

The Global Survey of Scientists: A Focus on Latin America

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Statistical Research Center
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Outline

- Timeline
- Methods
- Overview of Results
- Specific Results for Latin America
- Key Findings from South America
- Key Findings from the Caribbean and Central America
- Discussion



GENDER GAP IN SCIENCE

A Global Approach to the Gender Gap in Mathematical and Natural Sciences: How to Measure It, How to Reduce It?

- Meeting with project coordinators to determine scope of work
- Questions developed by SRC to include experiences people may have in all continents and in all included disciplines: math, chemistry, physics, astronomy, biology, computing, history and philosophy of science & technology
- Field tested in three different regions for cultural appropriateness: South America, Africa, and Asia
- Questionnaire reviewed and approved for data collection
- Data collection started 1 May 2018

Methods

- Snowball methodology used for data collection
- Regional outreach completed based on plans formed during regional meeting
- Data collection tracked and reported back to coordination team
- Survey instrument closed for first round of analysis
- Cleaning of the data by SRC
 - Accuracy of responses
 - Repeat participants
 - Data corrections
- Translation of qualitative data
- Data Analysis

Methods

The survey instrument used by The Global Survey on Gender Gaps in the Sciences, was developed in collaboration with the American Institute of Physics (AIP).

Questions were designed to address specific developmental periods in the education and career of a scientist.

Methods

To understand representation of women in STEM fields, it is important to look at three life phases:

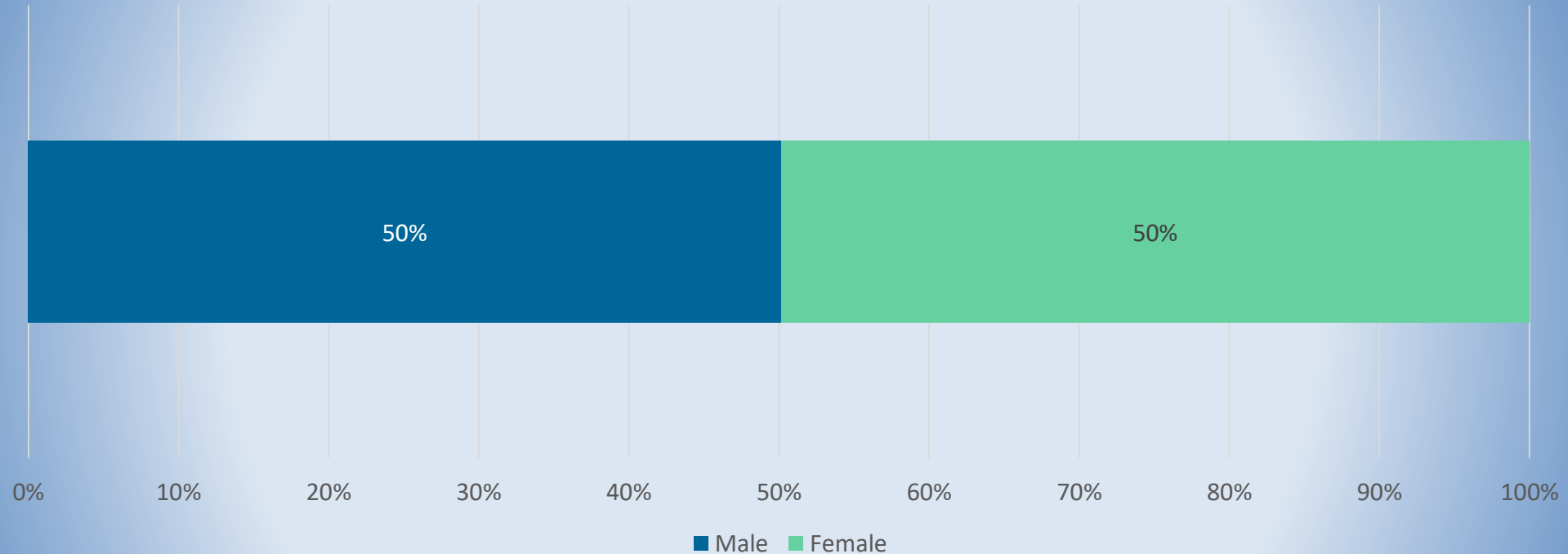
- 1) childhood,
- 2) early adulthood, and
- 3) professional life

The Global Survey on Gender Gaps in the Sciences takes these phases into account by assessing perceptions of scientists during their early years, university studies, doctoral studies, and career.

Methods

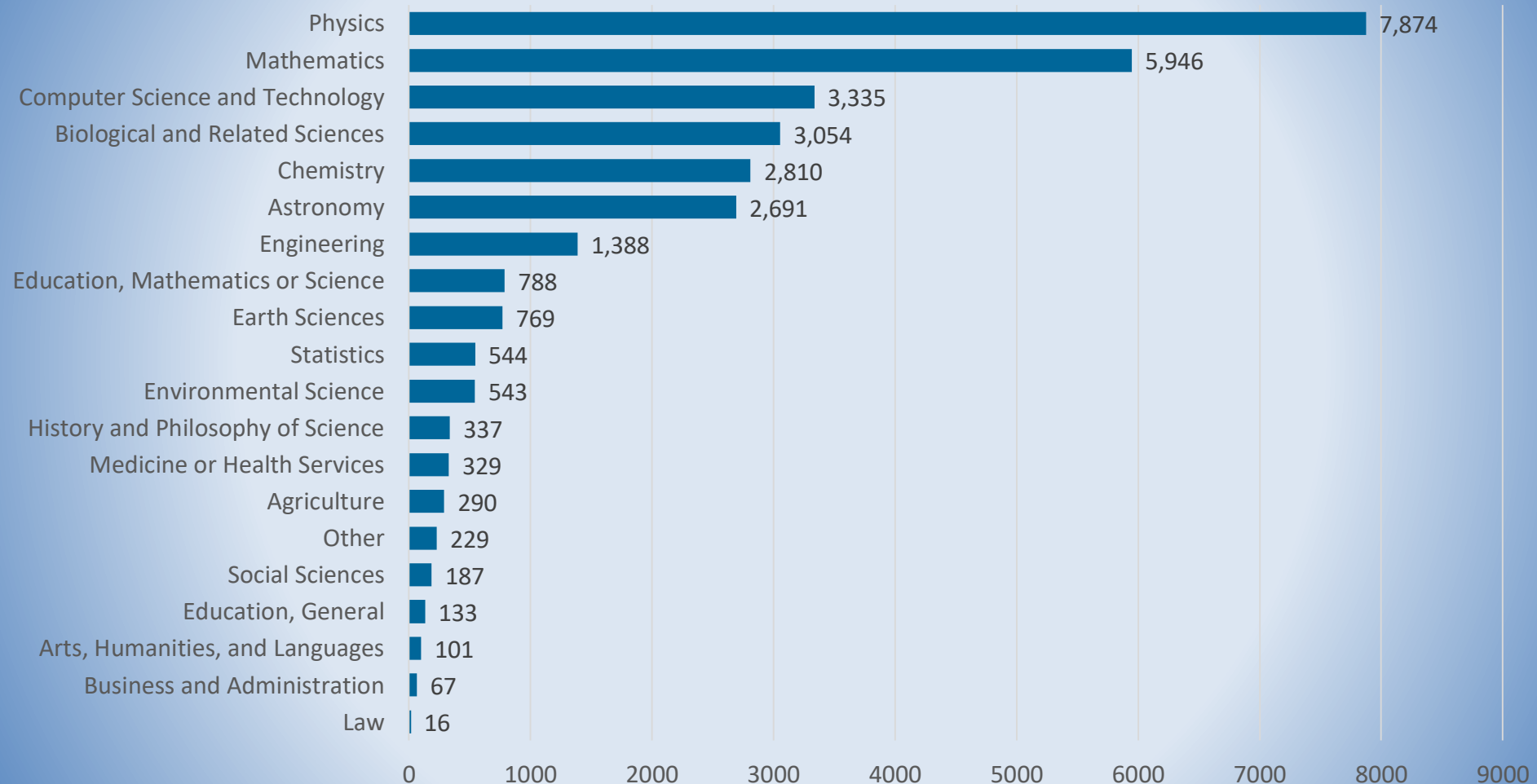
- The intentions of the project are to develop a broader picture of the status of mathematicians and scientists across the world.
- The following analysis is a snapshot of findings from the survey.
- Testing for statistically significant differences occurs between men and women within a single discipline, region, and societal development level.

Breakdown of Respondents to the Global Survey of Scientists as of January 1, 2019

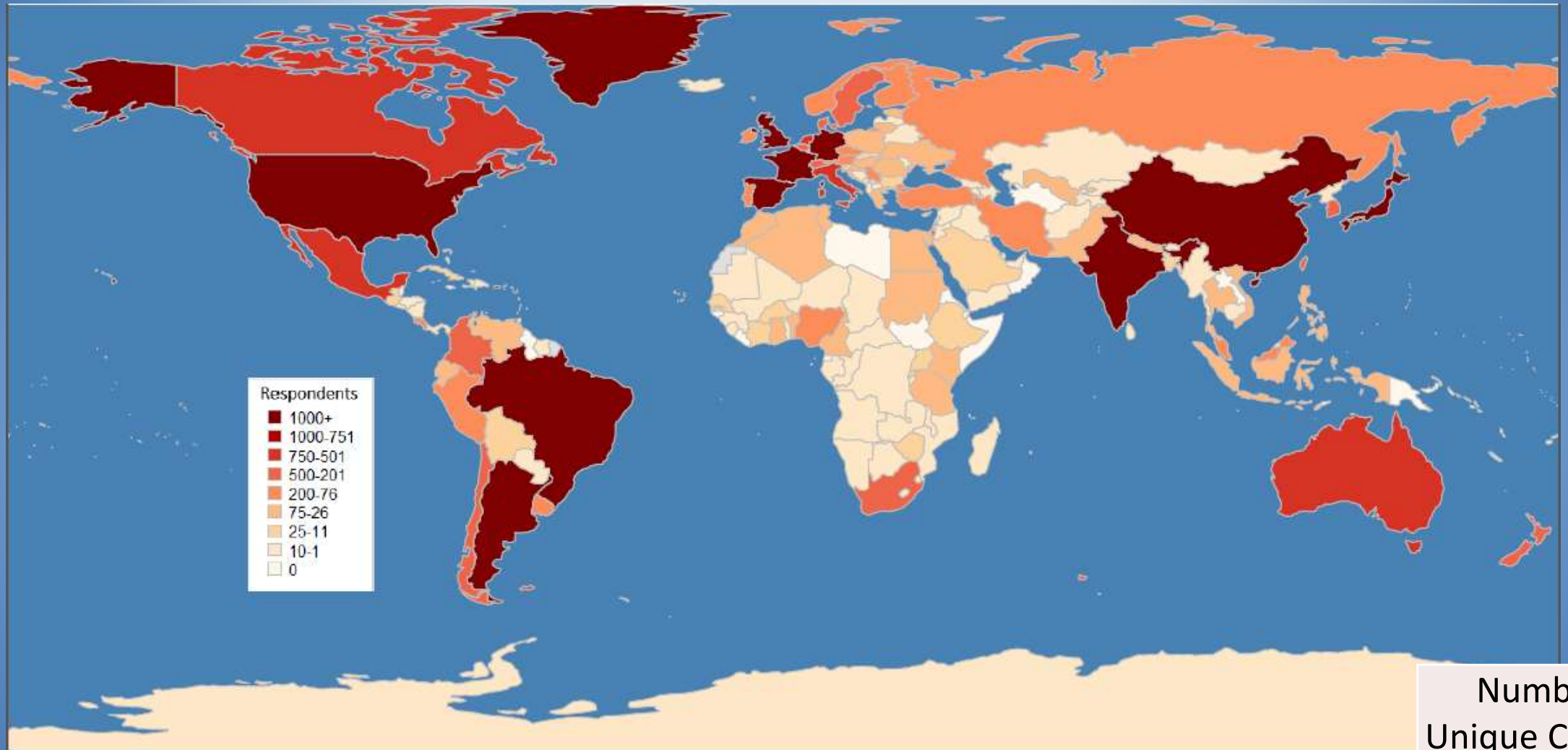


- There were a total of 32,406 respondents to the first question. Subsequent totals will vary based on skip patterns and question participation.
- 383 respondents preferred not to respond to the question querying their gender.

Number of Respondents in Primary Fields of Study

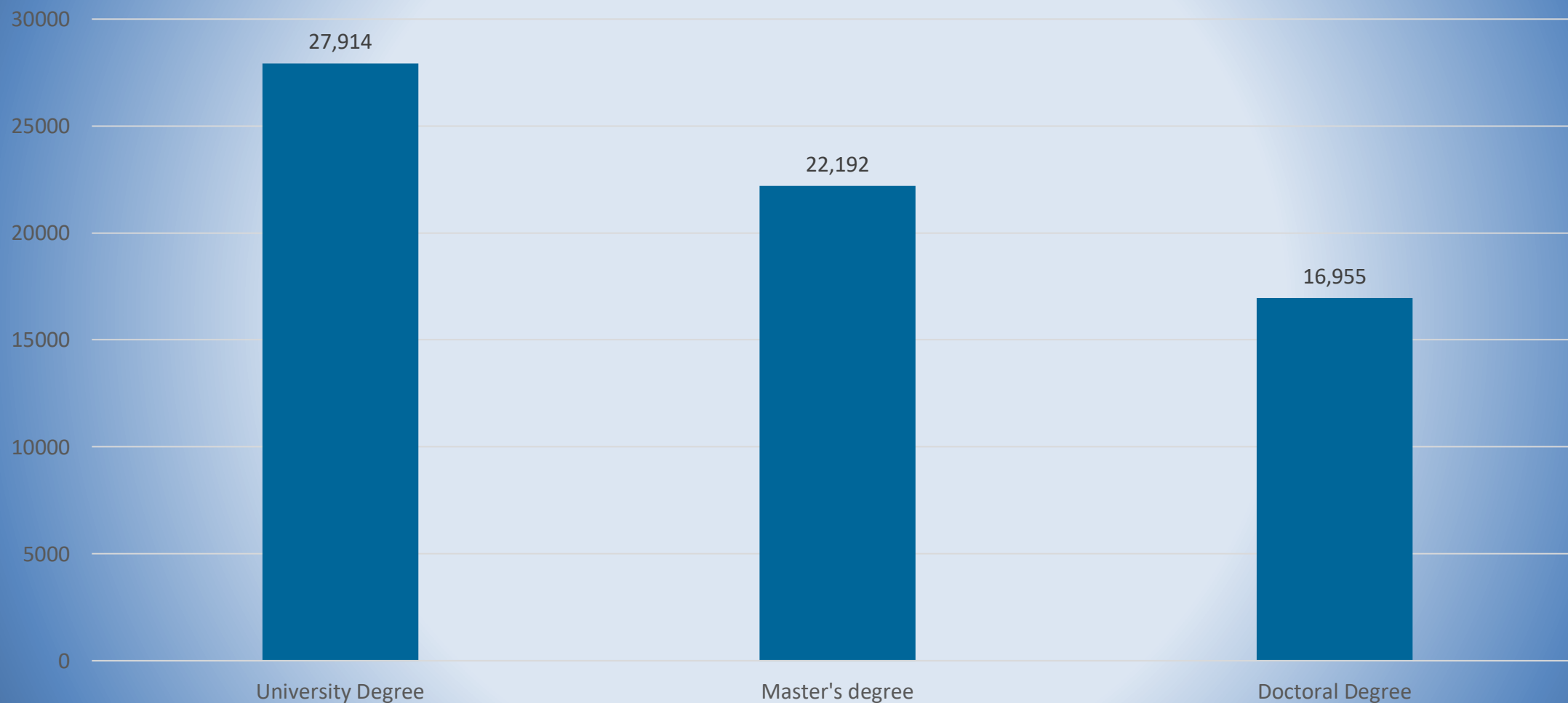


Representation Around the World



Number of
Unique Countries
159

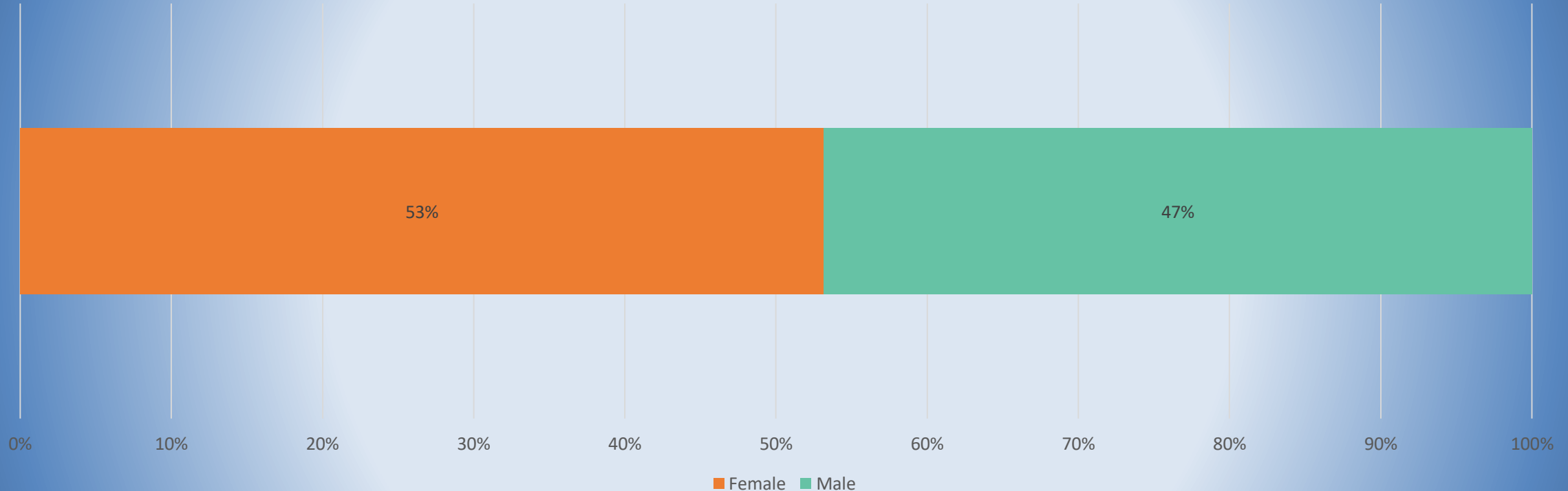
Education – Degrees Earned by Respondents



Latin America

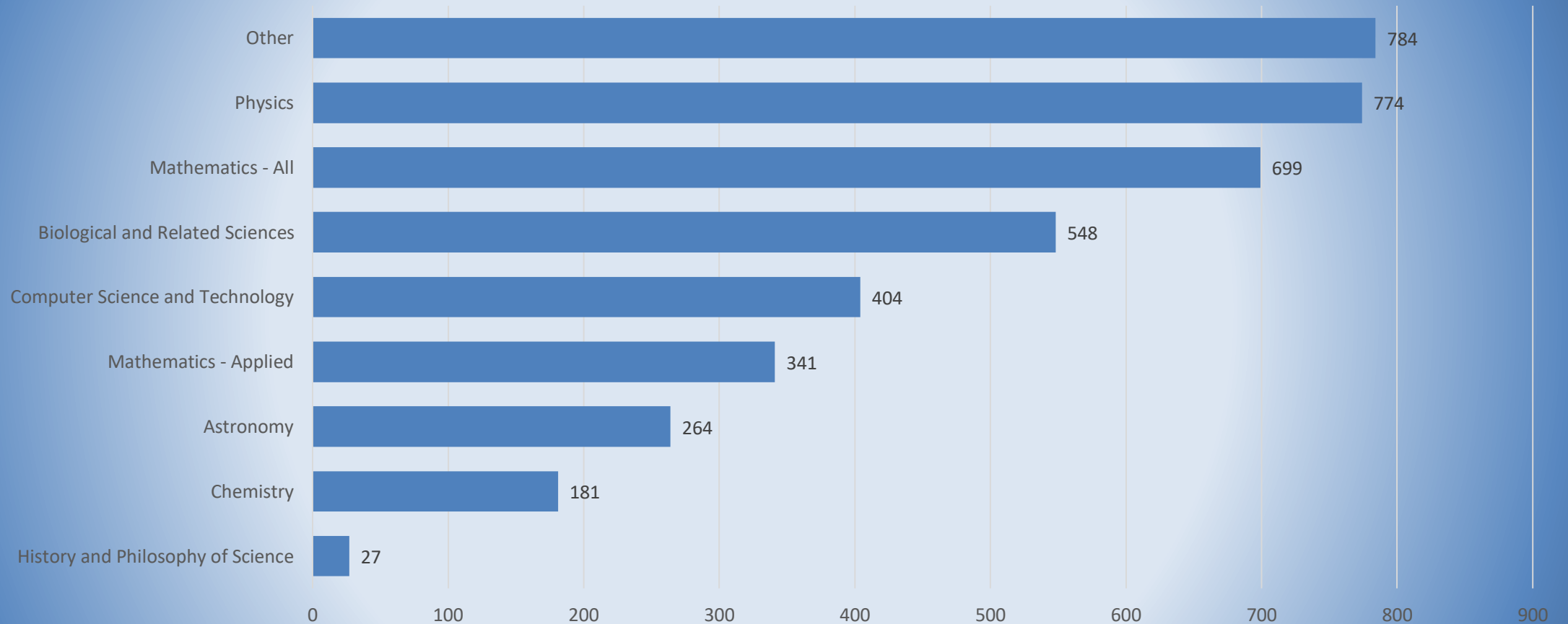
The following analysis includes results from South America, the Caribbean, and Central America.

Breakdown of Respondents to the Global Survey of Scientists

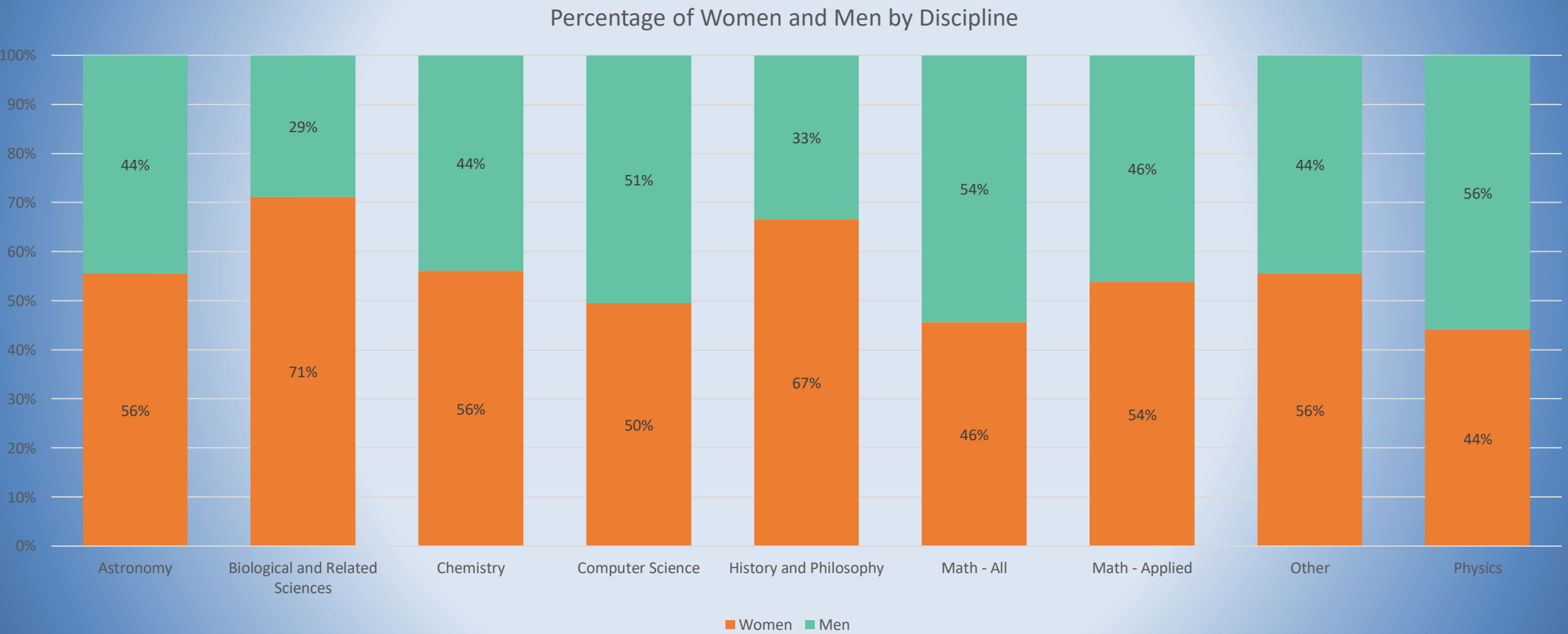


- There were a total of 4,020 respondents to the first question. Subsequent totals will vary based on skip patterns and question participation.
- 34 respondents preferred not to respond to the question querying their gender.

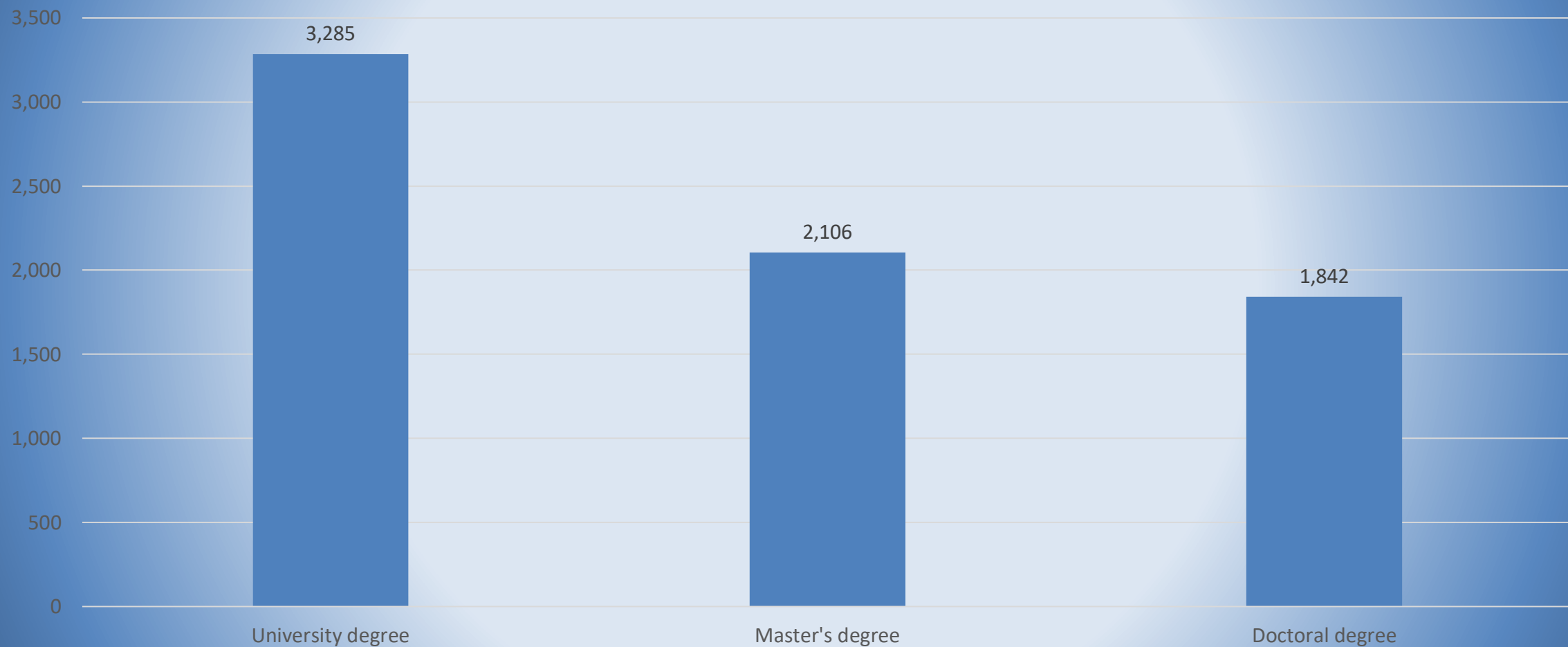
Number of Respondents in Primary Fields of Study



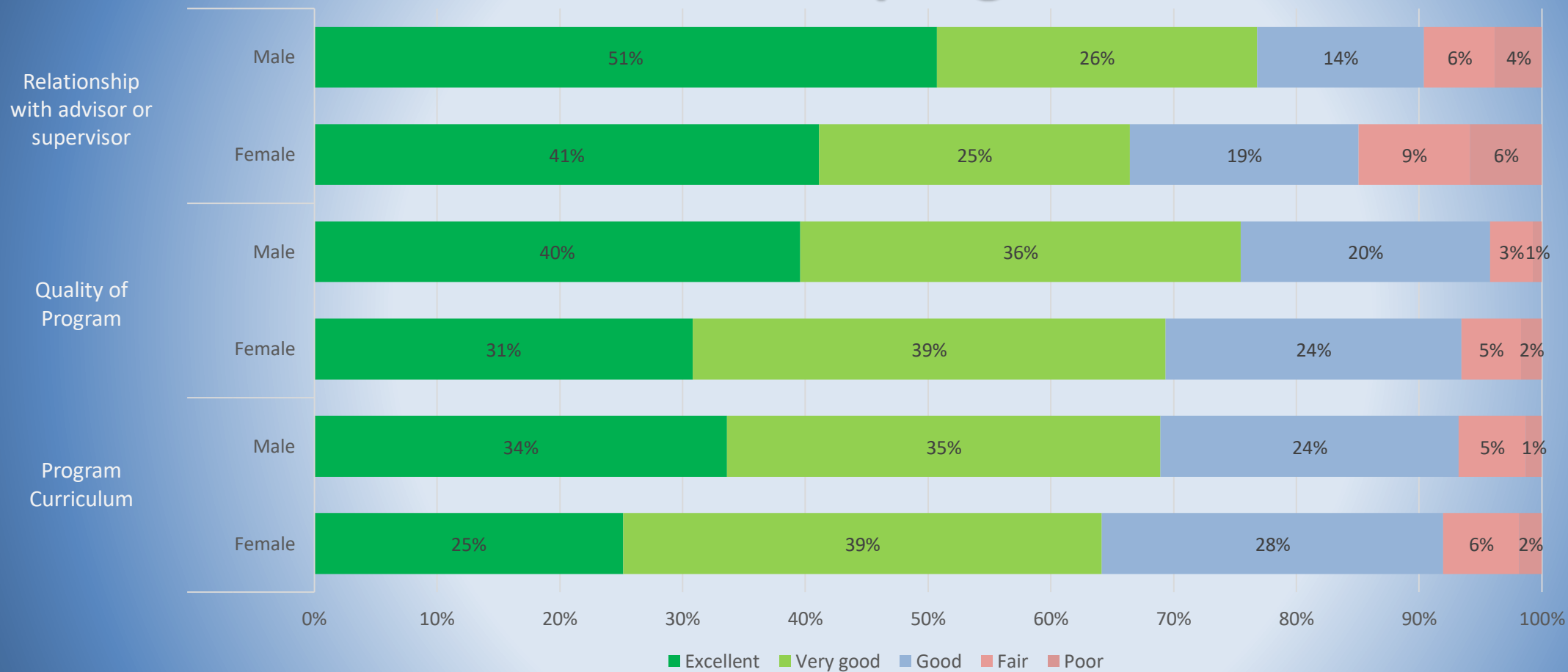
Discipline of Respondents



Education – Degrees Earned by Respondents

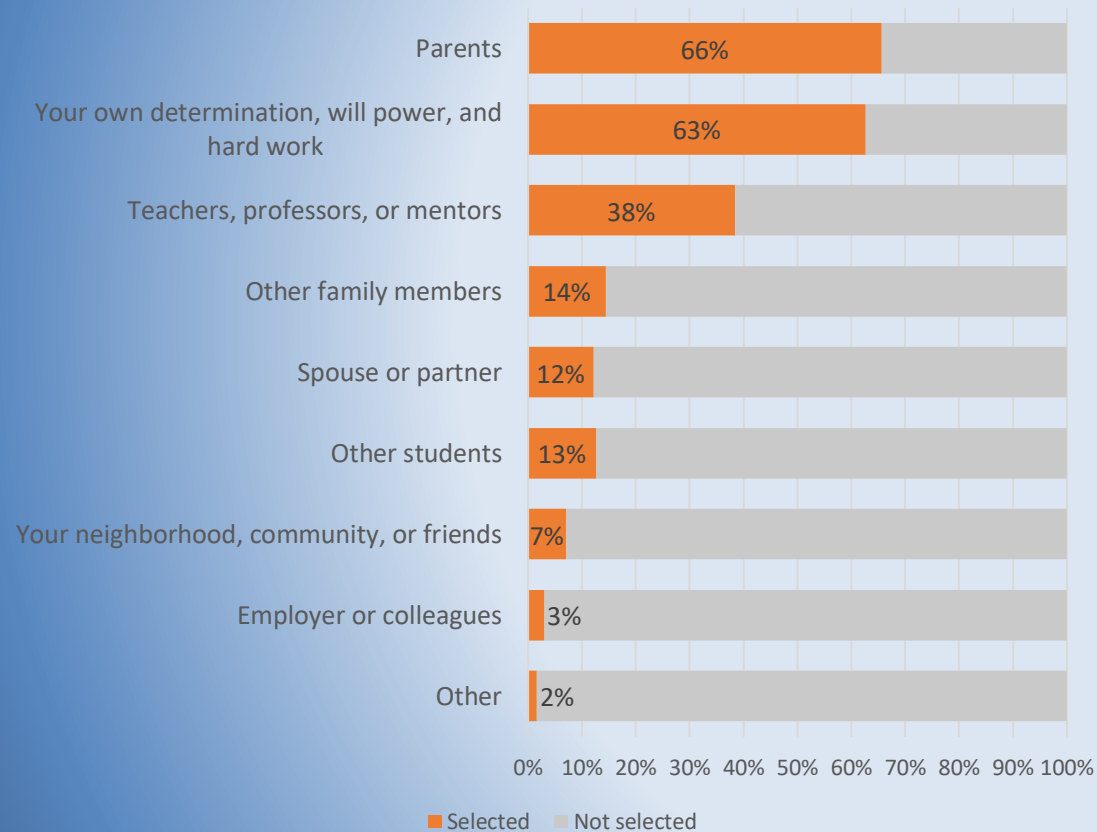


How would you rate your overall experience in your doctoral program?

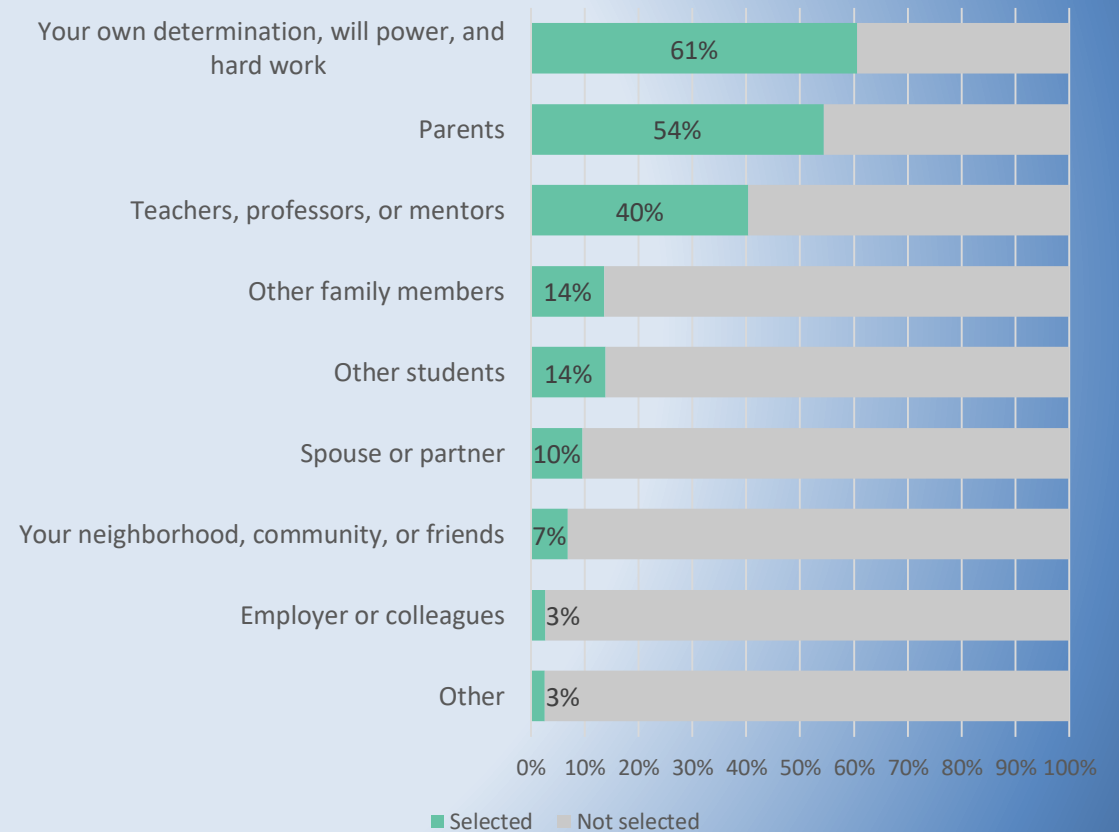


Who most encouraged you in your studies? Please select all that apply.

Female Responses



Male Responses



University Experience: Positive

“It was the most significant and decisive period of my life.” –
Math from Venezuela

"It was a very interesting experience in the sense that I learned about situations that I didn't know about from the natural world, about life, about living beings that you didn't even know existed."
Biology from Argentina

University Experience: Discouraged/Isolated

"Some of the lecturers actually discouraged me to continue my studies in front of a class of 60 students with 3 women. I realized that there was no point in attending his lectures and studied on my own, with results beyond 90 for the particular course." –
Physics from Brazil

"I was the only female in my class." Biology from Mexico

University Experience: Discouraged/Isolated

“When I started the program in physics I was the only woman and now at my work as a research teacher I am also the only woman and there are lot situations in which I am subjected to contempt and discrimination because of my gender.” Physics from Bolivia

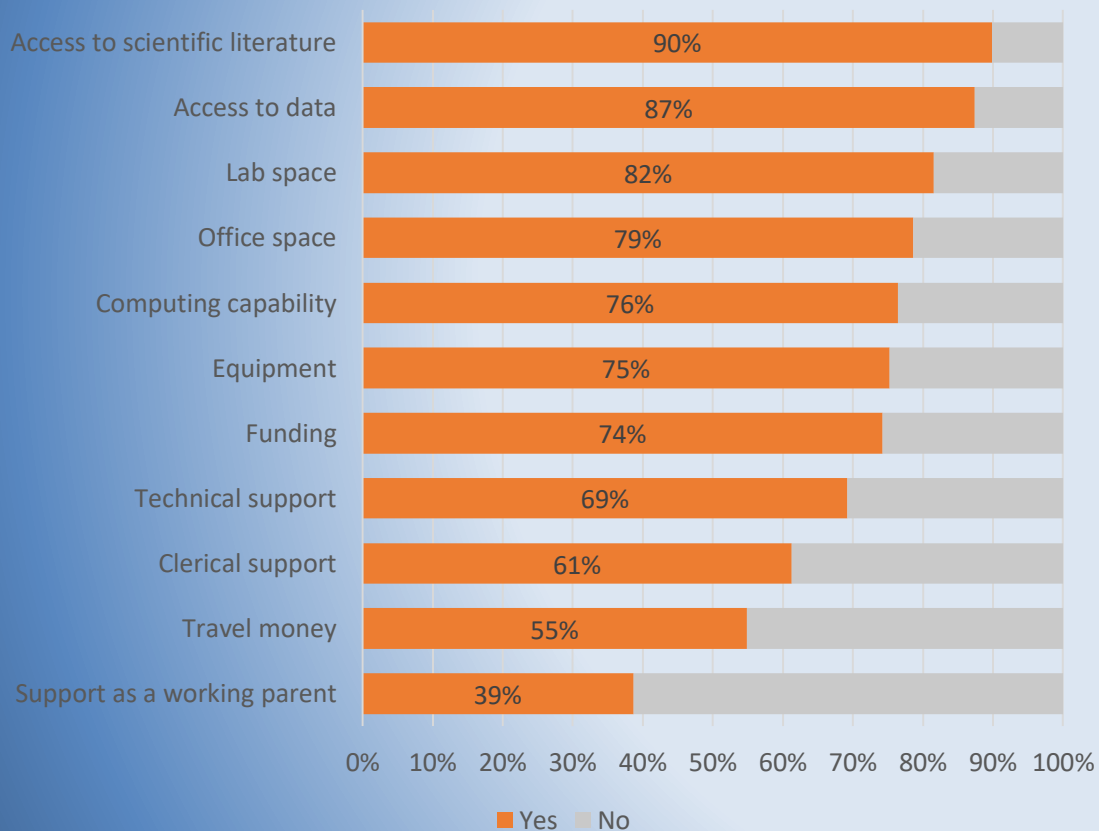
University Experience: Career Guidance

“There was neither guidance nor opportunities for getting involved in the job sector for scientific careers.” Biology from Venezuela

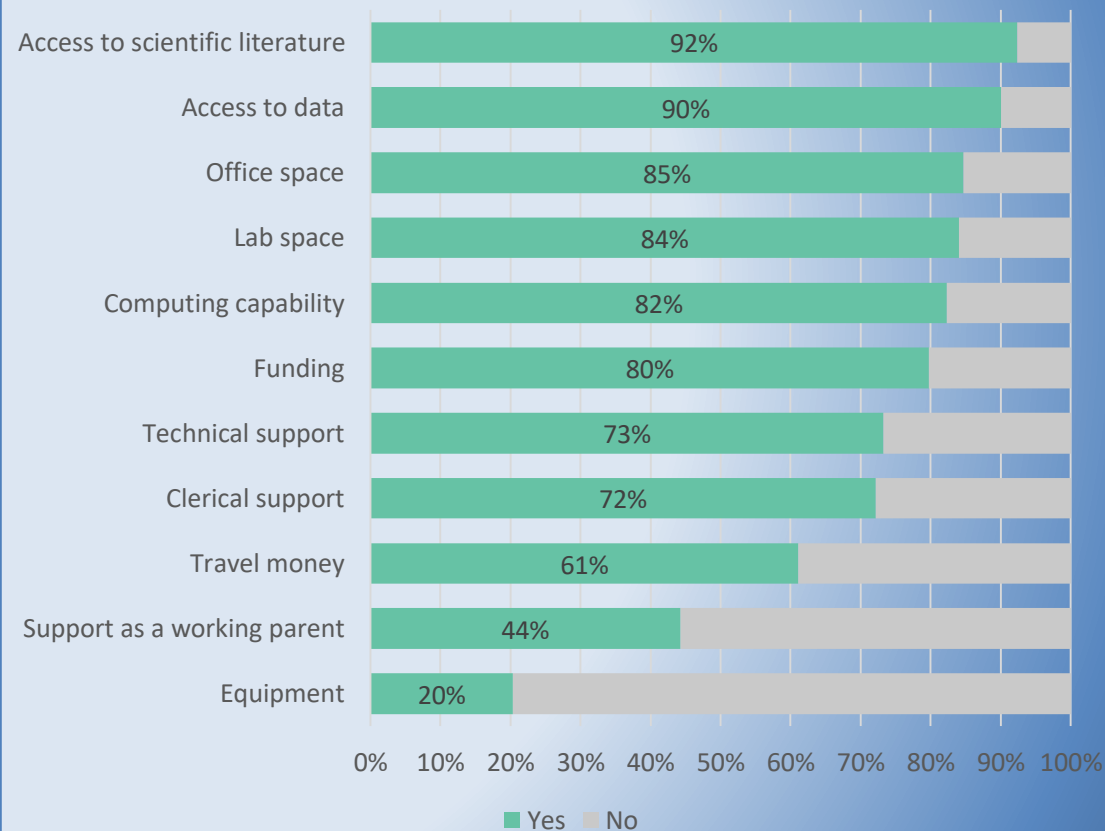
"I never had professional guidance. They offered me job counseling. I was poor and apparently my option was to find work at the end of high school. So what I've become professionally I've discovered along the way, a bit by chance. However, I always knew I wanted to be a researcher.” – Biology from Colombia

During your doctoral studies, did you have enough of the following to conduct or present your research?

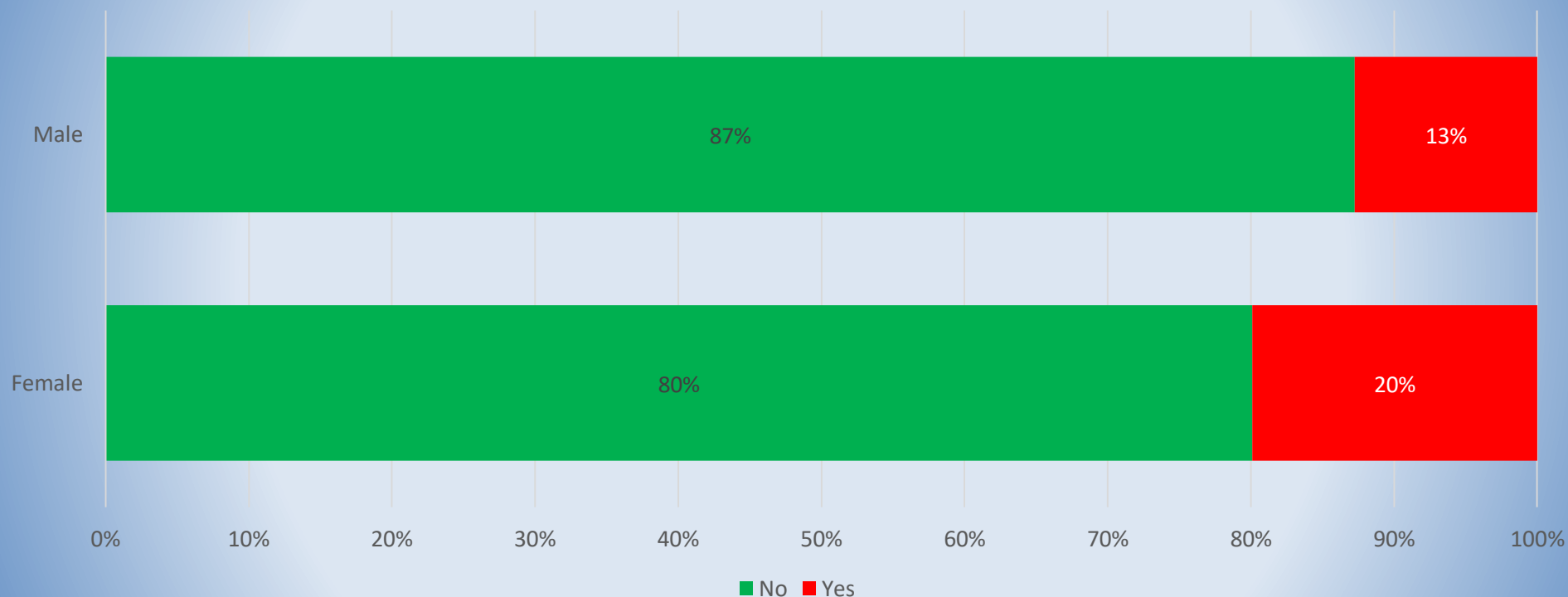
Female Responses



Male Responses



Have there been any significant interruptions in your doctoral studies?



Doctoral Experience: Support

“My doctoral experience was excellent, I had full professional and familial support, I completed it in 3 years (when the norm here in Brazil is 4) with a lot of success. The institute I attended (IMPA) gives full support to the student and I never heard about any prejudices of any kind.” Brazil

“The presence of honest and dedicated mentors who really want to help the doctoral student is important. Dialogue with a committee and with advisers is important.” Argentina

Doctoral Experience: Advisors

“My supervisor had a strong preference for two doctoral students, both of them men. He asked me to leave the doctorate program on more than one occasion.” CHL

“Harassment by my adviser, therefore I asked for change of thesis directors and it was granted, however I had to change the subject of the thesis.” Mexico, Physics

“When starting the doctorate, the new students are not told what the role of the director is during the program. It is taken for granted on the basis of tradition. This resulted in communication problems with my adviser.” Math from Argentina

Doctoral Experience: Harassment

“I started my doctorate with another supervisor, a man. He was my bachelor degree and master degree supervisor. But he was sexually harassing me. He died during the first semester and so I felt free and I was able to change my supervisor. I had a female supervisor and a person of excellent human qualities. If it hadn't been like that, I don't think I could have finished my doctorate.”

Mexico, Mathematics

Doctoral Experience: Resources

“At the university where I am, there are many scholarship holders, and we have no office or no desk of our own. There is a lack of equipment, but we can go to other universities or work groups that help us. The lab is small and we have to take turns to work, so it often results in delays.” Argentina, Chemistry

Doctoral Experience: Resources

“The lack of technical support took a lot of my time because I always needed to learn from the beginning and prepare my own solutions and how to use equipment.” Brazil, Biological and Related Sciences

“I spent a year waiting for my supervisor to read and correct my thesis, that year I was without a scholarship, with another part-time job and living off my savings. I didn't end up getting a postdoctoral scholarship because I didn't complete my doctorate.” ARG, Chemistry

Doctoral Experience: Doubt

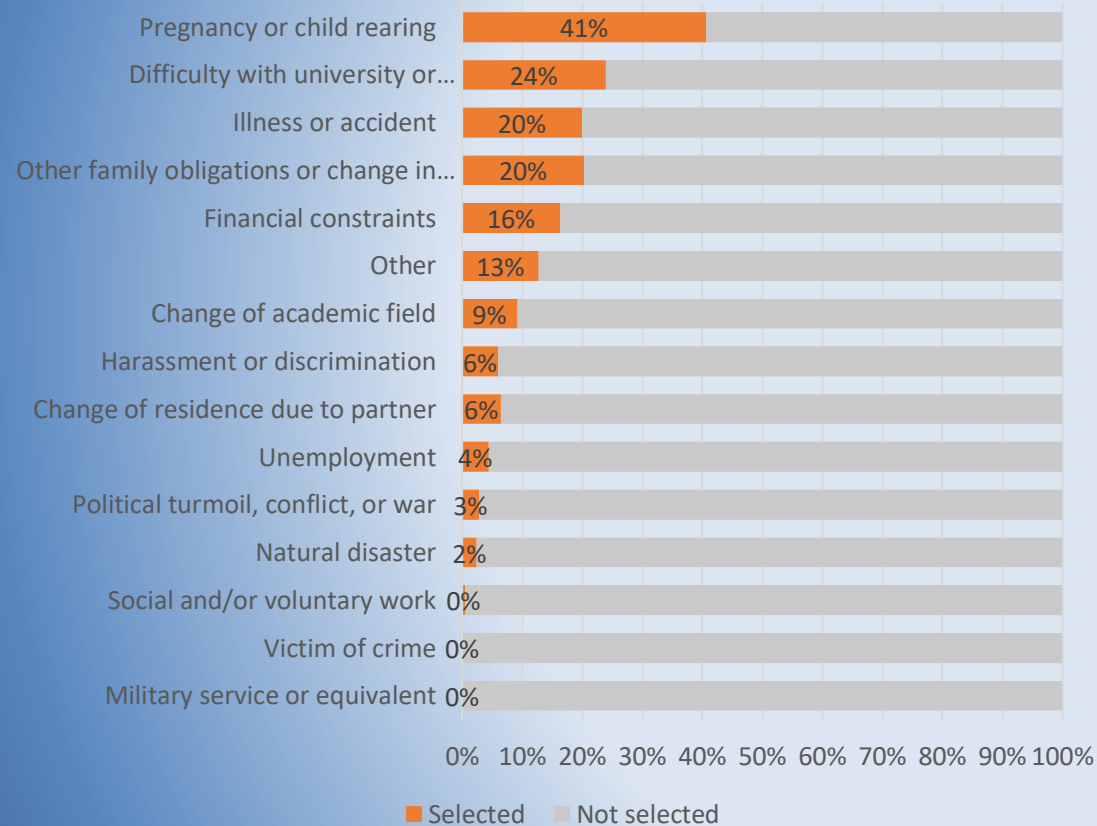
“I was very insecure about what I was doing.” Mexico, Physics

“It was stressful, I always feel alone and in debt to find my thesis” Brazil, Computer Science and Technology

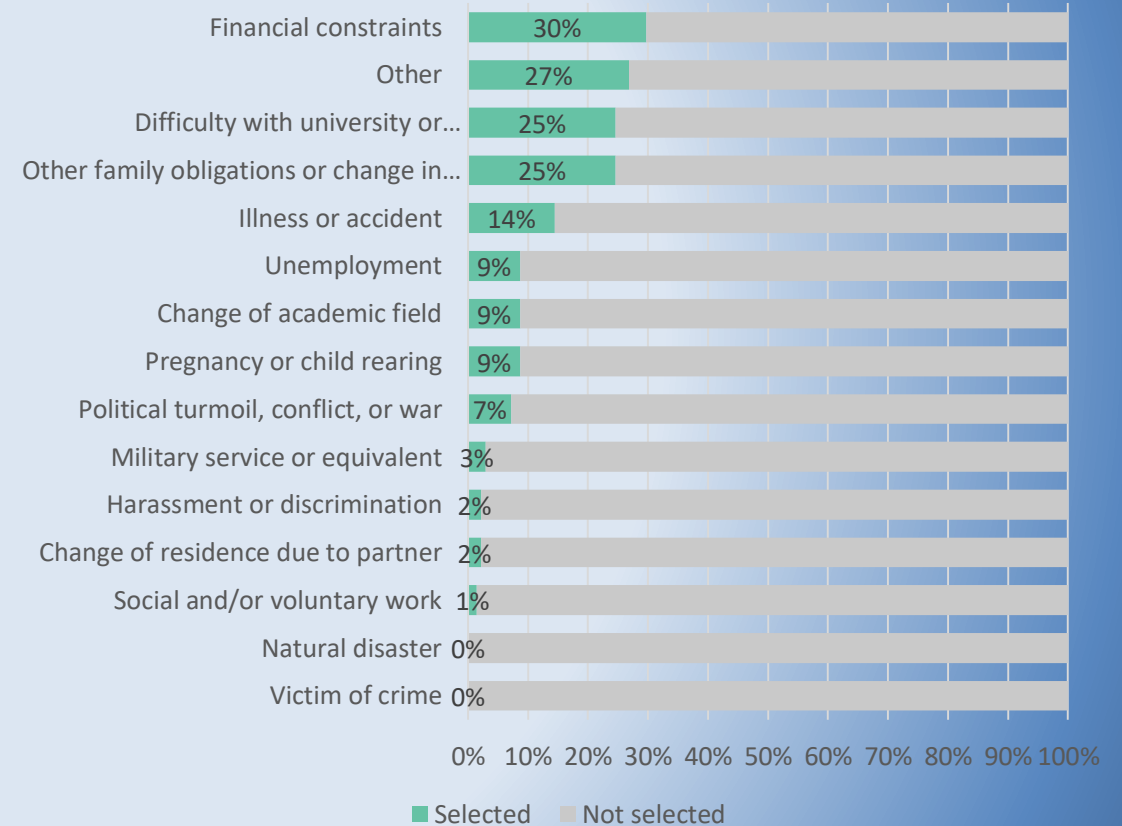
“No, I'd rather not remember it.” Argentina, Physics

What were the main reasons for the interruption?

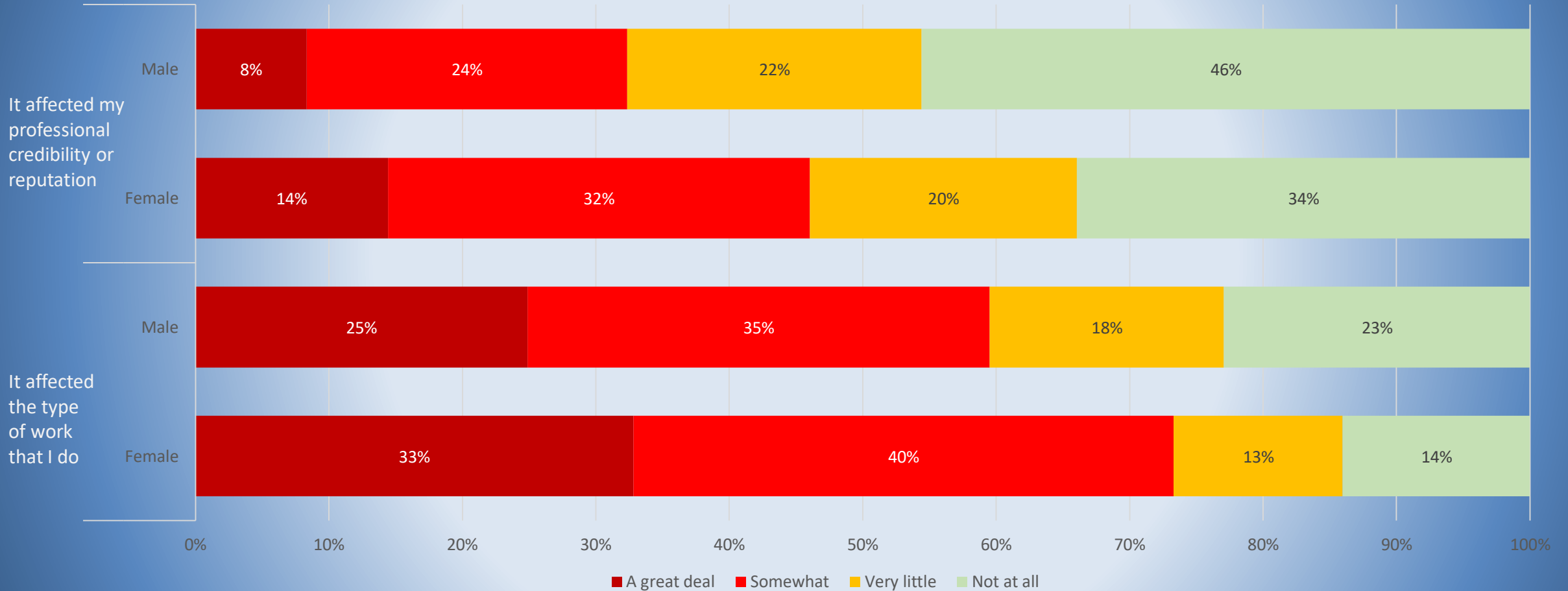
Female Responses



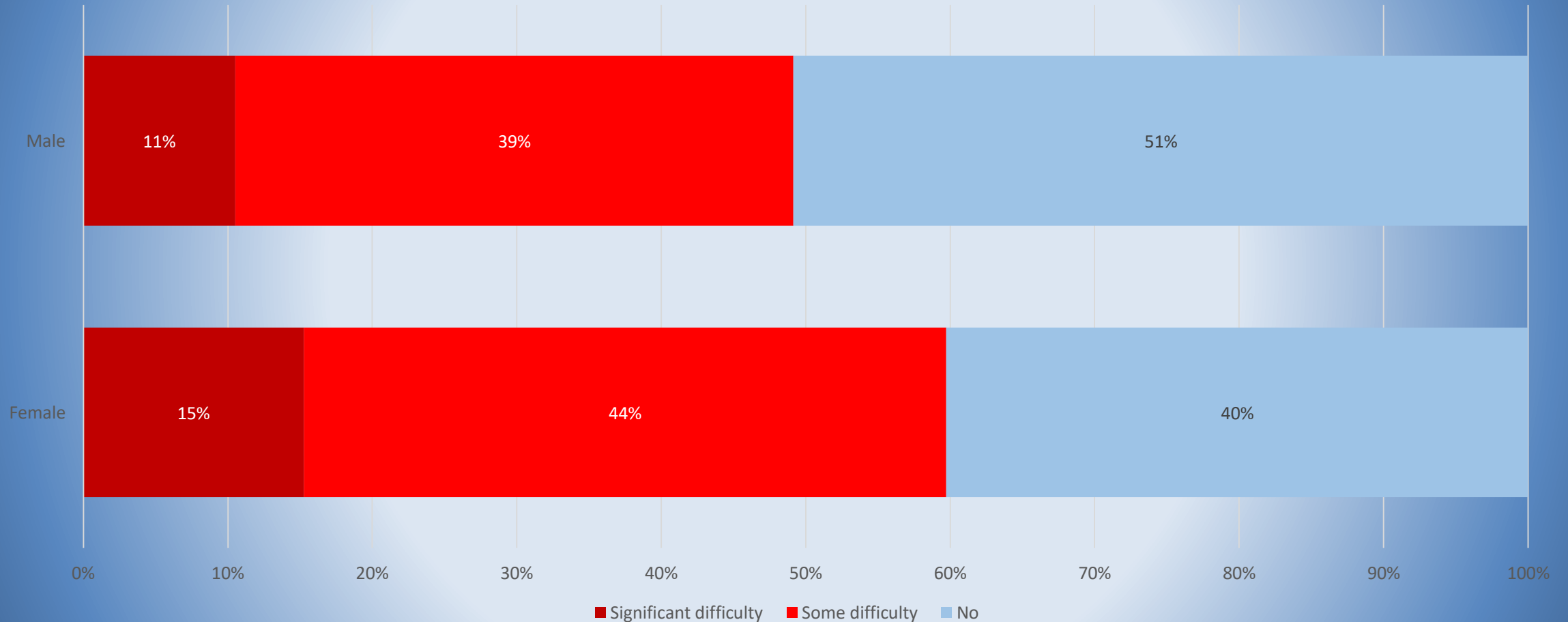
Male Responses



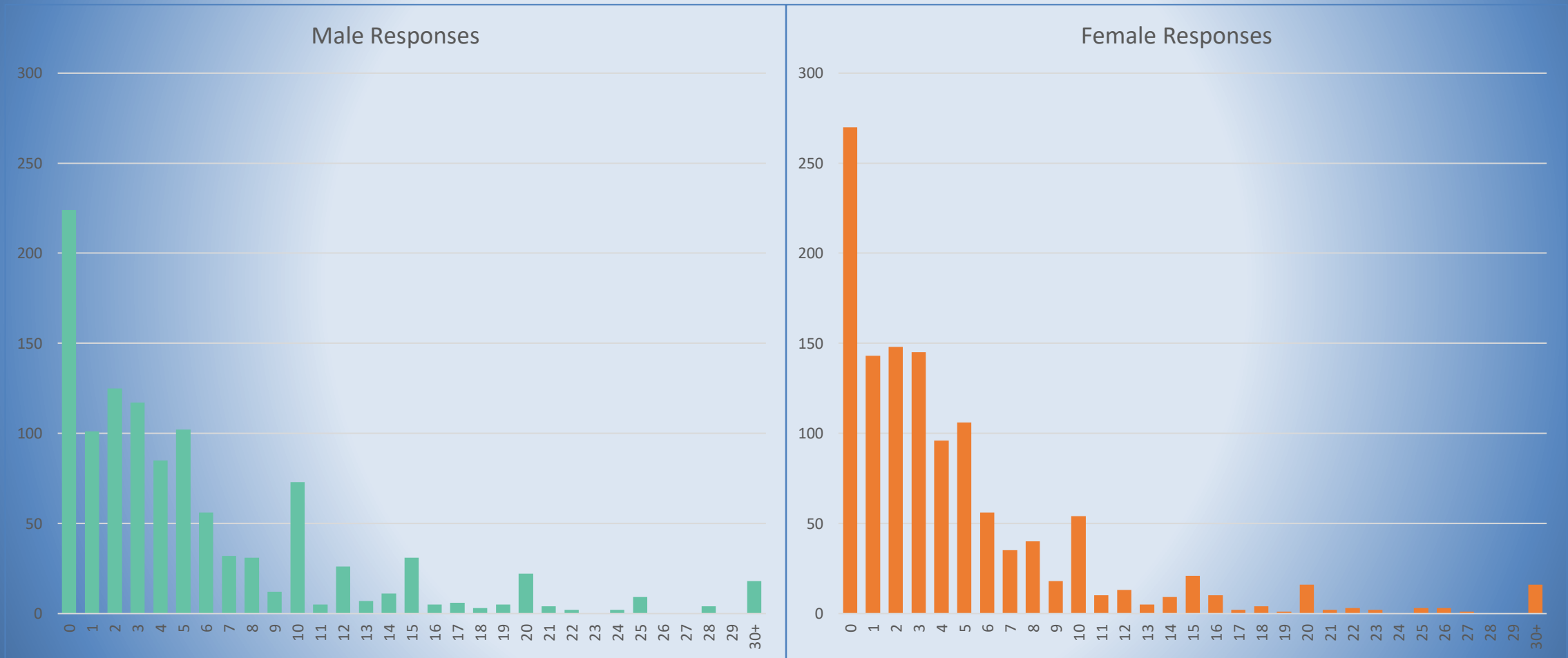
Did the break or slowdown significantly affect your career?



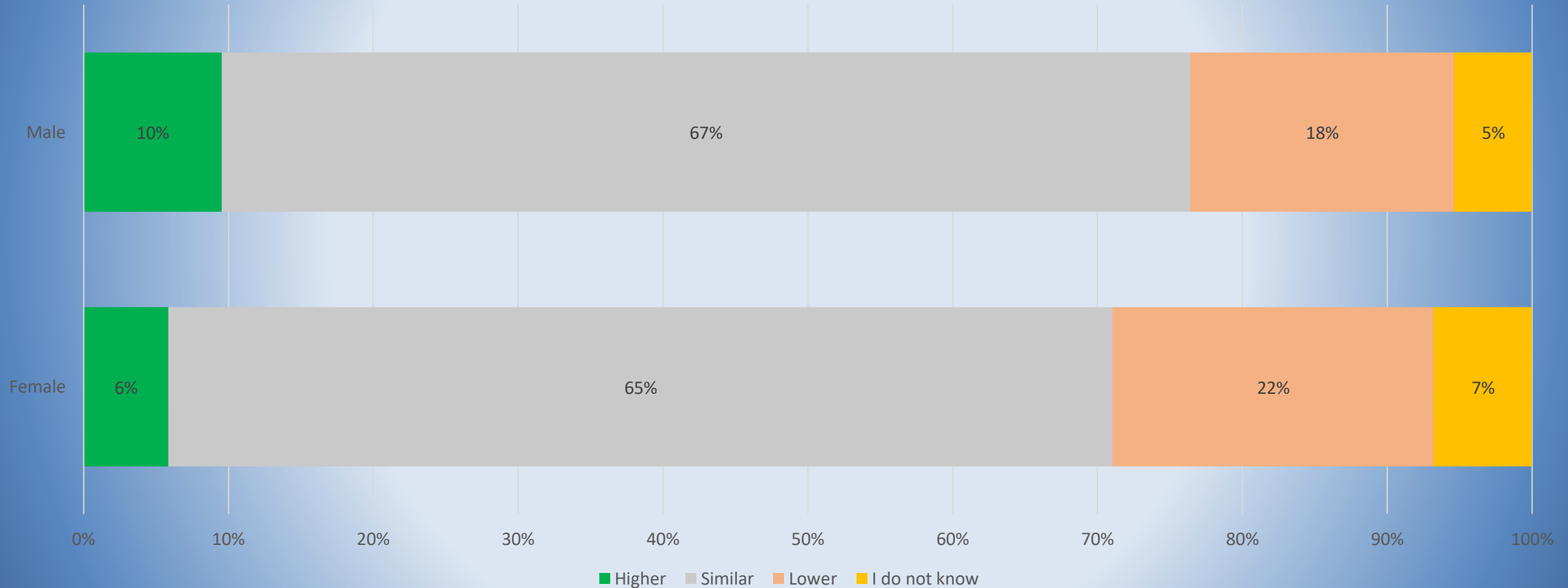
Have you had any difficulty finding positions or professional opportunities?



During the last five years, how many articles have you submitted to journals that are top-ranked in your field?

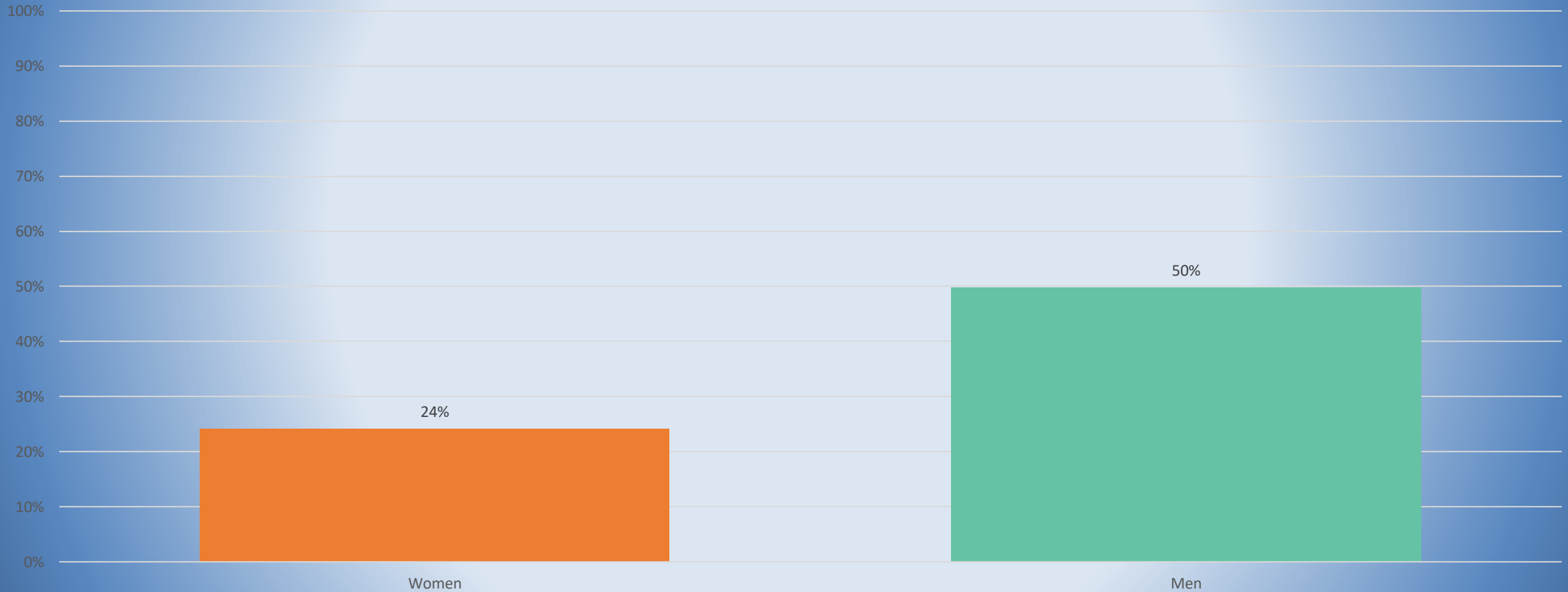


Compared to your colleagues in your workplace with similar qualifications as yours, do you think your salary/pay is:



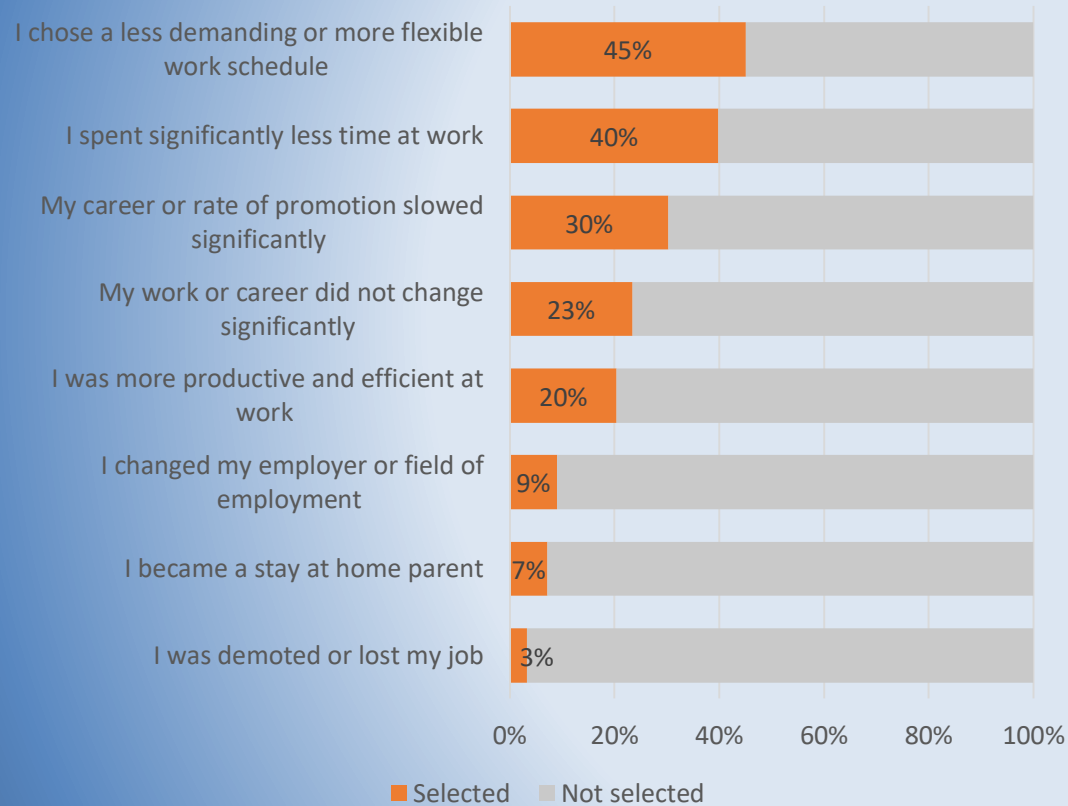
Percentage of Women and Men Reporting Making More than their Spouses

Percentage of Women and Men Reportedly Making More than their Spouses

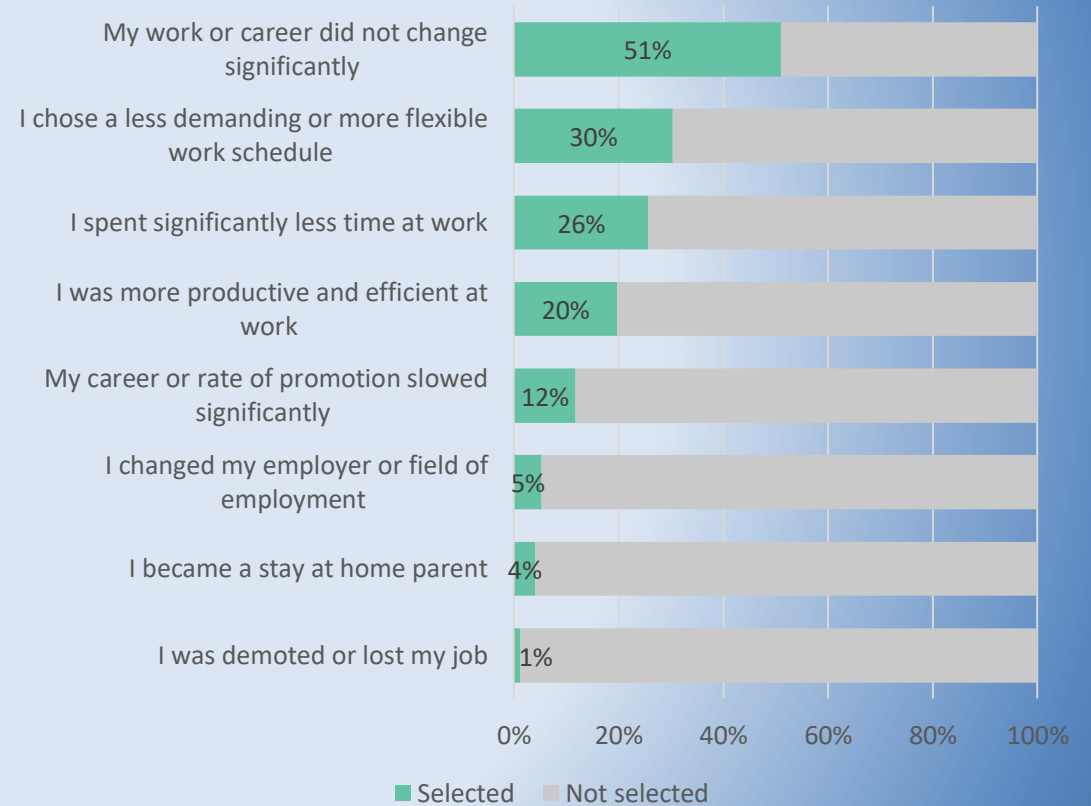


How did your work or career change because you are a parent?

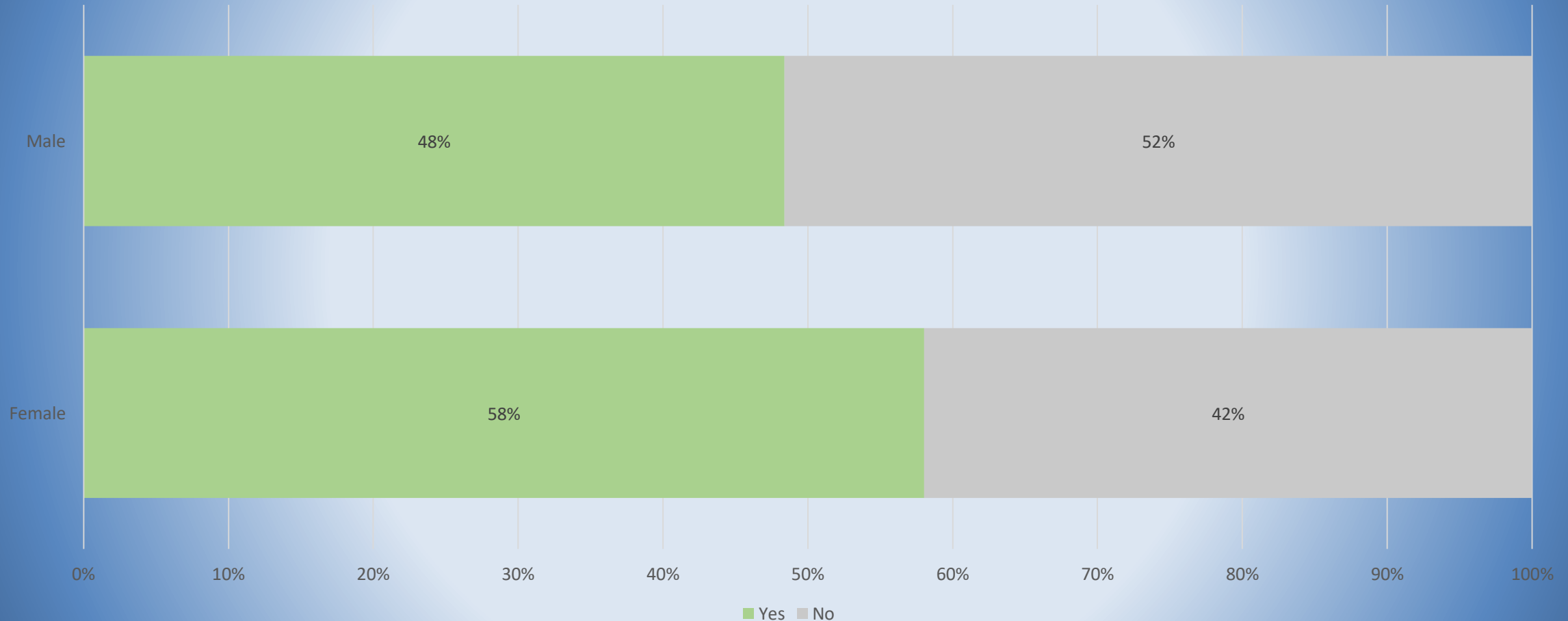
Female Responses



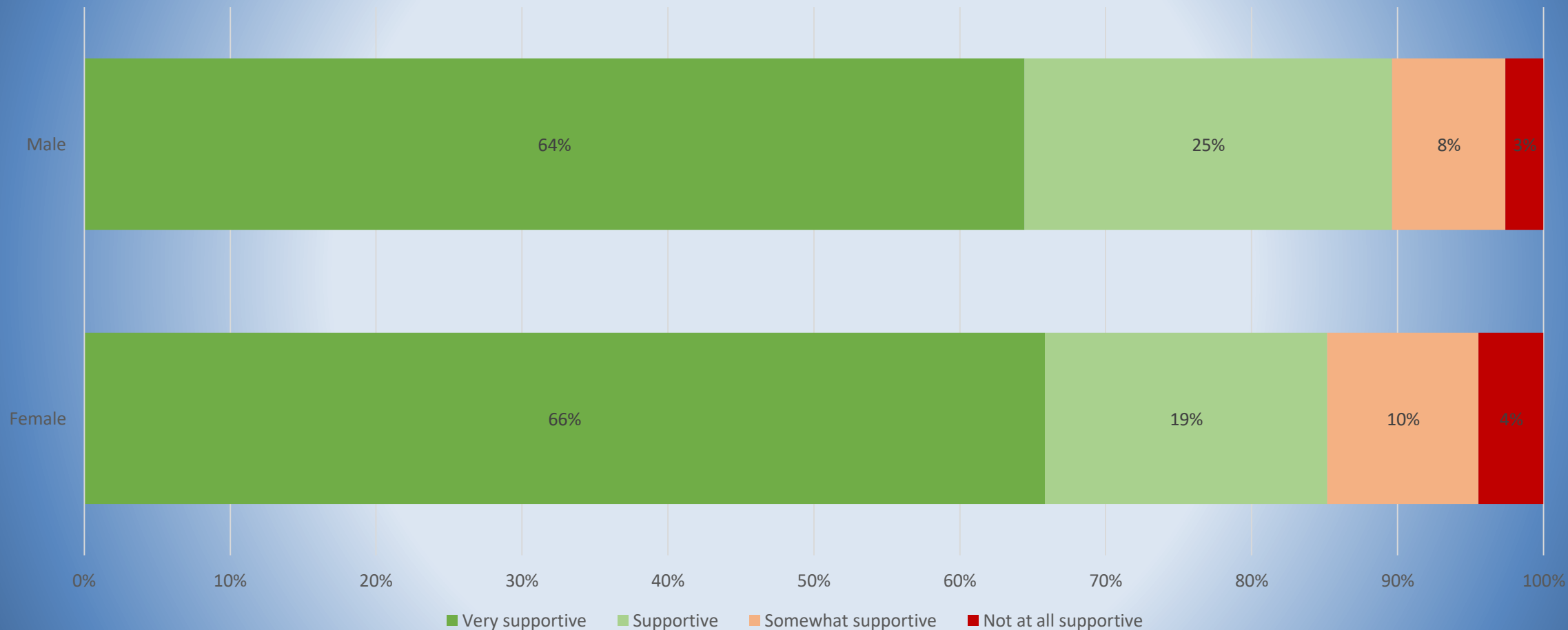
Male Responses



Has your career influenced your decisions about children, marriage, or a similar long-term partnership?

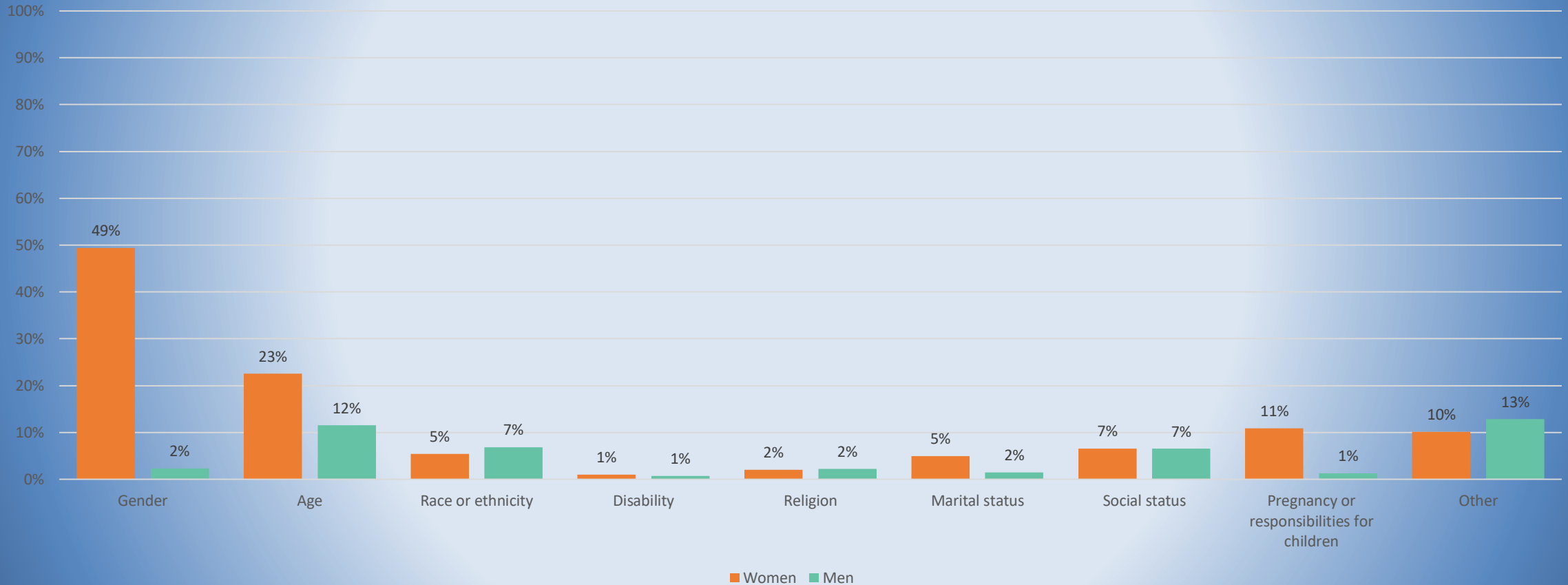


How supportive has your partner or spouse been of your work?



Percentage of Women and Men Selecting Sources of Discrimination

Percentage of Women and Men Selecting Sources of Discrimination



Discouraged by Discipline

	Research	Funding	Interaction with colleagues	Workplace environment	Personal life	Family obligations	Other
Astronomy	X		X	X	X	X	
Biological and Related Sciences	X	X	X	X	X	X	X
Chemistry	X		X	X	X	X	X
Computer Science and Technology	X	X	X	X	X	X	X
History and Philosophy of Science	X	X	X	X		X	X
Mathematics	X	X	X	X	X	X	X
Mathematics - Applied	X	X			X	X	X
Physics	X	X	X	X	X	X	X
	X = more						

Discouraged: Funding

“Sometimes it is very difficult to get funds.” BRA, Physics

“As I said before, I am from Mexico which is not a country that really cares about science in general, being a minority is always hard, I'm a woman, Mexican, studying physics in a country where funds are minimal and on top of that you question yourself about your abilities as a scientist for not being able to really do research as an undergrad and therefore having no experience in the field.” Mex, Physics

Discouraged: Funding

“Having to encourage people to do research is difficult because they are not interested; the lack of money for doing research makes the process difficult.” ECU Biology

“Difficulty getting funding. Lack of appreciation by colleagues. Building problems mainly due to lack of funding.” ARG Mathematics

Discouraged: Workplace

“Research: sometimes I cannot see real meaning in some projects Funding: Brazil (and other countries) are not investing in science and education. Many projects are failing due lack of support. Workplace environment: I have NO window in my office. Nine hours of white, cold light and the computer monitor. I don't know if it is day, if it is raining... I am coming home later every day.” BRA Biological and Related Sciences

Discouraged: Workplace

“Harassment through anti-Semitic and misogynistic public emails on the part of a golden colleague from the department and a lack of action on the part of the school. Luckily, I did have support from my department.” ARG Computer Science

“My university does not support science and the administrative workload is enormous and does not allow you to advance in your field of research. The work environment isn’t academically challenging and extremely mediocre.” ECU Biology

Discouraged: Workplace

“The stress that research produces, the need to publish and to be evaluated constantly (to ask for funding, scholarships, and a stable position) is discouraging for continuing in the field of research. During research, the lack of funding for networking, attending conferences, makes you feel really isolated and outside of the math environment. On a personal level, I have felt discouraged at not being able to balance my program with my former partner, who was not in the academic environment. To be able to continue my postdoctoral education involved a change of residence and that change was not well supported by that person. I can see the difference in this regard, since I currently involved with someone in the academic environment who supports that kind of change and seeks them out for himself as well.” BRA Mathematics

Discouraged: Workplace

“Limited support for resolving administrative, management, liaison problems.” - MEX Computer Science and Technology

“The academic environment is very competitive and men dominant, so sometimes I felt less capable than my colleagues. Besides that, we have more people and fewer jobs in the field, this decrease chances by getting funding.” BRA Physics

Discouraged: Resources

“The work environment at my university is very competitive, women are underestimated or undervalued, and that makes it difficult to get funding, which generally is determined by groups led by men.” URY Physics

“Poor funding, I sometimes feel like my colleagues don't respect me or that they treat the men in the group better. This whole unfair work environment sometimes makes me unhappy.” ARG Chemistry

Discouraged: Resources

“Due to a lack of spaces for support and consideration of the personal problems that affect academic development.” ARG Biological and Related Sciences

“Funding is always scarce, as are research positions. The insecurity of whether I will be employed next year was always a concern.” BRA Physics

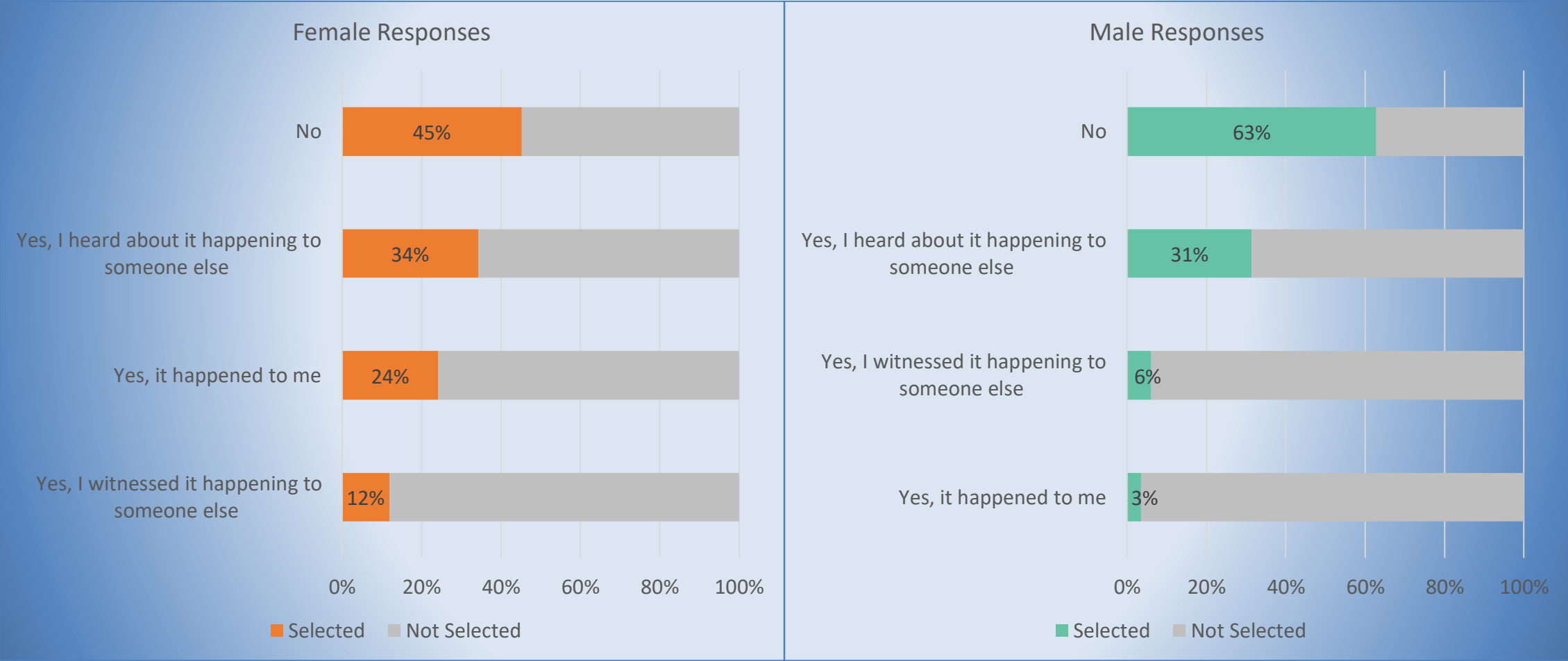
Discouraged: Career

“There was no recognition of my work.” MEX Mathematics

“Delaying my progress compared to other colleagues has discouraged me, as have the low wages or excessive amount of domestic and professional work.” ARG Physics

“I want to do research because that's what I'm passionate about, but it's a reality that salary in industry is much higher.” ARG Chemistry

Have you ever encountered sexual harassment at school or work?



Discriminated

- Not sleeping with my teacher and being an immigrant
- Being a foreigner
- I work in a private university and people very often look down on our work.
- Sexual orientation
- Being 'pretty'

Discriminated

- Being not friend of the director
- Colleagues who want to stand out at the expense of others
- Subjectivity of the evaluator due to a lack of objective and quantifiable evaluation criteria
- Being not friend of the director
- Colleagues who want to stand out at the expense of others
- Subjectivity of the evaluator due to a lack of objective and quantifiable evaluation criteria

Key Findings

- Women and men respondents most likely to select their primary field during secondary school.
- Women (66%) were more likely than men (55%) to say they were supported by their parents during their university degree.
- There were no gender differences reported when participants were asked about their overall experience in their doctoral program; 86% of women and men indicated their relationship with their advisor or supervisor was excellent, very good, or good.

Key Findings

- When asked about their doctoral program, women were more likely than men to disagree with the statements: my program treated everyone fairly, other students were respectful of everyone, and I had support from my advisor or supervisor.
- There were no gender differences reported in access to resources to conduct or present research during doctoral studies. There were no gender differences reported in primary sources of financial support during doctoral studies.

Key Findings

- Gender differences were found in the workplace. Women (29%) were more likely than men (22%) disagree with the statement, “my employer treats everyone fairly”. Women (25%) were more likely than men (17%) to disagree with the statement, “My co-workers are respectful of everyone.”
- Women (33%) were less likely than men (42%) to have indicated they received enough funding to conduct or present their research.

Key Findings

- Women and men reported similar rates applying for grants over the past 5 years, approximately 3.8 applications. Women and men reported similar rates of being awarded grants over the past 5 years, approximately 2 grants awarded.
- Women and men reported different rates of career progression when compared to colleagues who graduated at the same time. Women (33%) were more likely than men (23%) to say their careers progressed more slowly.

Key Findings

- Women and men reported different salary/pay when compared to colleagues with similar qualifications. Women (22%) were more likely than men (19%) to indicate they were made a lower salary.

Key Findings

- During their career, women were less likely than men to have: conducted research abroad, acted as a boss or manager, served on committees for grant agencies, or to have served on important committees at your institute or company.
- After becoming a parent, women were more likely than men to choose a less demanding or more flexible work schedule, spend significantly less time at work, and report that their career or rate of promotion slowed significantly.

Key Findings

- Women were more likely than men to say they felt discouraged about their field because of research, funding, interactions with colleagues, workplace environment, personal life, and family obligations.
- Women (22%) were more likely than men (3%) to say they have personally encountered sexual harassment at school or work.

Key Findings for Caribbean and Central America

In total, we received responses from 673 individuals who listed a country within the region of Caribbean and Central America as their geographic location. Of these respondents, roughly 52% percent identified as female and 48% identified as male.

Key Findings

- Participants rated their overall experiences during their doctoral program favorably; 91% of women and men indicated their program curriculum was excellent, very good, or good, 92% of women and men indicated the quality of their program was excellent, very good, or good and 90% of women and men indicated their relationship with their advisor or supervisor was excellent, very good, or good.
- There were no gender differences found in resources needed to conduct or present research during their doctoral program.

Key Findings

- There were no gender differences found in primary sources of financial support during their doctoral studies.
- Women and men reported similar rates applying for grants over the past 5 years, approximately 3.5 applications. Women and men reported similar rates of being awarded grants over the past 5 years, approximately 1.7 grants awarded.
- Women were more likely than men to report discrimination based on gender and age.

Key Findings

- Women (79%) were more likely than men (45%) to say their work or career changed significantly after becoming a parent.

Key Findings

- Approximately 56% of women and men said they felt discouraged about their field because of workplace environment and ~75% of women and men said they felt discouraged about their field because of funding.
- Women (33%) were more likely than men (4%) to say they have personally encountered sexual harassment at school or work. Fifteen percent of women compared to 5% men said they witnessed sexual harassment happening to someone else.

Success: Mom

"My family has a incredibly tough background when I started... We've become very poor at some point, so without the government support...I could not have access to basics needs, as simply food to eat. General support from others members of family to buy clothes and school material was necessary as well. And I've always had a very believer mother who pushed me to move on to my dreams. " - BRA Physics

"Financial and emotional support delivered by my mother, encouragement from friends and access to therapy." BRA Mathematics

Success: Mon

“Support from my mother and the benefit of having gotten a scholarship for my doctoral studies.” COL Mathematics

"To be honest, in my country there is very little financial support for low-income youth. My mother was the one who supported me to pay the costs of my program, since I attended a public university, where tuition costs are affordable. Thanks to the support of my mother, family and the part-time work I did, I was able to graduate from the National University of Colombia.”

Success: Mom

"Financial and emotional support delivered by my mother, encouragement from friends and access to therapy." BRA
Mathematics

"My mother's dedication and effort to get ahead with her children was a motivation to finish my degree. Then when I saw at the university where I studied that several professors were doing master's and doctorate degrees outside of the country, it motivated me to try to do the same thing." COL Mathematics

Success: Support

"Familial support, support from friends and older colleagues. Self-motivation." ARG Chemistry

"Emotional support from parents and siblings" MEX
Mathematics

"Talking to classmates and teachers about what came next. Becoming active, understand the workings of the school." - ARG
Chemistry

Success: Hardwork

" The courses were free if we kept up our weighted grade point average. The thesis to obtain the degree of Bachelor in Physics gave me a better vision to continue, I have a completed master's degree and I need to do my thesis work in this year 2018. " - PER Physics

"My enthusiasm for moving forward, doing internships and studying at the same time." ECU Biological and Related Sciences

Success: Classmates/Friends

"I'm still at the early years of my career but one of the main advantages is being fortunate enough to have classmates that love physics as much as I do and that are supportive of each other, because we know that eventually we'll be colleagues and that science is a teamwork effort." – Mex Physics

"Great support, friendship and encouragement from teachers, partnership with student colleagues. Partnership with a spouse/colleague with whom I have shared the difficulties and the opportunities, as we have worked independently. "MEX

Success: Resources

“The opportunity to have done research in the field of biotechnology during my undergraduate degree” Col Biology

"My family's economic situation afforded me not only lots of comforts during my life, but also access to quality basic education. In addition, I can advance in my studies without the need to get a job at the moment, as my parents support me financially." ARG Mathematics

“Family's socioeconomic status that enables me to concentrate fully on my education. ARG Physics

Success: Advisor

“I had a very experienced PhD supervisor. I started my career at a new university, which invested in research in the early years. I have always submitted proposals to all possible grants.” BRA

Biology

“Support from my parents, research summers, having excellent advisers during my education.” MEX Mathematics

Success

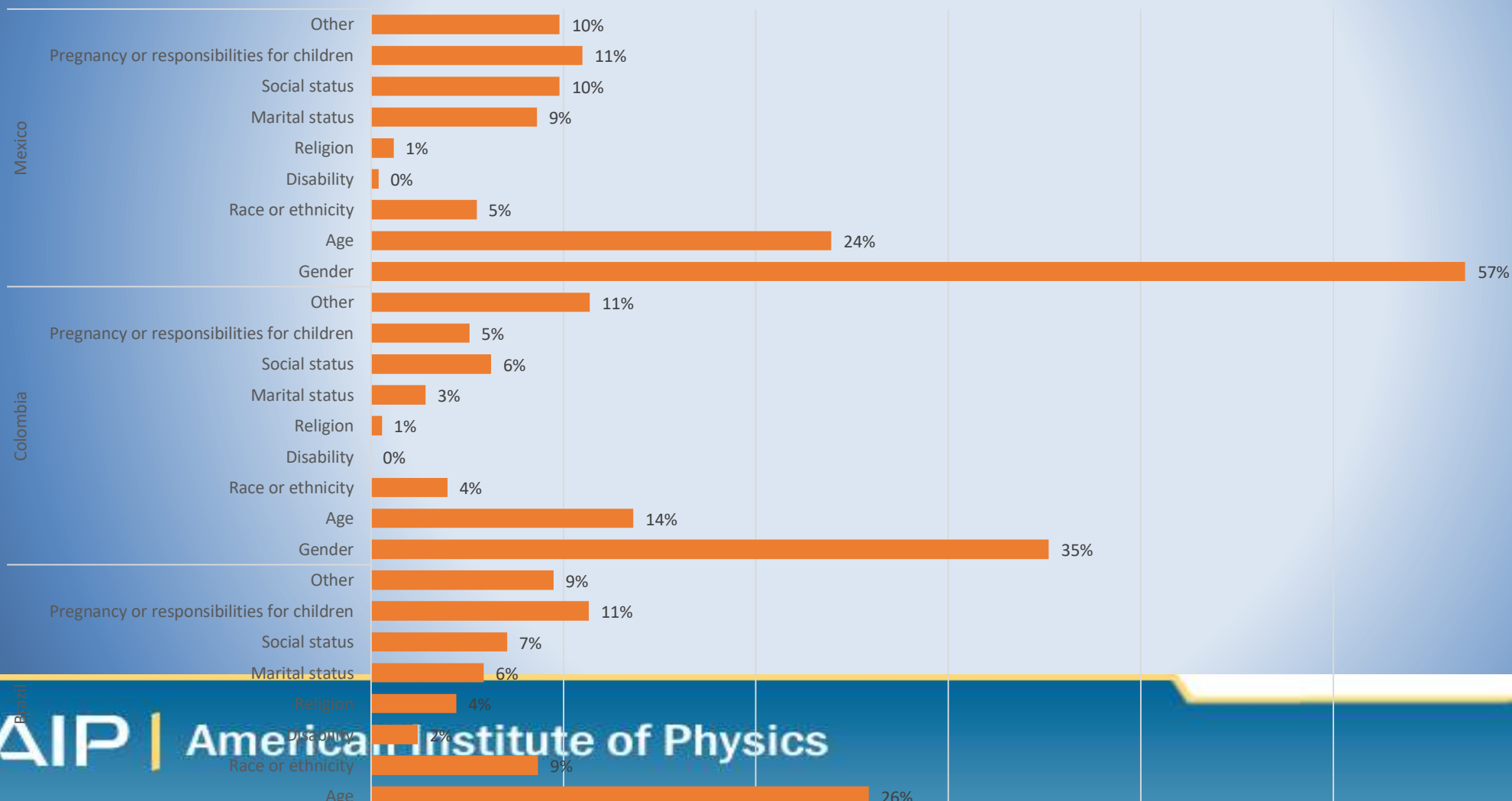
"Financial and emotional support delivered by my mother, encouragement from friends **and access to therapy.**" BRA
Mathematics

Discussion

- Do these results reflect your experiences?
- Did any of the results surprise you?
- What can we change now to alter these results?
- How can we make systemic change to alter these experiences?

Percentage of Women Selecting Sources of Discrimination

Percentage of Women Selecting Sources of Discrimination



Percentage of Women Selecting Sources of Discrimination

