant dean for mentoring at Weill Cornell Medical College in New York City. A coming report from the US National Academies of Sciences, Engineering, and Medicine notes that positive mentorship is the “most important factor in completing a STEM [science, technology, engineering or mathematics] degree”. The report also cites studies showing that effectively mentored students are more likely to publish papers,

and more likely to finish their PhD programme.

Luckily for students, mentorship needn't be a one-person job. The survey results underscore the importance of networks that can fill in gaps when a supervisor falls short, says Emma Williams, an author and career coach and founder of EJW Solutions, a scientist-advisory company in Cambridge, UK. "PhD students should be encouraged right from the start to have a variety of mentors," says Williams, who earned her degree in medical physics from the University of Cambridge.

No time for career advice

Many graduate students have discovered that not all mentors can devote much time to the job. In the survey, 49% of students reported spending less than an hour one-to-one with their supervisor each week (see 'Brief encounters'). "That's a shocking figure," Williams says. Although some students can probably thrive on that amount, or on even less, most could benefit from more direct guidance and attention, she says. She speaks from personal experience; her own highly accomplished PhD adviser didn't have the time to build a strong connection. "He called me by the wrong name in the middle of my PhD," she says. "That was a low point."

Job prospects are a persistent worry for PhD students, but they can't always count on their supervisors to show them the way forward. In the survey, just one-third of respondents said that they were satisfied with the career guidance they received from their mentors and others in their PhD programme, down from 40% in the 2017 survey. When asked how they arrived at their current career decision, just 28% credited advice from their supervisor, down from 34% in the survey two years ago.

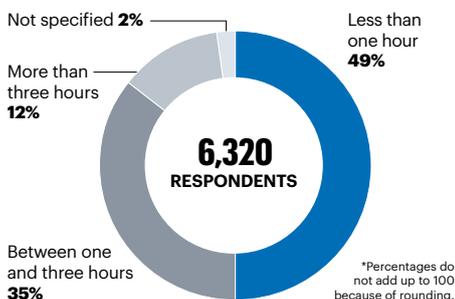
Notably, 60% of respondents said that they based their career decision on their own research of the topic. Unfortunately, students who try the do-it-yourself approach probably won't be aware of all of their options, Williams says. "They're only going to google the things that they already have in mind," she adds.

Many advisers seem too preoccupied with

BRIEF ENCOUNTERS

Interactions with a supervisor can be a crucial part of PhD training, but some students get much more individual time than others.

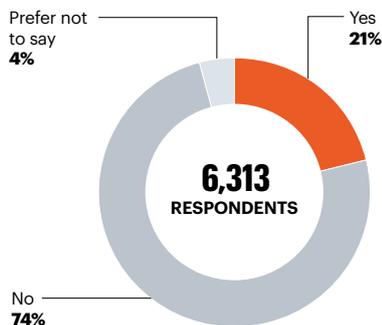
Q: On average, how much one-to-one time do you spend with your supervisor each week?



BULLYING FROM THE TOP

A substantial number of PhD students feel bullied in their programmes. Speaking out is difficult — partly because supervisors tend to be the chief culprits.

Q: Do you feel that you have experienced bullying in your PhD programme?*



their own science to offer careers advice, says Nick Valverde, a PhD student in physics at the US National Superconducting Cyclotron Laboratory, located on the campus of Michigan State University in East Lansing. "It's almost impossible to find someone who knows about career trends," he says. "Mentors have a lot on their plates, and trends change." Guidance for careers in industry can be especially hard to come by. Only 28% of respondents said that they had received useful advice for pursuing a career outside academia.

Unready for duty

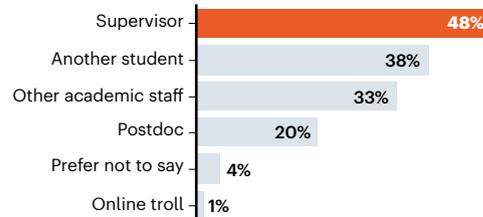
Part of the problem, Gotian says, is that mentors who have spent their entire careers in academia might not think much about other career paths. "Very often, mentors will try to create 'mini-mes', another version of themselves," she says. But if mentors took off the academic blinkers, they could boost their students' career prospects without much effort, she adds. "They may not have much knowledge of industry, but they probably have contacts that they could connect their students with. That doesn't happen as often as it should."

A further problem is that mentors don't necessarily receive much training in people management, a shortcoming that can contribute to especially dark consequences. In the survey, 21% of respondents reported experiencing discrimination or harassment. The same percentage also reported bullying. Of those, nearly half said that their supervisor was the perpetrator (see 'Bullying from the top'). "In a results-driven culture, you're very dependent on people senior to you to move on with your career," Williams says. "It's very fertile ground for bullying and harassment."

These numbers once again reinforce the need to have more than just one person on a student's side, Williams says. "One of my clients at a prominent university was being bullied," she says. "Finding someone else that she could use as a sounding board really helped her."

With so much at stake, choosing a mentor

Q: Who was the perpetrator(s)?



Q: Do you feel that you can speak out about your experiences of bullying without repercussions?*



*Percentages do not add up to 100 because of rounding.

or a mentorship team can be one of the most important tasks a graduate student can face. Kovačević says that she peppered potential advisers with questions before joining her current lab. "I thought it was my right to ask anything," she says. "And I thought it was their job to answer."

But not all students have that option. "I had no say in choosing my PhD adviser," says Samhita Krishnaswamy, a PhD student in psychology at Jain University in Bengaluru, India. She says that she felt inspired by an accomplished professor in her programme. But he was not her adviser, and she rarely had a chance to speak to him in person. She feels that supervisors, in general, could be better prepared to guide their students. "In India, supervisors need more in-depth skill sets," she says. "They're mostly looking at furthering their own careers. They are very uncomfortable pursuing topics outside of their research area."

Even so, Krishnaswamy says that she's happy with her overall training. She's had the flexibility to study multiple topics in psychology, including the psychology of Indigenous populations of India. "I have everything I need here," she says. "It's given me a foundation to be an independent researcher."

In his third year at the National Superconducting Cyclotron Laboratory, Valverde says that he's building a foundation, too. But it wasn't easy. At first, he was intimidated by the experience and knowledge of Cyclotron researchers. "You're working with someone who has 40 years under their belt," he says. "They're talking about particles and symmetry, and I'm like, man, I know about tension in a rope."

Valverde managed to bridge some of those gaps in his knowledge and form real connections with researchers at the lab — because he had to. Ultimately, he says, science is too challenging to tackle without help. "It could be crippling if you tried to do it alone," he says. "That's where a mentor comes in."

Chris Woolston is a freelance writer in Billings, Montana.