



ILLUSTRATION BY THE PROJECT TWINS

CHINA'S PHD STUDENTS GIVE THEIR REASONS FOR MISERY

The nation's junior scientists are struggling for work–life balance, careers guidance and emotional support. **By Chris Woolston and Sarah O'Meara**

PhD students in China face outside challenges as they try to complete their degrees, according to *Nature's* fifth biennial survey of PhD students.

On many measures, students in China fare worse than students in other parts of the world. One telling number: only 55% of the Chinese students who responded to the survey said that they were at least partially satisfied with their PhD experience. For the 5,630 respondents outside China, the satisfaction rate was 72% (see 'A nation apart').

The self-selecting survey was translated into Chinese as part of an effort to increase participation inside the country; it was created with Shift Learning, a market-research company based in London, and the full data set is available at go.nature.com/2nqjndw. The outreach paid off, with responses from 690 students in China – the highest response in the survey's 8 years. Through survey answers and free-text comments, the students expressed a relatively troubled view of PhD life marked by pockets of optimism and resilience.

Some respondents used the survey's comments section to point out the positives of PhD programmes. One student wrote that, compared with other sectors of Chinese society, such as politics and industry, the academic system encourages "freedom, creativity, discovery, and a greater acceptance of unexpected failure". Another said that the system is "relatively free and fair" and that PhD students are "able to do the things they like based on their own interests". One respondent singled out the opportunity for

“independence and innovation”. And one reported being satisfied “overall”, but added that there is “much room for improvement”.

Most respondents who felt prompted to comment expressed a more negative outlook. “Do not do a PhD in this country,” one student wrote. “No one will help you. No one will understand you. This is a prison.” Another wrote: “PhD pressure is too great, beyond my expectations.” In many ways, pressure is built into the system, says Di Chen, a cell biologist at Nanjing University. “Graduate students from most institutions are required to have at least one first-authored paper with certain levels of impact factor to get their PhD degree,” he says. “Therefore, everyone has to be productive, which is nearly impossible.”

The PhD ranks are becoming crowded. According to the Chinese Ministry of Education, 95,502 new PhD students enrolled in 2018, bringing the total PhD-student population to 389,518. By comparison, little more than 70,000 new PhD students enrolled in 2013, and fewer than 62,000 enrolled in 2009. Some observers think that the supply of PhD students is greater than the nation’s current educational system or job market can completely support. “The whole infrastructure needs to be reformed,” Chen says. “I personally believe reducing the number of PhD students might help.”

PhD programmes remain popular, but the survey found that regrets are widespread. Asked what they would do differently, 22% of respondents said that they would change their supervisor, 36% that they would change their area of study, and 7% that they wouldn’t pursue a PhD at all. Forty-five per cent of respondents said that their programme fell short of expectations. Outside China, that proportion fell to 36%. At the other end of the spectrum, just 5% of Chinese respondents said that their PhD programme exceeded expectations; the corresponding rate in the rest of the world was more than twice as high.

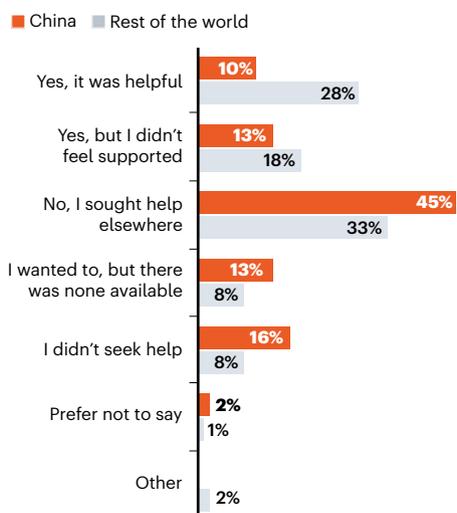
EMOTIONAL TOLL

Like PhD students everywhere, students in China face strains that can threaten mental health. Relatively few Chinese students found help at their institutions.

Q. Have you ever sought help for anxiety or depression caused by PhD study?



Q. Did you seek help for anxiety or depression within your institution?



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

Often, the expectations might have been too lofty from the beginning, says Qilin Zhou, a chemist at Nankai University in Tianjin. “Many students think scientific research is beautiful and romantic before entering the laboratory,” he says. “When they start to do research, they will inevitably encounter various difficulties.”

Nancy Li, a master’s student who dropped out of a PhD pharmacy programme at a leading university in China, isn’t surprised that so many Chinese students struggle with the reality of

a PhD programme. “A considerable amount of Chinese PhD students are not adequately prepared for PhD study and are in need of more guidance, including career advice and also psychological counselling,” she says.

Heavy tolls

Comments and survey answers put a spotlight on the emotional toll of PhD work. One student wrote that she wished she had known “how a PhD would affect my mental health and work-life balance”. She wasn’t alone. In the survey, 40% of respondents from China said that they had sought help for depression or anxiety caused by their PhD programme (see ‘Emotional toll’). That’s slightly more than the 36% of respondents in other parts of the world who sought help. For students in China, support is unlikely to be close at hand. Of those who sought help, only 10% said that they had benefited from assistance at their home institution. In other parts of the world, that figure was 28%.

In a positive development, students in China were less likely than were students elsewhere to complain about mistreatment. Only 15% reported bullying, compared with 22% in the rest of the world. Likewise, the percentage who reported discrimination or harassment (12%) compares favourably with the rate for respondents from other nations (22%).

Anxiety can come from many directions. For one thing, Chinese students face many demands on their time, although in lower numbers than elsewhere. More than half of all respondents (53%) reported working more than 40 hours a week. In the rest of the world, 79% of students reported putting in such hours; it could be that China’s percentage is smaller because the proportion of part-time students is higher. Fifty-four per cent agreed with the statement that “there is a long-hours culture at my university, including occasionally working through the night”. In China, as elsewhere, those long hours in the lab come with consequences: 45 per cent of respondents in China said that they were dissatisfied with their work-life balance. In the rest of the world, 38% shared that complaint.

Chong Tian, a chemist at the University of Manchester, UK, says that she regularly put in long hours – up to 11 hours a day, 6 days a week – during her PhD programme at Tsinghua University in Beijing. She says that she didn’t complain. “Working overtime is a common phenomenon in the whole society,” she says. “I enjoyed my project and always pushed myself to work harder to get results ASAP.”

Uncertain prospects

Like their counterparts in other countries, PhD students in China also worry about job prospects after graduation. Nearly 90% of students ranked uncertainty about careers as one of their top-five concerns. On a more optimistic note, 70% of respondents think

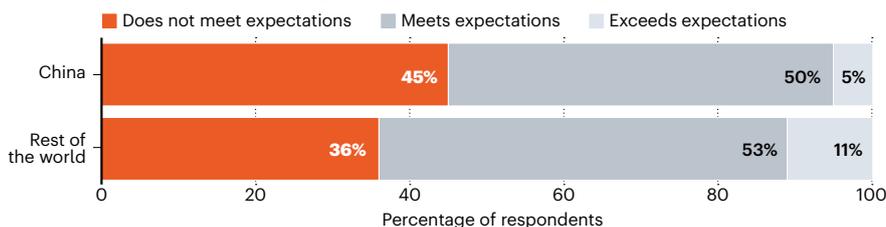
A NATION APART

Compared with their peers in the rest of the world, PhD students in China are less likely to find satisfaction – and more likely to find disappointment – in their programmes.

Q. How satisfied are you with your PhD experience?



Q. To what extent does your PhD programme compare to your original expectations?



that their PhD work will “substantially” or “dramatically” improve their job prospects, putting them slightly ahead of their peers in the rest of the world on that score (see ‘High hopes’). Despite a tight and competitive market for jobs in academia, the dream of a university research position remains powerful. Nearly 70% of respondents said they would most like to work in academia after graduation. By comparison, 55% of respondents outside China shared that goal.

Some worries are warranted. A nationwide survey found that 83% of new PhD recipients were employed in 2017, putting them slightly behind those with master’s degrees (85%) and vocational degrees (89%).

Solid careers advice could ease concerns about the future, but that advice isn’t always available. Nearly half of the respondents in China said that they had reached their career decisions on the basis of their own research, and another 28% credited family influence. Just 29% said they had based their decisions on advice from their supervisor. Overall, 46% of respondents said that they were dissatisfied with their careers guidance, putting them on a par with students elsewhere.

As a rule, the survey found, students in China are given little time to speak to their supervisors or principal investigators (PIs) about their careers, or about anything else. The majority, 52%, reported spending less than an hour one-to-one with their supervisor each week. Outside China, that figure was 49%. “Unfortunately, many supervisors do not provide enough help and guidance to students because they are busy applying for grants and other business,” Zhou says.

Several respondents complained that their lab felt more like a business operation than a training ground. As one put it, “the PI has all of the power. Everyone else in the lab is just a factory worker.” Li says that many labs have time clocks that record when each member arrives and leaves. “It is not so much a teacher–student

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relationship as it is an employer–employee relationship,” she says.

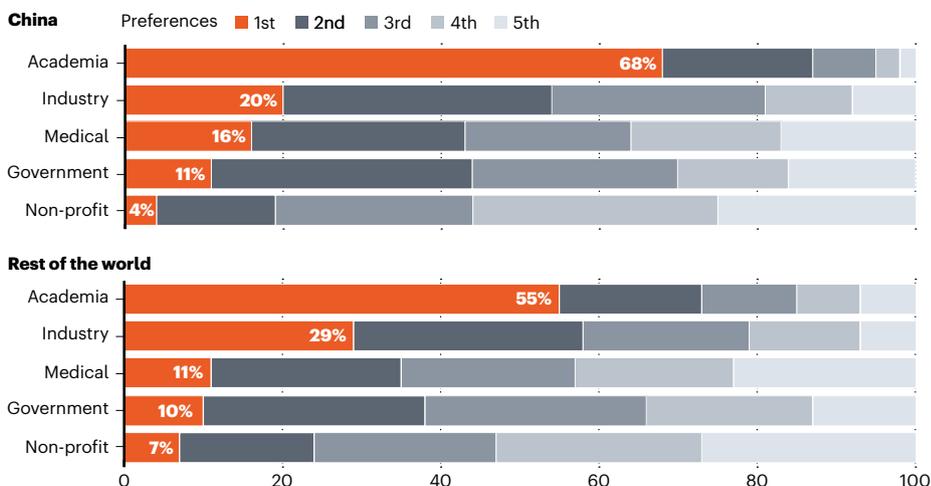
Chen notes that PIs themselves are under pressure. “PIs are evaluated mainly based on publications, especially those from prestigious journals, which sometimes require very labour-intensive experiments,” he says. “Compared to PIs from other countries, Chinese PIs seem to have more time-consuming duties from administration, lab management, family and so on.”

Zhou says that a growing number of Chinese academics are realizing that they have an

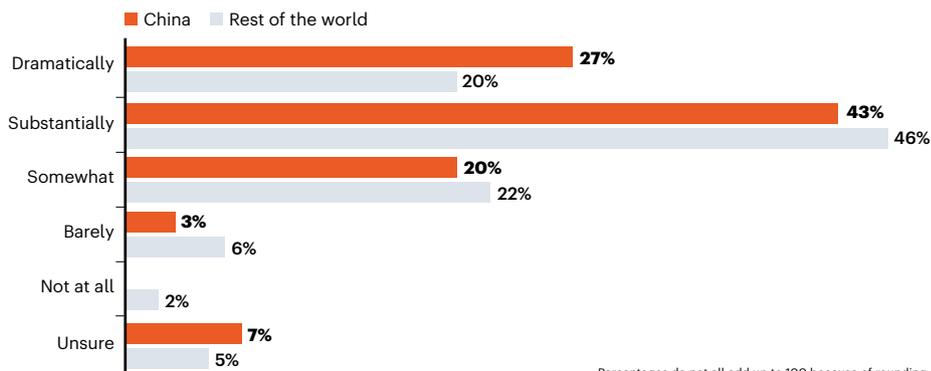
HIGH HOPES

PhD students in China are holding on to dreams of academic careers, and they’re relatively hopeful that a degree will boost their chances in the job market.

Q. Which of the following sectors would you most like to work in (beyond a postdoc) when you complete your degree? (Showing first choices only)



Q. How much do you expect your PhD to improve your job prospects?



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

obligation to their teams. “Things are already changing for the better, albeit slowly,” he says. “Supervisors should spend more time with students to give them help and guidance.”

Students could be doing more to get the advice they need, says a materials scientist at the Institute of Advanced Materials and Technology in Beijing, who prefers to remain anonymous. “I always tell my students that the speed of their growth depends strongly on how often they meet me,” the scientist says. “Like most Chinese professors, I’m busy, of course – but I always have time, or can find another time, if they want to discuss anything with me.”

PhD perseverance

Despite all of the challenges, respondents to the survey still found things to like about their graduate training. Asked what they enjoyed most about life as a PhD student, 27% singled out the university/academic environment – making that the most popular response. Others cited the intellectual challenge, the opportunity to be creative and the chance to work with bright and interesting people.

When asked if they were satisfied with their decision to pursue a PhD, 62% of respondents

said yes. That’s significantly behind the 76% of respondents from the rest of the world who expressed satisfaction. But Chinese academia is still in its relative infancy – just 18 PhD students were enrolled in PhD programmes in 1978 – and there are reasons to suppose that it will become more effective, rewarding and satisfying for students. “Science is developing fast in China,” Zhou says. “As the economy develops, more students will want to stay in academia.”

Looking back, Tian says, she values the training she received at Tsinghua University. She says that her adviser was always around and available, and she got useful careers advice from her “chemistry brothers”. She thinks she’s on the right track, but adds that time will tell. “No one can be adequately prepared for the future because we never know what will happen in the next second,” she says. “The most important thing is to figure out what we want, to be brave, and to try.”

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