

Supplemental Material 4.

Reasons for students' change in career preference

Below are sample student responses to the question, "*If your career preference has changed, please briefly describe the reason(s) for this change.*"

Only the 79 responses that referred to moving away from the academic track were coded. After reading through the responses, themes were defined by C. N. Fuhrmann, and refined through discussion with D. G. Halme. C. N. Fuhrmann coded each comment. D. G. Halme independently coded 30 of the 79 responses. These codes matched those assigned by C.N. Fuhrmann; consequently, Dr. Fuhrmann's codes were accepted for the remaining comments. Many comments were coded to multiple themes.

Theme: *Inadequate quality of life or work-life balance*

30% of the comments (n=24) included a reference to this theme.

In general, comments referred to lifestyle, dedication required to succeed, and not enough time to start a family or spend time with family.

"I realized that my passion for science was not greater than my desire to have a well rounded personal life and a family. I also realized that while I enjoy bench work I don't enjoy project management or grant writing and that as a PI I wouldn't get to do much bench work."

- Female student in fifth year of graduate school

"Previously I would have considered "principal investigator of a lab in a major research-intensive institution" as my first choice but after a few years of observing the lifestyle/personality this seems to require I am less attracted to it."

- Male student in third year of graduate school

“I found that I was more interested in helping move research from the bench to bedside through business means. Also, the career track in academia has become too long and unstable to become a realistic option for me and my small family.”

- Male student in fifth year of graduate school

“I have seen how PIs live, and am not sure that I want that lifestyle.”

- Female student in third year of graduate school

Theme: *Competition or stress associated with trying to succeed as a PI*

22% of the comments (n=17) included a reference to this theme.

In general, comments referred to stress as a PI, difficulty getting tenure, low job stability/security until tenure, competition involved in trying to succeed.

“Being a scientist hasn't made me as happy or fulfilled as I had thought it would. I am disappointed at the level of personal ambition that is required for success. This could be due to the funding situation and cutthroat competition it demands.”

- Female student in third year of graduate school

“Amount of competition in academia, difficulty, uncertainty, and amount of sacrifice in terms of personal life required to even have a shot at an academic career, much less maintain a successful one.”

- Female student in her sixth year of graduate school

“I am turned off by the intense competition in academia and the stress related to funding.”

- Female student

“I used to want to run a lab in a major academic institution, but don't enjoy the cutthroat competition or resulting stress.”

- Sixth year student

Theme: *Difficulty in getting research funding*

24% of the comments (n=19) included a reference to this theme.

Some comments within this theme referred to “funding” generally (without specifically indicating what aspect of this issue was the concern). Others referred to the difficulty of getting grants more specifically, such as uncertainty in funding causing stress or dislike of the competitive nature of funding.

Since research funding was a recurring theme in comments related to “*competition or stress associated with trying to succeed as a PI,*” we coded this as a separate theme related to that category. Comments that related both to stress/competition and to funding were coded as belonging to both categories.

“I’ve become less enamored of becoming a PI at an R1 institution. There are two main reasons for that: 1) I’m still not convinced I can have a family and be a good PI, and 2) funding for young PIs is so tight now.”

- Female student in sixth year of graduate school

“I learned more about what I could do with my PhD. Also, I see how PIs struggle to get funding. They spend more time writing grants than anything else.”

- Female student

Theme: *Length of training required or competition to get jobs*

19% of the comments (n=15) included a reference to this theme.

In general, comments referred to the inadequate supply of academic PI positions, length of postdoctoral training needed, concern about being able to get an academic PI position (in some cases, due to a desire to be in a particular geographical location).

“1st wanted academic path. Now want industry position.

Reasons:

1. Extremely small job market for starting Professors
 2. Consequently, academic jobs more likely to require relocation to non-optimal university
 3. Less pay
- (I have a family-kids- which color my decision)”

- Male student in his sixth year of graduate school

“I changed my mind for a variety of reasons, but basically I am moving away from wanting to be a PI at a major institution because I don't think that lifestyle is 1) compatible with having children (I am female) and 2) something I am interested in for a career. Regarding reason 1, I state this because with the length of postdocs in biology and the pressure to produce multiple papers increasing, I think it makes it extremely hard to have a family. If I graduate from UCSF at 29, I will be in a post-doc until my mid-30's, and then I will START on a career not knowing if I have tenure (and financial security) until way too late to have children. If post-docs were back down to 2-3 years then this would not be such a big issue. Regarding reason 2, it seems as though PI's lives are consumed by grant writing since funding hasn't been so great lately and that does not interest me. If I could warp from being a grant-writing junior faculty to being able to do more science in my lab and science outreach to the general public then I would more consider this career path.”

- Female student in her third year of graduate school

Theme: *Low salary*

11% of the comments (n=9) included a reference to this theme.

In general, comments referred to low salary while training as a student or postdoc, or low salary as faculty compared to other types of career paths.

“Length of postoc; pay of postdoc; desire for a stable situation (kids?)”

- Male student in his fourth year of graduate school

“Overall, I don't like many parts of academic culture and find the time spent at very low pay unworkable.”

- Female student in her seventh or higher year of graduate school

Theme: *Disliked tasks required of an academic PI*

25% of the comments (n=20) included a reference to this theme.

In general, comments referred to a personal disinterest or dislike of performing certain tasks seen as commonplace for academic PI's, such as writing grants, managing projects, and the slow pace of research.

"The theoretically fun idea of pursuing interesting academic research does not seem to match the reality of begging for grants, only researching what will get more grants, and getting paid so little after so many years of training. Industrial research seemed appealing, but it also seems way too competitive with low job security, and most people I know who now work in industry hate it. Additionally, I have found that I may only like research in theory- the experience of watching my experiments fail day after day after year after year has really made me lose interest."

– Female student in third year of graduate school

"When I entered UCSF I thought that I was passionate about research and I would want research to be in my life in some way or another for life. But after getting grant-writing experience, and more research experience directing and discussing my own project, I have become disenchanted with the research path. Simultaneously I have found so much happiness in teaching."

– Female student in fourth year of graduate school

Theme: *Lacking ability to succeed*

9% of the comments (n=7) included a reference to this theme.

In general, comments described having not enough talent, lacking the skills required for success, or lacking the passion or dedication to succeed as faculty.

"At first I was interested in an academic position, but I realized I lacked the skills to appropriately "pimp" my research."

– Male student

“I’m not good enough or smart enough to be a professor, and I’m not sure I’m as passionate as I need to be about it as well.”

- Male student in his fifth year of graduate school

Theme: *Positive reason for career change*

24% of the comments (n=19) included a reference to this theme.

In general, comments referred to positive reasons, such as learning more about other career options or discovering a new skill or interest related to other types of careers.

“I have discovered that I have a desire and ability to interact with people to an extent beyond what most science careers offer and what most scientists would like. I feel strongly, though, that more interaction between science and politics can only lead to a net benefit for everyone. ”

- Male student in second year of graduate school

“I have found that I am a better match for teaching than for research. I find basic research to be very unrewarding, and I enjoy every minute that I spend teaching. ”

- Female student in fifth year of graduate school

“During graduate school I realized that teaching was an enjoyable experience, and also learned about the pressures and many challenges of being a principal investigator. Prior to graduate school I was not aware of the other career options that might be available to me after graduating.”

- Male student in sixth year of graduate school

“When I entered grad school, I was planning to pursue a faculty position. Exposure to other options, such as biotech entrepreneurship, as well as the difficult climate for new faculty has caused me to reconsider. ”

- Male student in sixth year of graduate school