

SFS 2017 Early Career Survey Report: Meeting the Changing Needs of an Overlooked Demographic

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Motivation for Early Career Survey within SFS

In recognition of the rapidly evolving academic landscape and emerging challenges for early career scientists (Ruben 2017, Thon 2014, Walker 2015), the ad hoc SFS Early Career (EC) committee was formed in 2016 to identify and support the needs of EC society members. To this end, we asked all EC SFS members (defined as within 10 years of their terminal degree) to take a survey (Appendix 1) designed to address three key aspects of early career attitudes toward SFS: (1) the perceived benefits SFS conferred to EC members, (2) the reasons EC society members attend the annual SFS meeting, and (3) enthusiasm toward different topics for EC programs and workshops. Additionally, this survey collected demographic information on the EC SFS membership and solicited EC members for ideas on how to improve the services SFS provides to EC scientists.

Survey Methods

To assess the perceptions and needs of EC members, we developed a survey of thirty-six questions that was sent electronically to the SFS e-mail list (Appendix 1). We downloaded, aggregated, and analyzed raw survey data in R using the “likert” package (Bryer and Speerschneider 2016). While the survey was given to graduate and EC members, we chose to focus most of our analyses for this report on the EC membership (i.e., only non-student participants). Finally, in order to assess how time influenced attitudes and perceptions of EC members, we regressed responses to items 1-3 (above) against time since terminal degree. For these analyses, we chose to include responses of graduate students (0 years since degree), since they represented an end-point on this gradient.

Survey Results

Demographics of survey

Of the SFS members who filled out the survey (n = 212), 40% were graduate students (n = 85), leaving a remaining 127 respondents who met our definition of EC respondents. A vast majority of respondents (85%) were from North America. Europe and Oceania accounted for ~7% of respondents each, and South America (~3%) and Asia (~1%) accounted for the remainder or respondents. Among early career respondents, 63% were in academia, 25% were associated with a government agency, 6% were in consulting, and 6% were in other lines of work (e.g., NGOs,

industry). Among all respondents, 43% had a PhD, 28% had a MSc or MA, 26% had a BSc or BA, and the remaining 3% had other degrees (e.g., GED, Associate degree).

Perceived benefits of SFS

Among EC members, workshops were perceived as the most important benefit SFS could provide to them (64% positive responses), while science presentations, special sessions, and networking were also all important, each with 51% positive responses (Figure 1b). The least important benefits of SFS to EC members were potential for travel grants (46% positive responses, 35% negative responses) and web resources (43% positive responses, 29% web resources) (Figure 1b). Overall, respondents outside of academic sectors tended to value travel grants, workshops, special sessions, and service opportunities more than respondents in academic sectors, and academics tended to assign higher value to the importance of science presentations at meetings (Figure 2). We note that many of these “perceived benefits” were hypothetical, as the survey was administered before the 2017 annual meeting and thus the first official EC mixer and EC-focused workshop.

Factors influencing decision to attend SFS meetings

The three primary factors EC respondents felt most strongly influenced their decision to attend annual SFS meetings were networking opportunities (47% positive responses), meeting location (47% positive responses), and travel and lodging costs (47% positive responses) (Figure 1a). Attendance of co-workers from a respondent’s institution (62% negative responses) and keynote speakers and distinguished scientists (54% negative responses) were the least important factors (Figure 1a). Travel and registration costs and the attendance of others from a respondent’s institution were more important factors for EC members outside of academia (Figure 3). The meeting theme and scientific focus were much more important for respondents in consulting compared to other sectors (Figure 3). Finally, while networking was important to all early career members, it was particularly important to members working in consulting, government agencies, and academics serving as associate professors (Figure 3).

Enthusiasm about workshops and preference of workshop topics

Among EC respondents, members indicated that they were most likely to attend workshops with the three following themes: training and mentoring graduate students (44% positive responses), the publishing and the peer-review process (40% positive responses), and negotiation (39% positive responses) (Figure 1c). The two workshop topics members were least likely to attend were family and work balance (32% positive responses, 47% negative responses) and the tenure process (24% positive responses, 61% negative responses) (Figure 1c). Respondents in

academic positions were much more likely to attend workshops about training and mentoring graduate students, grant writing, and teaching compared to respondents in non-academic sectors (Figure 4). Additionally, respondents in non-academic sectors were less inclined to attend workshops, regardless of the workshop theme.

Role of time since terminal degree in EC survey responses

Although many response variables significantly correlated with time since degree, low R^2 values for all correlations indicate additional variables may also be responsible for members' responses. Time since degree was frequently associated with factors influencing members' decision to attend SFS meetings (Figure 5a-g), perceived benefits of SFS (Figure 5h,i), and likelihood to attend workshops (Figure 5j-l). Factors associated with cost (Figure 5a,b), scientific content (Figure 5c,d) and peers (Figure 5e) tended to be more important in terms of meeting attendance for students and EC scientists, declining in importance with time since degree. Logistical factors, such as time commitment (Figure 5f) and meeting location (Figure 5g), however, were less important for determining meeting attendance for student and EC members, but increased in importance with time since terminal degree. Only two perceived benefits of SFS showed temporal patterns: travel grants (Figure 5h) and web resources (Figure 5i), with importance decreasing with years since terminal degree. Support for three workshop themes had a temporal gradient, with the peer-review process (Figure 5j), grant writing (Figure 5k), and negotiation (Figure 5l) all themes that were more likely to be attended by graduate students and members early in their career, but likelihood of attendance declining with years since terminal degree.

The voice of the EC community: observations from EC survey feedback

Beyond quantitative analysis of survey responses, a qualitative assessment of the written responses of survey respondents helps to further support quantitative findings and reveal new dimensions of the EC SFS community (Appendix 2). Four key observations arose from a qualitative assessment of survey feedback. First, underscoring the quantitative findings of the survey, it was clear that costs related to membership, the SFS meeting, and travel were particularly important to EC members. A majority of written comments related to the high—often prohibitive—costs of attending SFS meetings. A second observation from the survey feedback was that SFS needs to do more to improve and enhance its capacity for mentorship for EC members. While survey respondents often noted existing mentorship programs geared at EC scientists (i.e., the student-mentor mixer), participants often expressed disillusionment over how these programs were implemented or how senior scientists failed to provide adequate mentorship (Appendix 1). Related to the issue of mentorship, a third observation from survey feedback was that EC members were very interested in networking and collaborative opportunities. These sentiments echoed the quantitative results, which indicated that networking was one of the key drivers of early career attendance at SFS meetings (Figure 1a). Despite this, much of the survey

feedback indicated that networking opportunities were limited at SFS meetings (Appendix 1). Several members expressed a perception of cliquishness, especially among senior scientists and long-term society attendees, which made them feel isolated or excluded (Appendix 1). A final observation of the survey feedback was that there is a desire for more international integration and potentially international SFS meetings (outside of US).

Synthesis

Identifying and serving the needs of different groups within the EC community

The Early Career Survey has helped the EC Committee to identify four key areas SFS can target to improve the society's service of early career members. First, **SFS must find a way to alleviate cost as a prohibitive restriction to attending annual meetings**. Prohibitive costs may disproportionately affect underrepresented groups in STEM fields, and in many cases society and meeting costs likely outweigh other factors affecting EC members' decisions to attend annual meetings. For example, while meeting location was viewed as one of the most important factors influencing members' decisions to attend the annual meeting (Figure 1a), this factor was generally rated lower by very early EC members and increased with time since degree (Figure 5g). A cheaper venue and more central location are probably more important to less established EC members than exotic or exciting locations for annual meetings. Additionally, among EC members, costs associated with annual SFS meetings are more prohibitive to postdocs and scientists in non-academic sectors (Figure 3). Because non-academic scientists represent another minority in SFS membership, this demonstrates another way costs can be prohibitive for underrepresented groups in SFS. Thus, alleviating some of the financial burden associated with SFS membership and meeting attendance could be a key way of enhancing diversity within the EC demographic and within the society as a whole.

Second, **SFS should sponsor and highlight activities and events at annual SFS meetings that target EC members**. Traction toward this has started with mixers and workshops hosted by the EC Committee in 2017, and these events were well-received. These efforts should continue, and they should also be in tune with the changing needs of EC members. Future efforts could also include securing endowments to help alleviate the financial burden many EC scientists find prohibitive (i.e., for society membership and meeting attendance) without taking away from fundraising efforts that support undergraduate and graduate student members.

Third, **SFS needs to bolster its efforts to improve networking among all members of the society**. Because of the perceived importance of networking among EC members (Figure 1a,b), it is imperative that SFS finds ways of cultivating this in a way that promotes inclusivity and fosters new connections beyond existing social and professional networks in the society. Many

of the activities discussed above could help improve networking and inclusivity among society members, but activities need to target the specific needs and skillsets of EC members. For example, SFS could work to improve the current student-mentor mixer, or the EC Committee could create its own mentorship program that capitalizes on the unique position EC scientists occupy. Because EC members are in a transitional period of their career, they can likely serve as mentors to graduate students but also need guidance and mentorship on progressing toward the next stage of their career. Given this, the EC Committee has discussed developing a mentorship program that brings together both of these elements, and one could envision a three-tiered program where groups of three (one student, one EC member, and one established scientist) are matched within a given sector or area of interest. This system could provide benefits to all parties and eliminate some of the anxiety students or younger scientists have with meeting an established scientist.

Finally, and in a further effort to be more inclusive, **SFS should take steps to become a more global society.** While the EC Survey did not consider this directly, it was clear from the demographic information (mainly U.S. members) and the survey feedback that there is growing interest in being more inclusive and becoming a more diverse society. One of the key ways this could be achieved is through an international meeting, which was expressed in several comments of survey feedback (Appendix 2). One of the clear obstacles to an international meeting, which was evident from the EC Survey responses, would be the potentially prohibitive cost of international travel. However, if SFS aims to improve its diversity and international inclusion, it will need to find creative solutions for having at least some international meetings. One possibility is finding partnering international universities that would host the conference, thereby saving money from renting out expensive convention centers and other venues. Additionally, food and lodging can often be much cheaper internationally, depending on the location. The EC Committee has discussed the possibility of having an international meeting once every five years, which would mean that high costs for North American members would not be incurred every year. If SFS did decide to have periodic international meetings (e.g., every five years), these meetings could be merged with other international societies to both offset costs and provide more incentive for North American members to travel abroad for SFS meetings. SFS could also create special events at these international meetings (e.g., host special workshops with globally relevant themes, facilitate international workshops, hold a five-year SFS internal review) that would be further motivation for meeting attendance.

Future directions: the SFS EC vision for the next 5 years

Although it is difficult to determine the long-term needs of EC scientists given the rapidly changing social, political, and academic landscapes that shape current employment and funding security in STEM fields, the SFS 2017 Early Career Survey provides a data-rich snapshot in time

of our EC community, allowing us to focus our efforts moving forward over the next five years. To date, we have assembled a committee of nine EC members who have worked to understand the needs of the broader EC membership of SFS; in addition to conducting the EC survey and analyzing survey results, this committee has held monthly meetings, hosted a workshop on grant writing and a mixer at the annual SFS meeting in Raleigh, and made efforts toward establishing the EC committee as a formal part of SFS infrastructure that is written into SFS by-laws.

Over the next five years, we aim to achieve four goals to improve the EC Committee's service to the EC community:

1. Continue our efforts toward formalizing the EC Committee within SFS.
2. Develop a scholarship or travel grant that will be awarded to one or more EC members to defray costs of attendance at our annual meeting.
3. Provide valuable networking and workshop experiences at annual SFS meetings. Currently, we are planning an EC mixer and a teaching and mentorship workshop at the 2018 SFS meeting in Detroit, MI.
4. Enhance diversity and international participation within the EC membership of SFS. We will start by making concerted efforts to invite under-represented groups to participate on the EC Committee; our aim is to achieve an equal gender balance and include representatives from countries outside of North America. Additionally, we aim to partner with existing SFS programs (e.g., Instars Program, Student-Mentor mixer), to enhance the capacities of these programs to recruit and serve underrepresented groups at SFS, as well as to innovate new programs and activities that will promote diversity in the EC community.

Literature Cited

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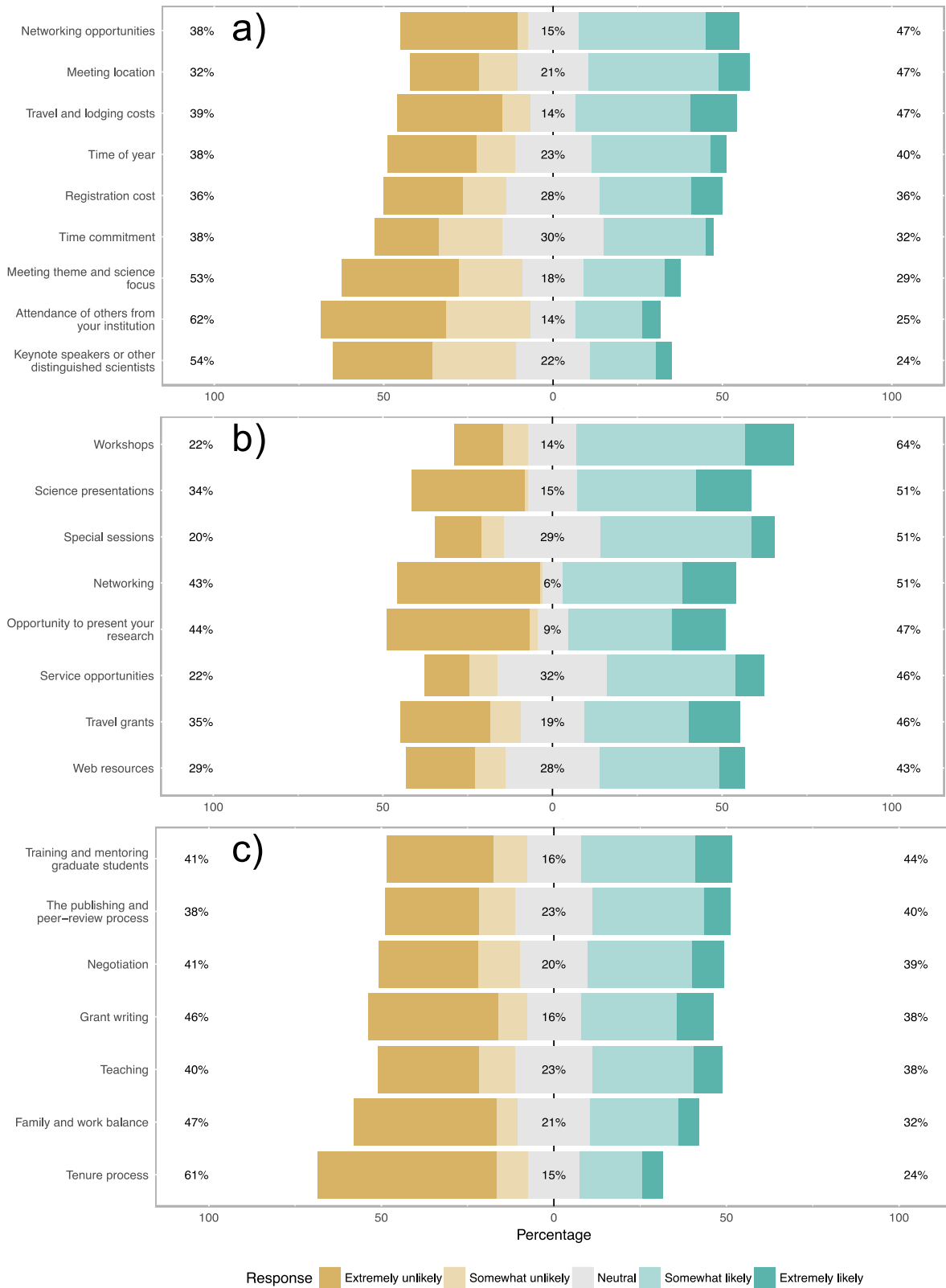


Figure 1. Factors influencing decision to attend SFS meetings (a), perceived benefits of SFS (b), and likelihood of attending a workshop (c) for early career SFS members.

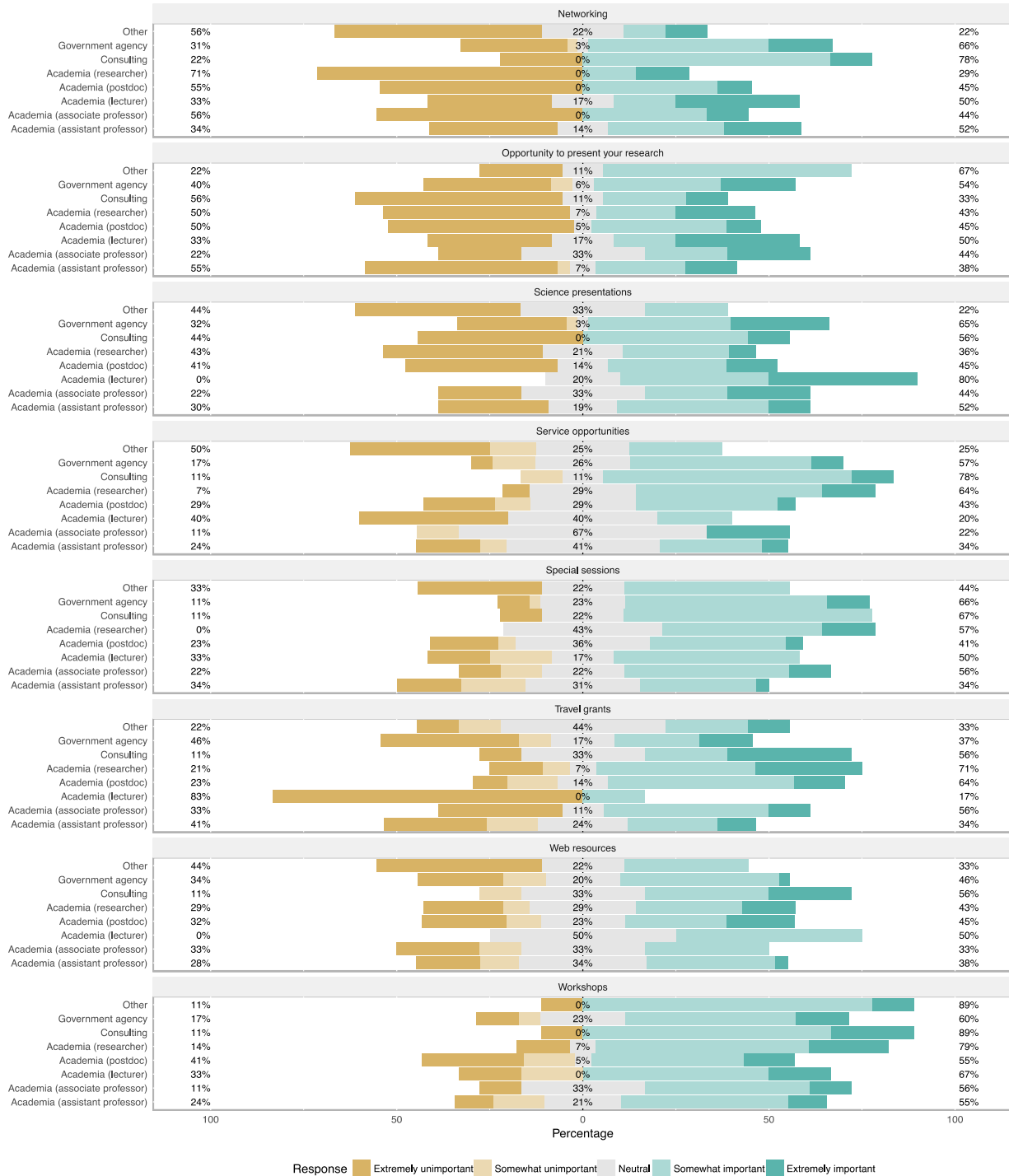


Figure 2. Perceived benefits of SFS to early career members, by sector.

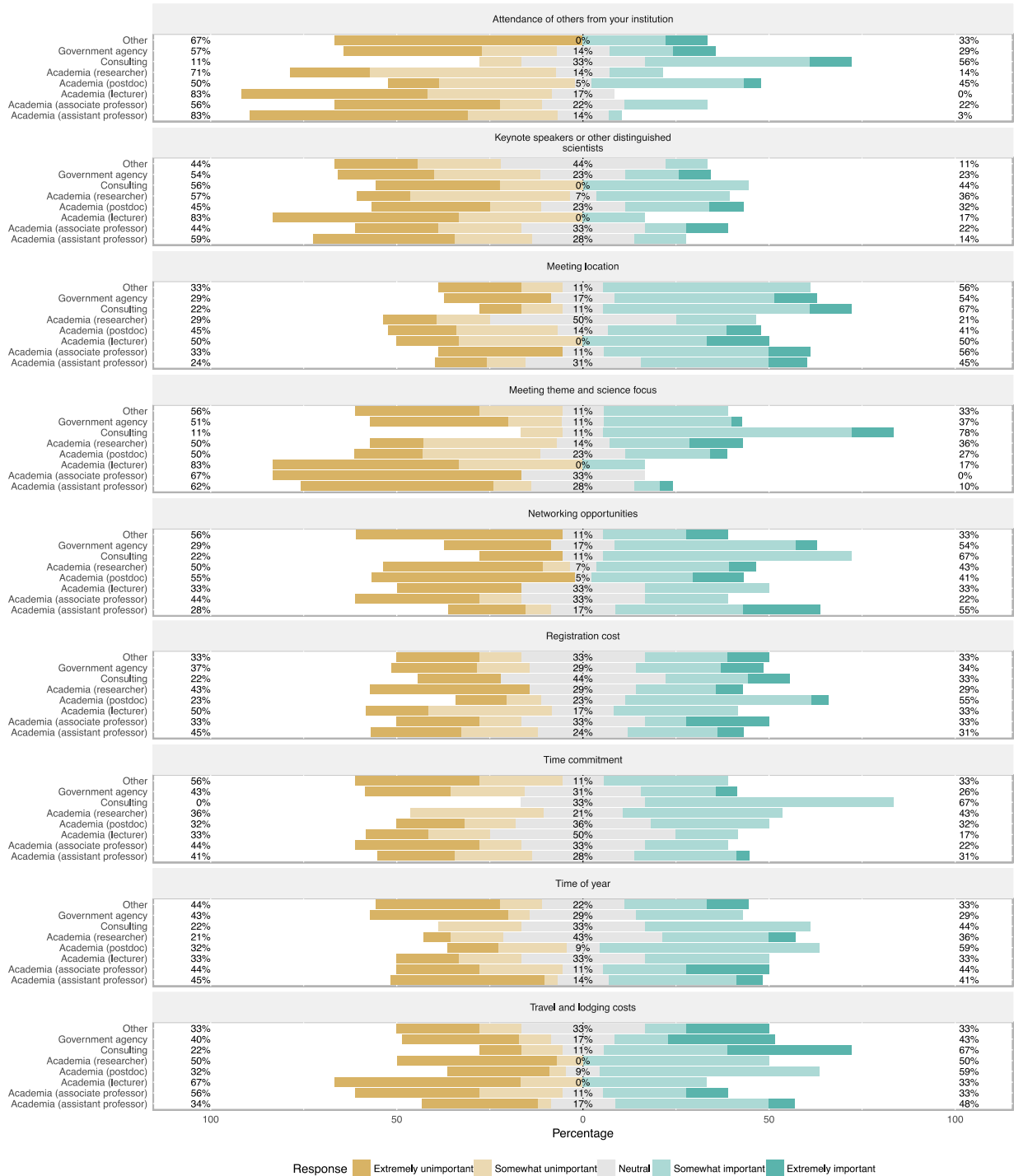


Figure 3. Factors affecting decisions of early career members to attend SFS meetings, by sector.

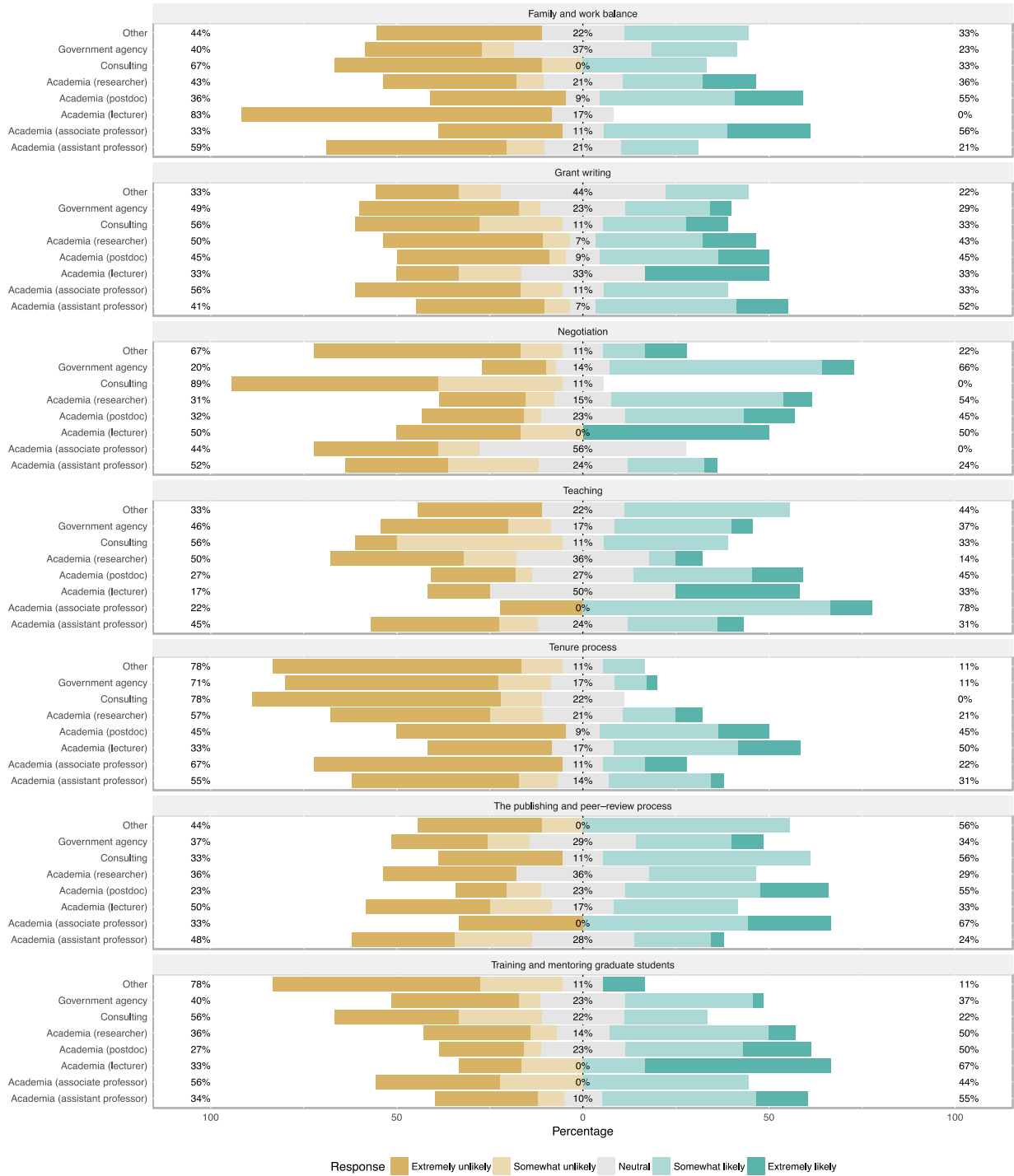


Figure 4. Likelihood of early career members to attend an SFS workshop, by sector.

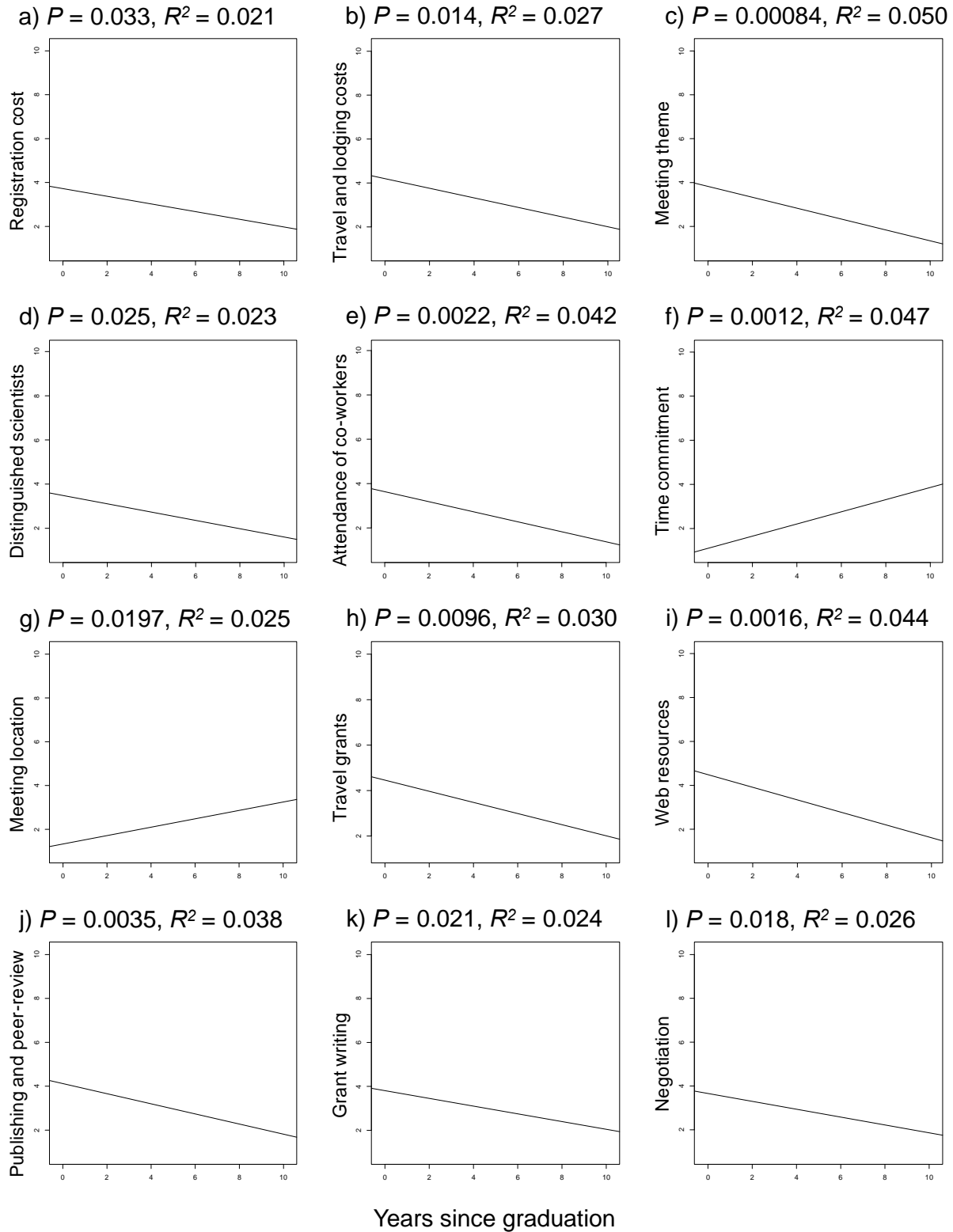


Figure 5. Regressions comparing the association of years since degree with factors influencing decision to attend SFS meetings (a-g), perceived benefits of SFS (h-i), and likelihood to attend workshops (j-l). Only statistically significant correlations are shown.

Appendix 1. SFS Early Career Survey, administered in 2016.

The on-line version of the survey can be found here:

<https://goo.gl/forms/1b0JmpXFdLp6IWS02>

Section 1: Preamble

The Society for Freshwater Science is committed to expanding resources available to Early Career Members, and this survey is designed to gather feedback to inform our ongoing development of Early Career activities and resources. SFS's currently defines Early Career Members as anyone who is three years past a terminal degree, but if you received your terminal degree ≤ 10 years ago, or are a current student, we would appreciate you filling out this survey. All responses will remain anonymous. If you have any questions about this survey or are interested in getting involved in organizing Early Career activities, please email Natalie Griffiths (griffithsna@ornl.gov).

Section 2: Background Information

Instructions: For the questions below, select the most accurate responses.

Questions:

Where are you currently located? (Multiple choice.)

- Asia
- Africa
- Europe
- North America
- Oceania
- South America

What is the highest degree you hold? (Multiple choice.)

- High school diploma / GED (or equivalent)
- Associate degree (or equivalent)
- BSc / BA
- MSc / MA
- PhD
- Other

Are you currently working on one of the following degrees? (Multiple choice.)

- High school diploma / GED (or equivalent)
- Associate degree (or equivalent)
- BSc / BA
- MSc / MA
- PhD
- Not planning on working on another degree.
- Other

How many years has it been since your terminal degree? (Multiple choice.)

- 0 (currently a student)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- >10

Which of the following sectors best describes where you work? (Multiple choice.)

- Industry
- Consulting
- Federal agency
- State or provincial agency
- Academia—student
- Academia—postdoc
- Academia—lecturer
- Academia—researcher
- Academia—assistant professor (pre-tenure)
- Academia—associate professor (post-tenure)
- Non-profit
- Other

Since finishing your graduate degree, have you continually been a member of SFS? (Multiple choice.)

- Yes
- No
- Not yet graduated
- Other

Since finishing your degree, what best describes your participation in SFS society activities? (Multiple choice.)

- Increase
- Decrease
- No change
- Not yet graduated

Section 3: Factors Influencing Decision to Attend SFS

Instructions: For the following several questions, rate how important each factor is in terms of your decision to attend (or not attend) SFS meetings. (0 = Not important, 10 = Extremely important)

Questions:

Registration cost

Travel and lodging costs

Time commitment

Meeting location

Time of year

Keynote speakers or other distinguished scientists

Attendance of others from your institution

Meeting theme and science focus

Networking opportunities

Are there other factors, not listed above, that influence your decision to attend (or not attend) SFS meetings? (Short answer.)

Section 4: Perceived Benefits of SFS

Instructions: Rate how important the following benefits are that SFS could provide to Early Career members. (0 = Not important, 10 = Extremely important)

Questions:

Networking

Workshops

Special sessions

Service opportunities

Opportunity to present your research

Science presentations

Travel grants

Web resources

Are there any other benefits SFS can provide to Early Career members that are not addressed above?

Section 5: Workshops

Instructions: Rate your likeliness to participate in an Early Career focused workshop on the following themes. (0 = Would not participate, 10 = Would definitely participate)

Training and mentoring graduate students

Teaching

Negotiation

Tenure process

Family and work balance

The publishing and peer-review process

Are there any other Early Career focused workshops (not listed above) that you would be interested in attending? (Short answer.)

Section 6: Ways SFS Can Improve Its Service to Early Career Members

Instructions: Provide feedback to the following questions in the space provided.

Have you been a part of Early Career activities in other societies? If so, which society? Why was the activity successful (or not)? (Short answer.)

What other comments, suggestions, or ideas do you have that could help SFS improve its capacity to serve the needs of Early Career members? (Long answer.)

Appendix 2. Selected comments from anonymous early career member surveys, grouped by theme.

In the final question of the survey, respondents were asked to provide feedback or make suggestions pertaining to how SFS could better serve its early career membership. Below is a selection of responses representing a cross section of the issues that were brought up in the final written survey response.

Meeting and membership costs

“Very discounted rates for early-career (<5 yrs).”

“I just think making it affordable is the biggest factor.”

“Making it easier for broke graduate students to go to your meetings, webinars, [and] online workshops...”

Networking

“[A] useful session would be one where researchers looking for graduate students (or that had available post doc positions) could get together with students and talk about some of those opportunities.”

“More/longer social events or some sort of incentive for professional/experienced members to engage in these events for more networking and learning opportunities. Most of the more experienced members left with their friends right after the sessions, making it hard to network.”

“At the 2016 meeting, I felt like I was stuck outside of the two main social groups of grad students and established professionals / professors.”

“[T]he networking aspect of SFS can be expanded. Currently, there is one networking mixer at the annual meeting, and each time the way professionals and students are matched changes. In the 3 years I have attended the SFS annual meeting, I have not found the professionals I’m matched with to be particularly aligned with my career interests.”

Mentoring

“Long-term mentoring from faculty or someone in your job aspiration.”

“Facilitate connections with older [scientists with] interdisciplinary knowledge and people willing to mentor younger members.”

“I would be interested in seeing a workshop on mentoring students from different cultural and socioeconomic backgrounds, or tying that into a workshop on mentoring students in general.”

“Program to match potential grad students with early career faculty. Speed-dating style?”

Collaboration

“There should be awards for young researchers willing to collaborate in small projects. This has been working in a wonderful way in Europe, and gives the chance to young researchers to have their own project.”

Workshops

“Perhaps offering a transition workshop for graduating graduate students who will be entering a professional career. One of the biggest struggles I’ve faced as a new faculty member was really being prepared for everything I would face.”

Web resources

“Instead of (or in addition to) having jobs advertised on the SFS website, it would be helpful to have an e-mail listserv dedicated to freshwater ecology job postings similar to the ECOLOG-L listserv run by the Ecological Society of America, but with a more defined topical focus.”

“E-mail notifications or service opportunities/needs, both of SFS and other similar organizations and conservations groups.”

International expansion

“Better focus on improving the network of international freshwater ecologists.”

“A meeting outside North America (e.g. every 3 years) would likely increase the number of early career scientists attending the meeting.”

Vision for the future

“Make [early career needs] front and centre as an issue to focus on. Too many societies talk about an emphasis on ECRs, but do nothing about it. The society will not exist in the future without early career researchers of today.”