

January 27<sup>th</sup>, 2020

# Faculty Public Engagement Attitudes and Practices at Land-Grant Universities in the United States

**Kathleen M. Rose**

Institute for Writing and Rhetoric, Dartmouth College

**Claire M. Holesovsky**

Department of Life Sciences Communication, University of Wisconsin-Madison

**Luye Bao**

Department of Life Sciences Communication, University of Wisconsin-Madison

**Dominique Brossard**

Department of Life Sciences Communication, University of Wisconsin-Madison and Morgridge  
Institute for Research

**Ezra M. Markowitz**

Department of Environmental Conservation, University of Massachusetts Amherst

\* Corresponding Authors: Dominique Brossard ([dbrossard@wisc.edu](mailto:dbrossard@wisc.edu)) and Ezra Markowitz ([emarkowitz@eco.umass.edu](mailto:emarkowitz@eco.umass.edu))



**Life Sciences Communication**  
UNIVERSITY OF WISCONSIN-MADISON

**UMassAmherst**

Environmental  
Conservation

This material is based upon work supported by the Morgridge Institute for Research. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Institute.

### **Suggested citation**

Rose, K. M., Holesovsky, C. M., Bao, L., Brossard, D., and Markowitz, E. M. (2020). Faculty Public Engagement Attitudes and Practices at Land-Grant Universities in the United States. University of Wisconsin-Madison. Madison, WI: Department of Life Sciences Communication. Available from <http://scimep.wisc.edu/projects/reports/>.

This report expands on data first published in the following publication:

Rose, K. M., Markowitz, E. M., & Brossard, D. (2020, January). Scientists' incentives and attitudes toward public communication. *Proceedings of the National Academy of Sciences*. [doi.org/10.1073/pnas.1916740117](https://doi.org/10.1073/pnas.1916740117)

# Faculty Public Engagement Attitudes and Practices at Land-Grant Universities

Rose, Holesovsky, Bao, Brossard, Markowitz

(January 27, 2020)

## Table of Contents

<b>Executive Summary</b> .....	<b>5</b>
Select Results .....	5
<b>Part 1: Faculty in the Sciences</b> .....	<b>8</b>
<b>Section 1: Views of science and the public</b> .....	<b>9</b>
<b>Figure 1.1.</b> Views of the public regarding science. ....	10
<b>Figure 1.2.</b> Views of science in society .....	11
<b>Figure 1.3.</b> Views of scientific decision-making .....	12
<b>Section 2: Social media use and attitudes</b> .....	<b>13</b>
<b>Figure 2.1.</b> Frequency of social media platforms use .....	14
<b>Figure 2.2.</b> Frequency of social media use for specific science-related purposes.....	15
<b>Figure 2.3.</b> Social media attitudes .....	16
<b>Section 3: Engagement activities and training participation</b> .....	<b>17</b>
<b>Figure 3.1.</b> Participation in infrequent public engagement efforts over their careers.....	18
<b>Figure 3.2.</b> Participation in frequent public engagement efforts over the previous year .....	19
<b>Figure 3.3.</b> Willingness to participate in future infrequent public engagement efforts.....	20
<b>Figure 3.4.</b> Willingness to participate in future frequent public engagement efforts .....	21
<b>Figure 3.5.</b> Participation in science communication trainings.....	22
<b>Section 4: Defining public engagement</b> .....	<b>23</b>
<b>Figure 4.1.</b> Definition of public engagement .....	24
<b>Figure 4.2.</b> Types of events considered public engagement .....	25
<b>Section 5: Engagement climate and culture at universities</b> .....	<b>26</b>
<b>Figure 5.1.</b> University expectations for public engagement and outreach .....	27
<b>Figure 5.2.</b> University climate for public engagement .....	28
<b>Figure 5.3.</b> University barriers related to public engagement .....	29
<b>Figure 5.4.</b> University barriers related to engagement by participation .....	30
<b>Figure 5.5.</b> Graduate student support for public engagement .....	31
<b>Section 6: Perceptions of self-efficacy related to engagement</b> .....	<b>32</b>
<b>Figure 6.1.</b> Autonomy to participate in engagement split by position .....	33
<b>Figure 6.2.</b> Self-efficacy related to public engagement.....	34
<b>Figure 6.3.</b> Self-efficacy related to public engagement by communication training experience .....	35
<b>Figure 6.4.</b> Use of social science research for science communication.....	36
<b>Section 7: Engagement motivations, drawbacks, and barriers</b> .....	<b>37</b>
<b>Figure 7.1.</b> Motivations for engagement.....	38
<b>Figure 7.2.</b> Scientist drawbacks to engagement .....	39
<b>Figure 7.3.</b> Scientist barriers to engagement .....	40

<b>Part 2: Faculty in the Arts and Humanities .....</b>	<b>41</b>
<b>Section 8: Views of science and the public .....</b>	<b>42</b>
<b>Figure 8.1.</b> Views of the public regarding science .....	43
<b>Figure 8.2.</b> Views of science in society .....	44
<b>Figure 8.3.</b> Views of scientific decision-making .....	45
<b>Section 9: Social media use and attitudes .....</b>	<b>46</b>
<b>Figure 9.1.</b> Frequency of social media platforms use .....	47
<b>Figure 9.2.</b> Frequency of social media use for specific work-related purposes .....	48
<b>Figure 9.3.</b> Social media attitudes .....	49
<b>Section 10: Engagement activities and participation .....</b>	<b>50</b>
<b>Figure 10.1.</b> Participation in infrequent public engagement efforts over their careers .....	51
<b>Figure 10.2.</b> Participation in frequent public engagement efforts over the previous year ...	52
<b>Figure 10.3.</b> Willingness to participate in future infrequent public engagement efforts .....	53
<b>Figure 10.4.</b> Willingness to participate in future frequent public engagement efforts .....	54
<b>Section 11: Defining public engagement .....</b>	<b>55</b>
<b>Figure 11.1.</b> Definition of public engagement .....	56
<b>Figure 11.2.</b> Types of events considered public engagement faculty .....	57
<b>Section 12: Engagement climate and culture at universities .....</b>	<b>58</b>
<b>Figure 12.1.</b> University climate for public engagement .....	59
<b>Figure 12.2.</b> University barriers related to public engagement .....	60
<b>Figure 12.3.</b> Graduate student support for public engagement .....	61
<b>Section 13: Perceptions of self-efficacy related to engagement .....</b>	<b>62</b>
<b>Figure 13.1.</b> Self-efficacy related to public engagement .....	63
<b>Figure 13.2.</b> Use of social science research for science communication .....	64
<b>Section 14: Engagement motivations, drawbacks, and barriers .....</b>	<b>65</b>
<b>Figure 14.1.</b> Motivations for engagement .....	66
<b>Figure 14.2.</b> Scholar drawbacks to engagement .....	67
<b>Figure 14.3.</b> Scholar barriers to engagement .....	68
<b>Part 3: About the Survey .....</b>	<b>69</b>
<b>Section 15: Sampling and Procedures .....</b>	<b>70</b>
<b>Figure 15.1.</b> Total Faculty Responses from Land Grant Universities .....	71
<b>Section 16: Final Sample information .....</b>	<b>72</b>
<b>Figure 16.1.</b> Distribution by research designations .....	73
<b>Figure 16.2.</b> Distribution by U.S. regions .....	73
<b>Figure 16.3.</b> Respondents' fields of study .....	74
<b>Figure 16.4.</b> Respondents' primary university position .....	75
<b>Figure 16.5.</b> Respondents' additional university positions .....	75
<b>Figure 16.6.</b> Respondents' extension appointments .....	76
<b>Section 17: Fields of study .....</b>	<b>77</b>
<b>Section 18: Respondent demographics .....</b>	<b>78</b>
<b>Figure 18.1.</b> Respondents' ages .....	79
<b>Figure 18.2.</b> Respondents' races .....	79

**Appendix A: Responses across regions of the U.S. .... 80**

**Figure A.1.** Views of the public regarding science by U.S. regions..... 81

**Figure A.2.** Views of science in society by U.S. regions ..... 82

**Figure A.3.** Views of scientific decision-making by U.S. regions..... 83

**Figure A.4.** Participation in infrequent public engagement efforts by U.S. regions..... 84

**Figure A.5.** Participation in frequent public engagement efforts by U.S. regions ..... 85

**Figure A.6.** Participation in science communication trainings by U.S. regions ..... 86

**Figure A.7.** University climate for public engagement by U.S. regions ..... 87

**Figure A.8.** University barriers related to public engagement by U.S. regions ..... 88

**Figure A.9.** Autonomy to participate in engagement by U.S. regions ..... 89

**Figure A.10.** Self-efficacy related to public engagement by U.S. regions ..... 90

**Figure A.11.** Use of social science research for science communication by U.S. regions. 91

**Figure A.12.** Motivations for engagement by U.S. regions ..... 92

**Figure A.13.** Drawbacks to engagement by U.S. regions ..... 93

**Figure A.14.** Barriers to engagement by U.S. regions ..... 94

## **Executive Summary: Faculty public engagement with science: Attitudes and practices at Land Grant institutions**

This report presents the current state of public communication with science efforts and attitudes of faculty at Land Grant universities across the United States. Using the results from a census survey, we examine faculty views of public engagement activities and the role of science in society, along with their current participation in a variety of science engagement and science outreach activities. We also explore the institutional climate surrounding public communication and factors that may encourage or discourage involvement in outreach and engagement.

Results presented in this report stem from a large-scale census of all faculty at 46 land-grant universities (within 45 university systems) across the U.S. The survey was conducted from May to July 2018. Our final sample consisted of N=10,706 respondents who were distributed across multiple fields, broadly categorized into the arts and humanities (N=1,783) and sciences (N=8,923). More details can be found in the “About the survey” part.

The following topics are discussed: faculty views of science and the public; social media use and attitudes; participation in engagement activities and training; faculty definitions of public engagement; perceived engagement climate and culture at universities; perceived self-efficacy for engagement; and motivations, drawbacks, and barriers to engagement.

Responses to the survey questions are presented in two groups: faculty in the Sciences (N=8,923) include those who indicated they were in the social sciences, life sciences, or physics and mathematics and faculty in the Arts and Humanities (N=1,783) includes those who indicated they were in the arts and humanities or other non-science, profession-based fields.

Additionally, we also provide responses to survey questions distributed across the regions of the U.S. Figures showing public engagement-related attitudes attributable to cultural differences associated with the geographical locations of the land-grant universities spread across the United States (see Figure 16.2 for the distribution of responses across geographic location) can be found in Appendix A.

### **Select results**

- Both Science and Arts and Humanities faculty hold mixed views of the public. Faculty agree that members of the public can bring valuable perspectives to discussions about scientific research (75% agreement among Science faculty; 64% agreement among Arts and Humanities faculty), they also view the public as generally uninformed about basic science (68% agreement among Science faculty; 67% among Arts and Humanities faculty).
- Faculty have strong opinions about scientists’ involvement in policy decisions about science, with over eight in ten faculty in the Sciences (83%) and Arts and Humanities (85%) agreeing that scientists should be actively involved in political debates about science. Faculty in the Sciences are confident in the abilities of the scientific community to guide the responsible development of new technologies (75% agreement), as are faculty in the Arts and Humanities (65% agreement). At this same time, 55% of faculty in the Sciences and 40% of faculty in the Arts and Humanities think scientists should pay attention to wishes of the public.

- Social media is not heavily used by faculty respondents in either field for science or work-related purposes, although some platforms are more frequently used than other. Of those on social media, around half (50%) of Science and Arts and Humanities faculty report that they never used social media for a variety of specific purposes, such as sharing announcements about their new studies.
- Faculty in both disciplines are somewhat skeptical of social media as forum for public communication. Both those in the Sciences and Arts and Humanities generally do not agree that they should stay away from discussing controversial topics on social media (63% disagreement among faculty in the Arts and Humanities and 64% disagreement among faculty in the Sciences) but many respondents are unsure about whether it negatively impacts their reputations (around 40% ambivalent among faculty in the Sciences and 42% ambivalent among faculty in the Arts and Humanities). Nearly half of Science (49% agreement) and Arts and Humanities (47% agreement) faculty think it is too time-consuming.
- Overall, 98% of faculty in the Sciences and Arts and Humanities have participated in at least one outreach or engagement activity. Traditional activities, such as giving public lectures or interviews with journalists, remain more popular.
- Not all faculty who have participated in outreach or engagement activities received training; only 58% of faculty in the Sciences indicate they have had some type of science communication training.
- For the institutional climate and culture surrounding public communication, responses reveal that institutional support is lacking. About a quarter of faculty in Sciences (26%) and Arts and Humanities (25%) agree that public engagement is treated as a core component of the work expected of faculty at their university.
- Respondents indicate there is some support from their colleagues for public communication.
  - Around 66% of faculty in both disciplines disagree with the idea that people at their university who are active communicators are not very good researchers.
  - A high number of faculty in the Sciences (81%) reject the idea that public engagement is incompatible with the scientific culture.
- Generational changes may affect the culture of support for public engagement.
  - Around half of respondents in both the Arts and Humanities (55%) and Sciences (50%) indicate they were not encouraged by their advisors to get involved in engagement when they were graduate students.
  - Yet, faculty in both disciplines now support the engagement activities of their graduate students (88% agreement among Science faculty; 86% agreement among Arts and Humanities faculty).
- There is mixed confidence in respondents' abilities to interact with their audiences.
  - Most respondents from both Sciences (83%) and Arts and Humanities (85%) are confident they could have discussions with diverse audiences.
  - While around six in ten faculty from the Arts and Humanities (62%) and Sciences (59%) do not think that answering questions from an audience is difficult, the remainders find it difficult or are unsure.
- Around 78% of faculty from the Sciences and 70% of faculty from the Arts and Humanities think insights from social science research should inform science communication efforts, but only around half respondents (52% Science faculty; 42% Arts and Humanities faculty) report paying attention to science communication research and around a quarter of faculty do not use it.

- Having a sense of duty (85% agreement from both fields) and personal enjoyment (83% agreement from faculty in the Sciences and 85% agreement from faculty in the Arts and Humanities) are strong motivators for participating in engagement.
- Opinions are more mixed in identifying common drawbacks to engagement. Faculty indicate that they may not get involved because it does not help their career (26% agreement from faculty in the Arts and Humanities and 27% agreement from faculty in the Sciences) or because it makes people a target (38% agreement among faculty in the Sciences and 36% agreement among faculty in the Arts and Humanities).
- Agreement on possible barriers to engagement is also mixed. Faculty in both fields are ambivalent about the ideas that most researchers are bad at engagement (around 40% ambivalence) and that they may have had bad experiences (45% of faculty in the Sciences and 50% of faculty in the Arts and Humanities neither disagree nor agree). Notably, around half of faculty from the Sciences (54%) and the Arts and Humanities (49%) agree with the barrier that there are no institutional incentives to do so.

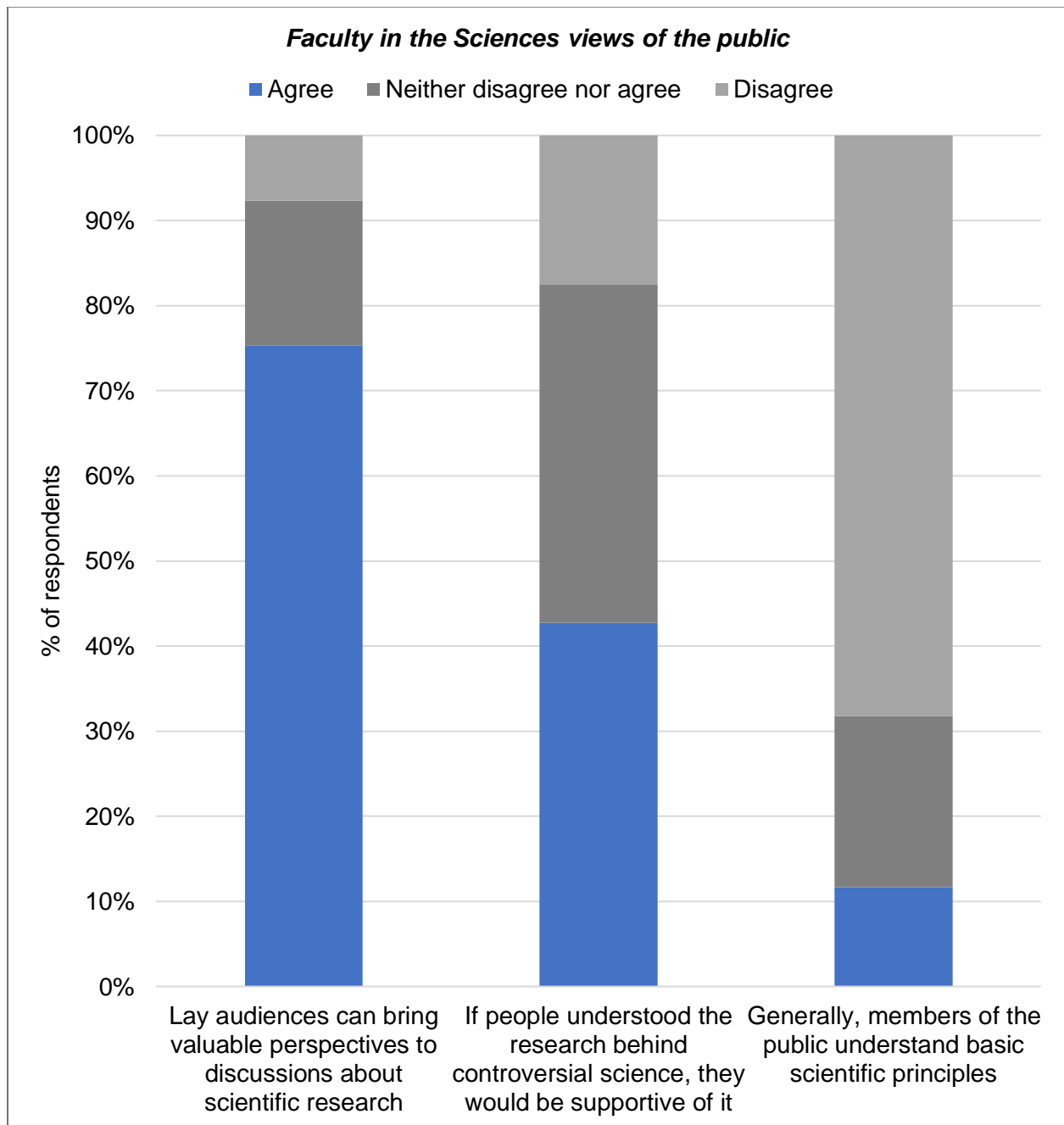


## **Part 1: Faculty in the Sciences**

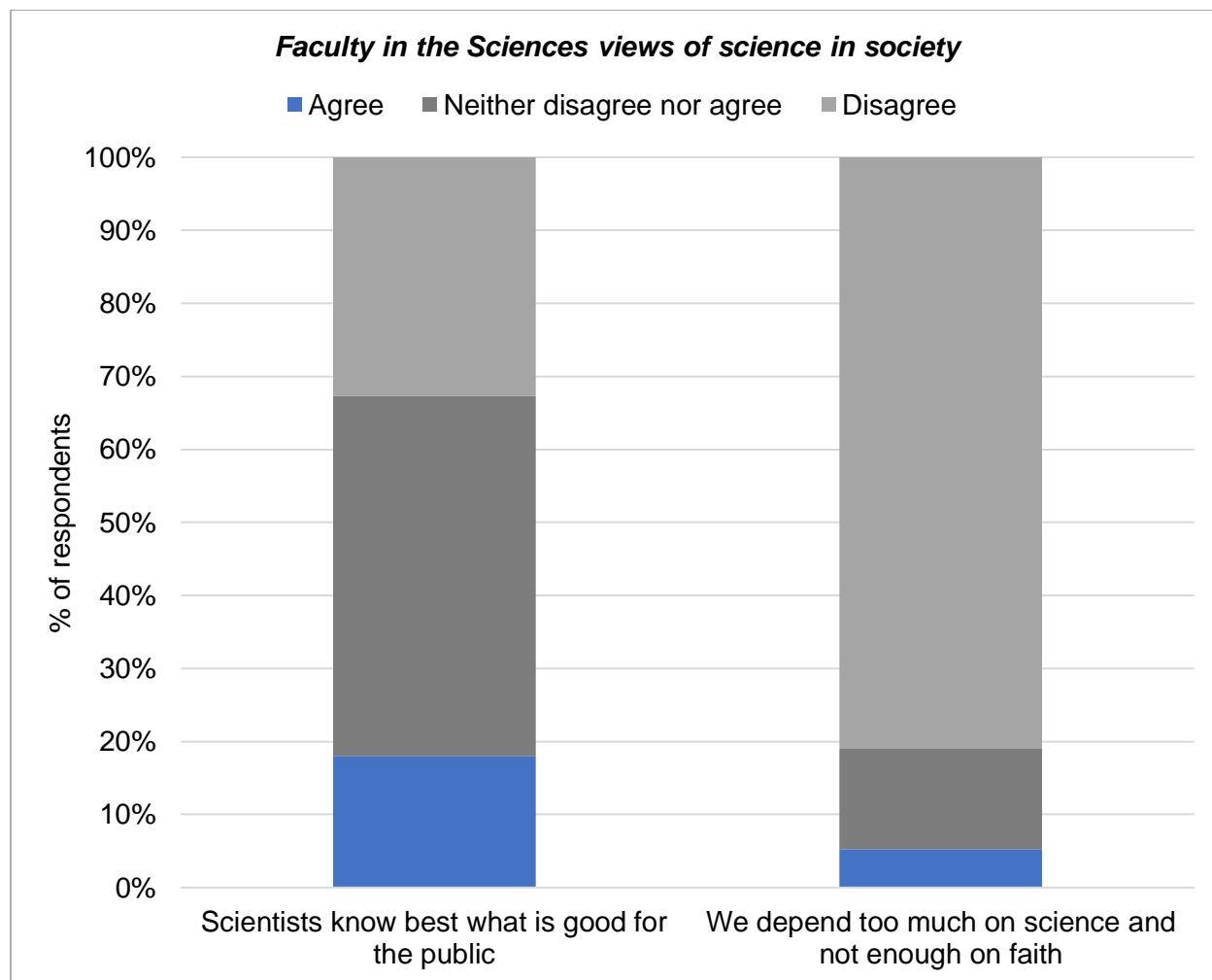
## **Section 1: Views of science and the public**

Science faculty respondents generally hold mixed views of members of the public (Figure 1.1). Most faculty in the Sciences agree that lay audiences can bring valuable perspectives to science discussions, but they also think members of the public lack an understanding of basic scientific principles. Further, many respondents still prescribe to a deficit model of thinking about public attitudes toward controversial science, with 43% agreeing with the idea that people would be more supportive of science if they understood it and just under 18% disagreeing.

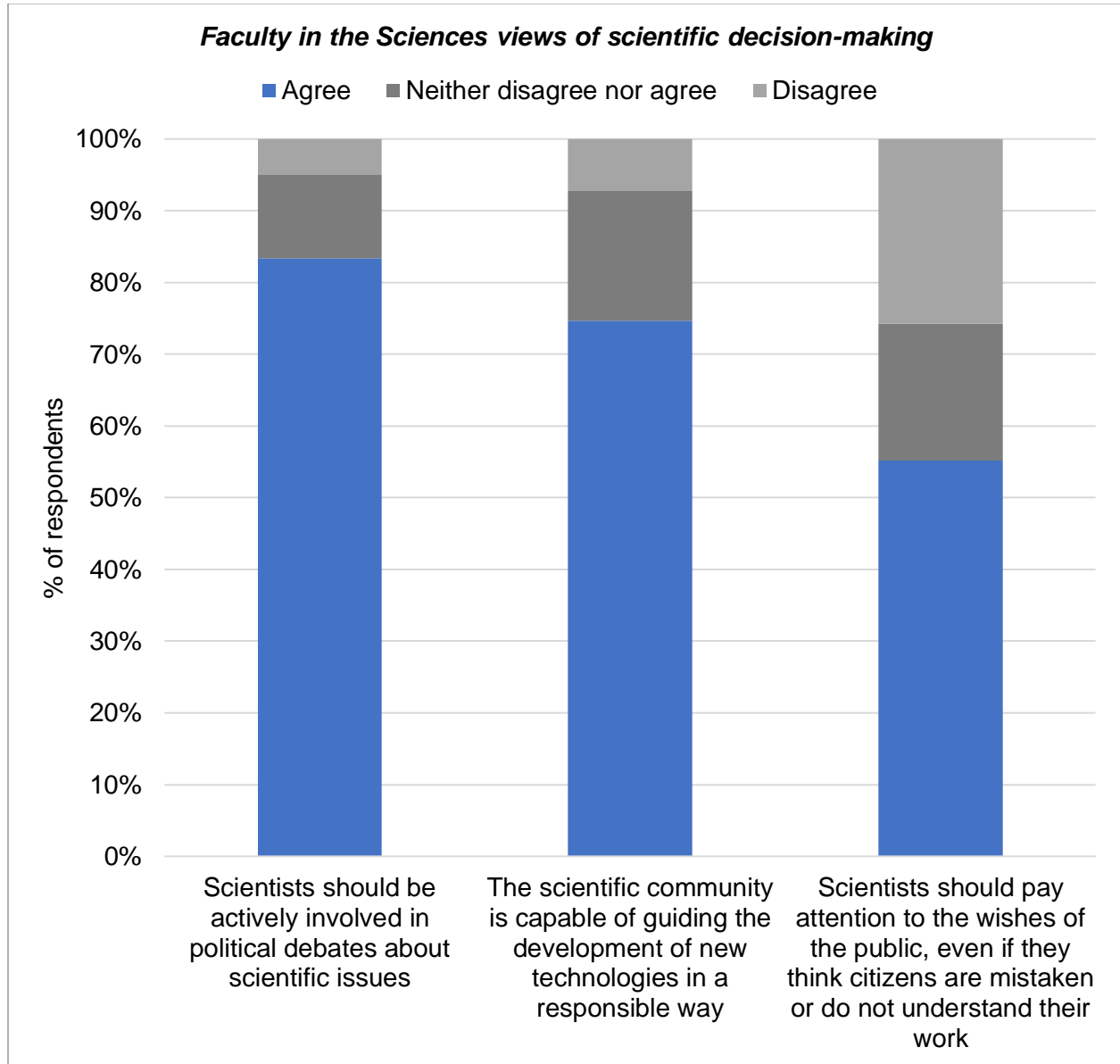
Regarding views of how science is used in society (Figure 1.2) and who should be responsible for making decisions about scientific issues (Figure 1.3), faculty respondents in the Sciences are mostly ambivalent about the idea that scientists know best what is good for the public (around 49% neither disagree nor agree). However, they do agree that scientists should be actively involved in political debates about science (over 83% agree) and that the scientific community is capable of guiding the responsible development of new technologies (75% agree). There is also general agreement among Science faculty that scientists should pay attention to the wishes of the public (55% agree). Notably, those in the Sciences appear to endorse the idea of multiple stakeholder involvement in making decisions about science: they are highly confident in the abilities of scientists to responsibly guide technology development and generally agree that scientists should pay attention to the wishes of the public.



**Figure 1.1.** Science faculty views of the public regarding science.



**Figure 1.2.** Faculty in the Sciences views of science in society



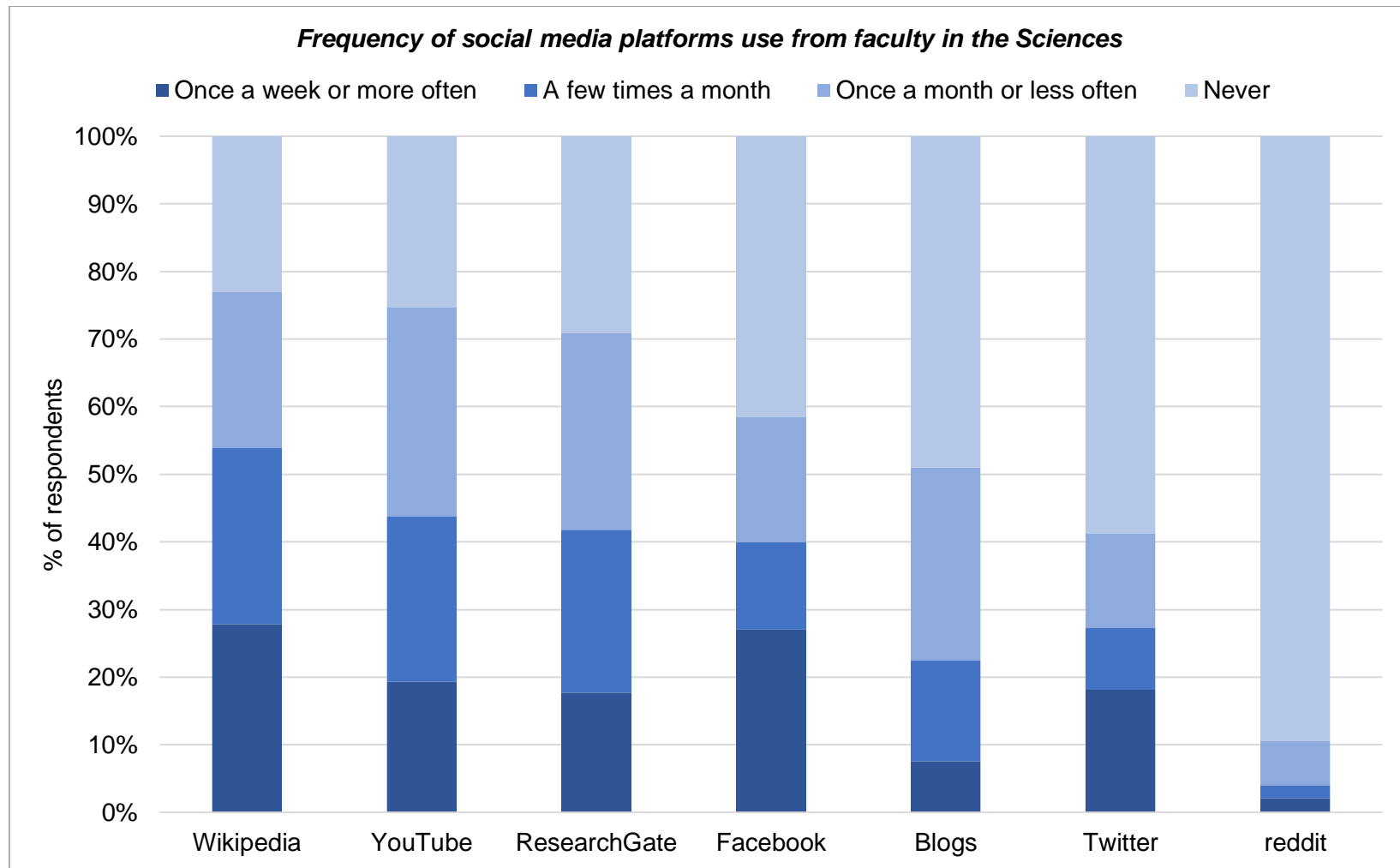
**Figure 1.3.** Science faculty views of scientific decision-making

## Section 2: Social media use and attitudes

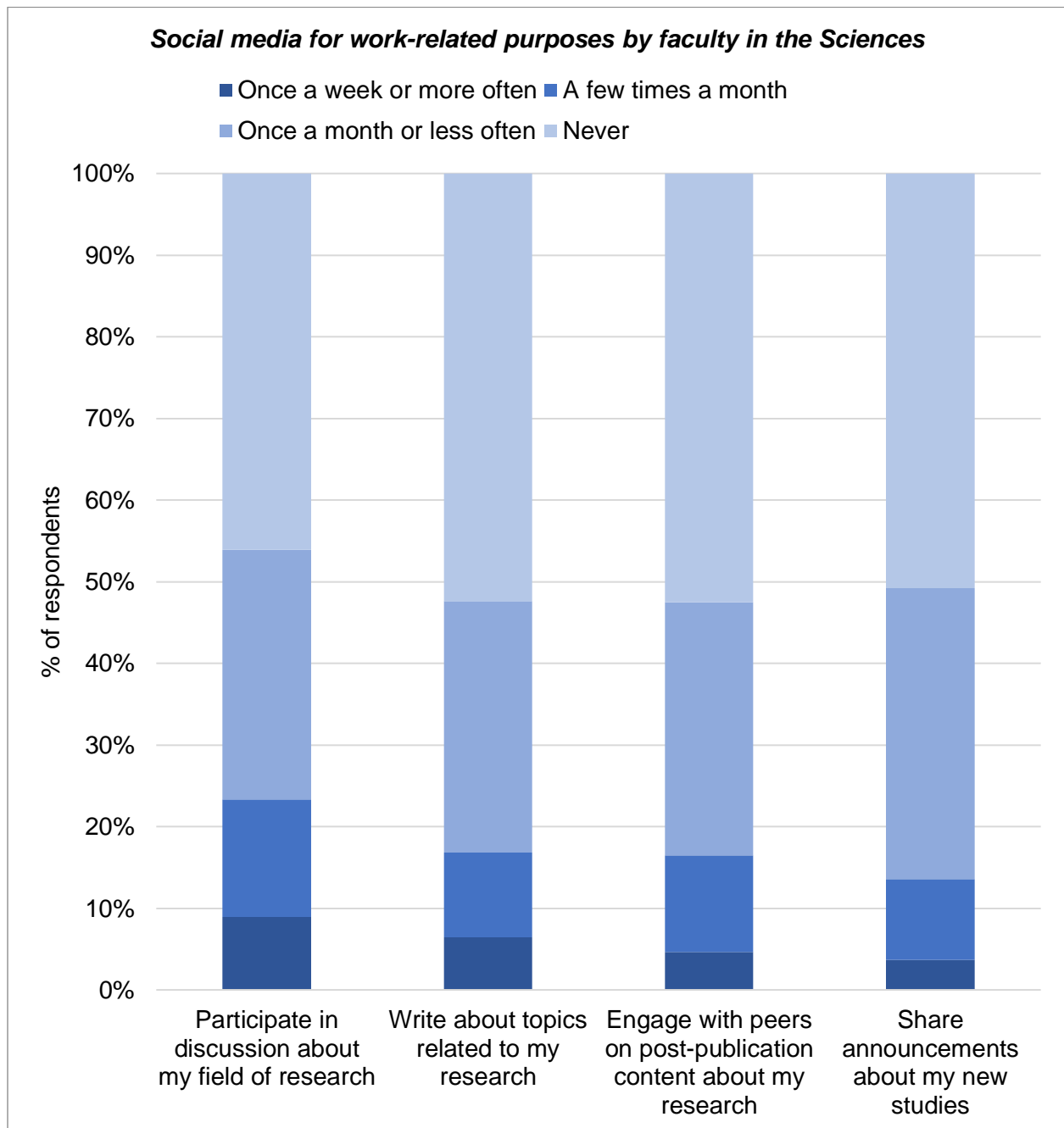
Overall, 84% of science faculty respondents indicate they used social media. They do not, however, report high social media use for science-related purposes. Of the common social media platforms we ask about, most respondents either do not use the platform or do not do so frequently. The respondents' use of social media do vary by platform (Figure 2.1). Wikipedia, YouTube, and restricted online communities such as ResearchGate or Mendeley are among the more universally used platforms by Science faculty. Platforms such as Twitter appear to be more polarized: while most respondents never use it (59%), a considerable proportion (27%) use it at least a few times a month for science purposes.

When asked about their general use of social media for specific work-related purposes, many Science faculty respondents again report that they do not engage in these activities (Figure 2.2). Around half of Science faculty report that they never engage with peers on post-publication content about their research (53%), write about topics related to their research (52%), share announcements about their new studies (51%), or participate in discussions about their research (46%). Of the remaining respondents, for each of these activities around a third of faculty do indicate they took part around once a month.

Looking at all Science faculty members' attitudes towards social media (Figure 2.3), over six-in-ten respondents (63%) disagree that scientists should not discuss potentially controversial topics on social media. Yet, considerably fewer respondents reject the idea that using social media negatively impacts a scientist's reputation (46% disagree). Many respondents also find social media to be time-consuming (49% agree) and they are ambivalent about whether using social media impacts their academic impact (44% neither disagree nor agree). Most Science faculty respondents do, however, believe that there are lay audiences interested in what scientists have to share about science on social media (83% agree).

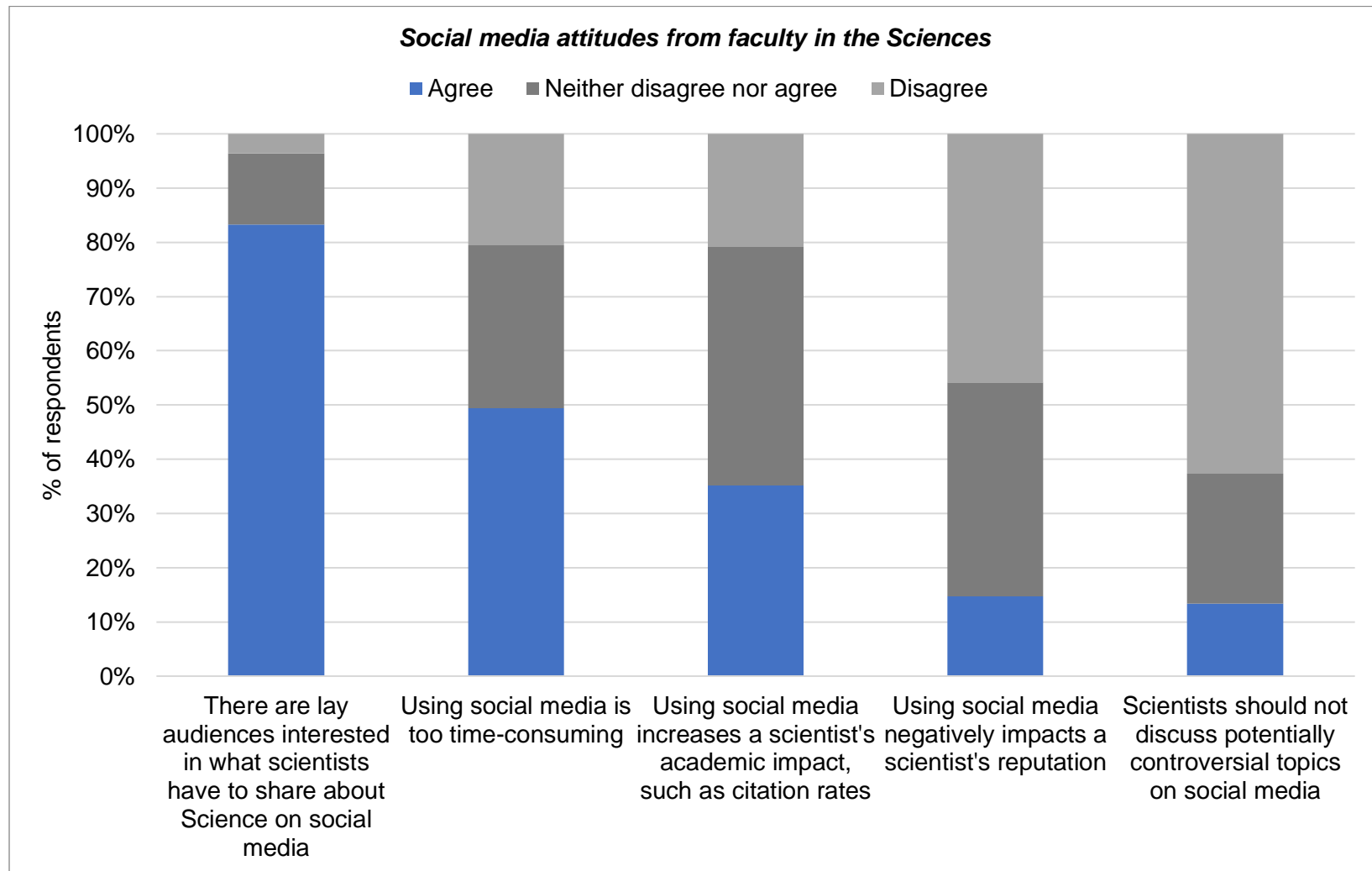


**Figure 2.1.** Frequency of social media platforms use by faculty in the Sciences



**Figure 2.2.** Frequency of social media use for specific work-related purposes from faculty in the Sciences





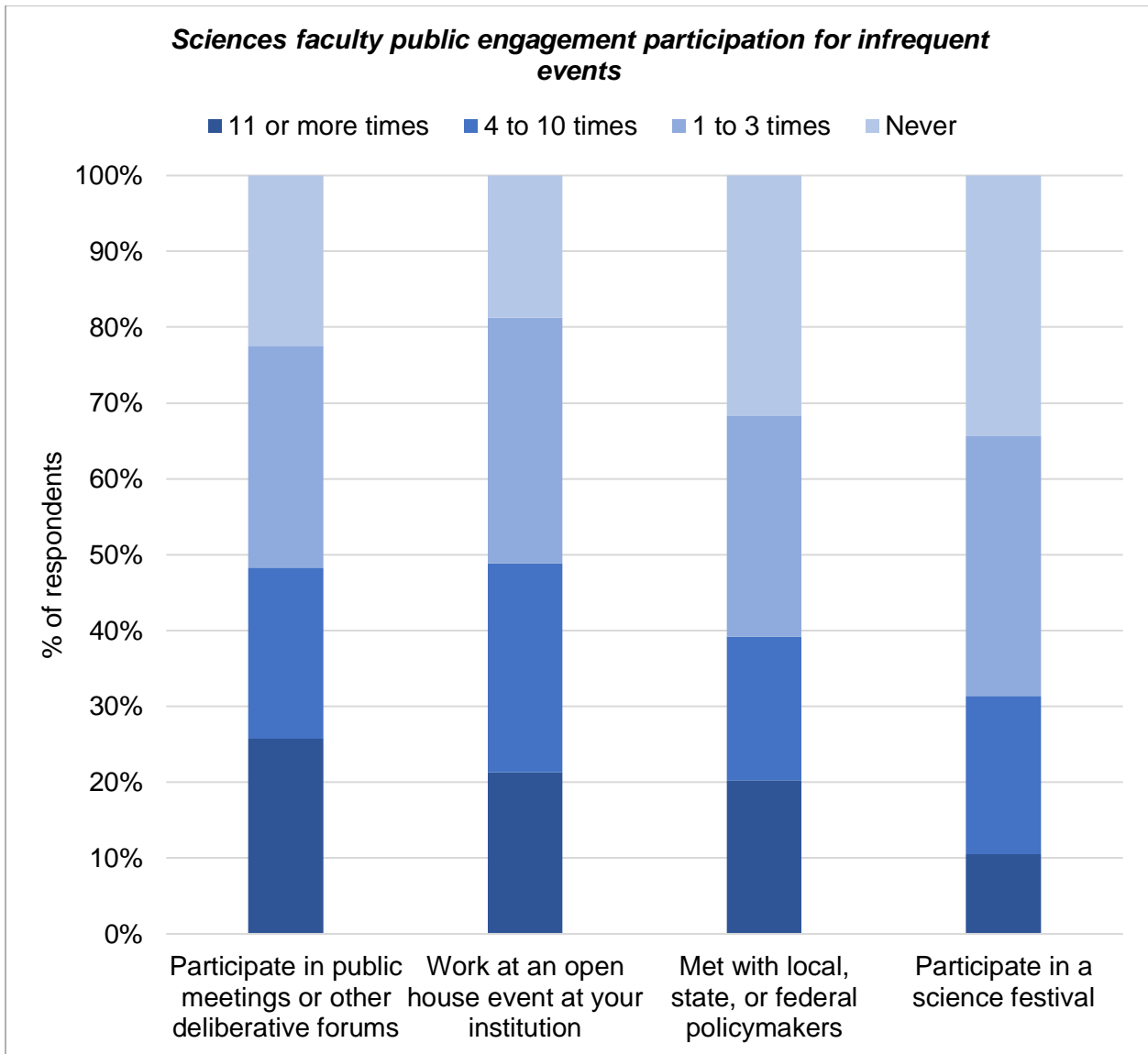
**Figure 2.3.** Social media attitudes from faculty in the Sciences

### **Section 3: Engagement activities and training participation**

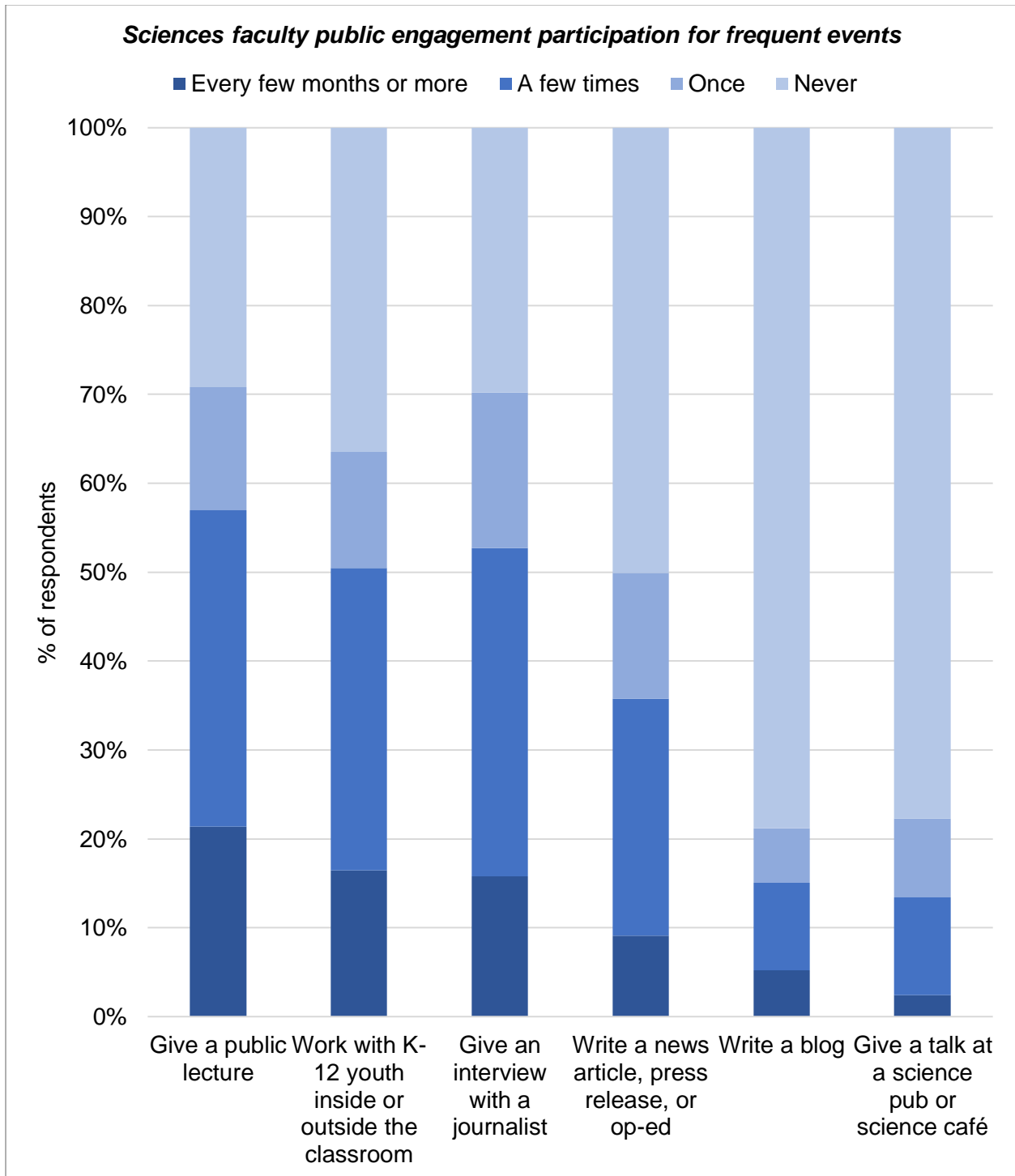
Respondents in the Sciences report participating in a variety of public engagement and outreach activities (Figures 3.1 and 3.2), although participation is more common for some activities than others. Over half of the Science faculty have worked at open house events (81%) or science festivals (66%), participated in public meetings (78%), met with policymakers (68%), given public lectures (71%), given interviews to journalists (70%), worked with K-12 youth (64%), or writing news articles (50%) at least once in their careers. Faculty more frequently (i.e., more than once in the past year) participate in activities such as giving public lectures, giving interviews, and working with K-12 youth. Activities such as meeting with policymakers and participating in science festivals occur less often. Most Science faculty respondents never give talks at science pubs and cafés or blogged, although some in the Sciences participate in these activities multiple times.

When asked about their willingness to participate in public engagement and outreach in the future, the vast majority of Science faculty respondents are willing to take part in a variety of activities (Figures 3.3 and 3.4). The most popular choices (over 85% of respondents are at least somewhat willing to participate) are more traditional activities that many are already actively involved in: giving public lectures, giving interviews, meeting with policymakers, participating in public meetings, working at open houses, and working with K-12 youth. Respondents are relatively less open to and enthusiastic about writing blogs, giving talks in science pubs or cafés, and participating in science festivals. Notably, writing a blog is one of the least frequently performed activities and has the most resistance in terms of future willingness to participate.

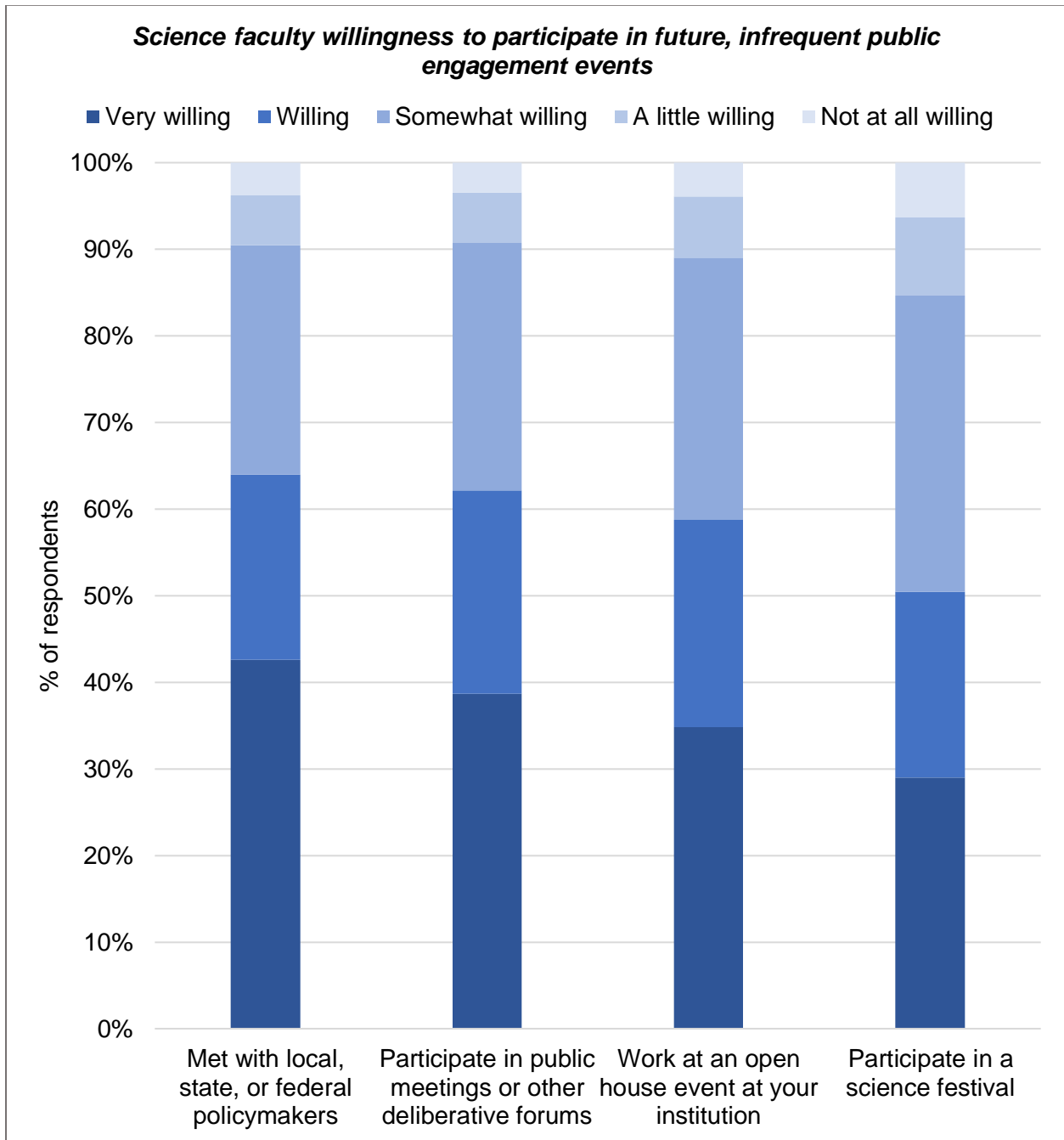
In complement to their past engagement involvement, a total of 58% of respondents in the Sciences indicated that they have received some science communication training, with 33% participating in more than one type of training (Figure 3.5). The most commonly attended type of training was short, single day workshops or seminars (49%), followed by webinars (23%) and multi-day workshops or seminars (22%).



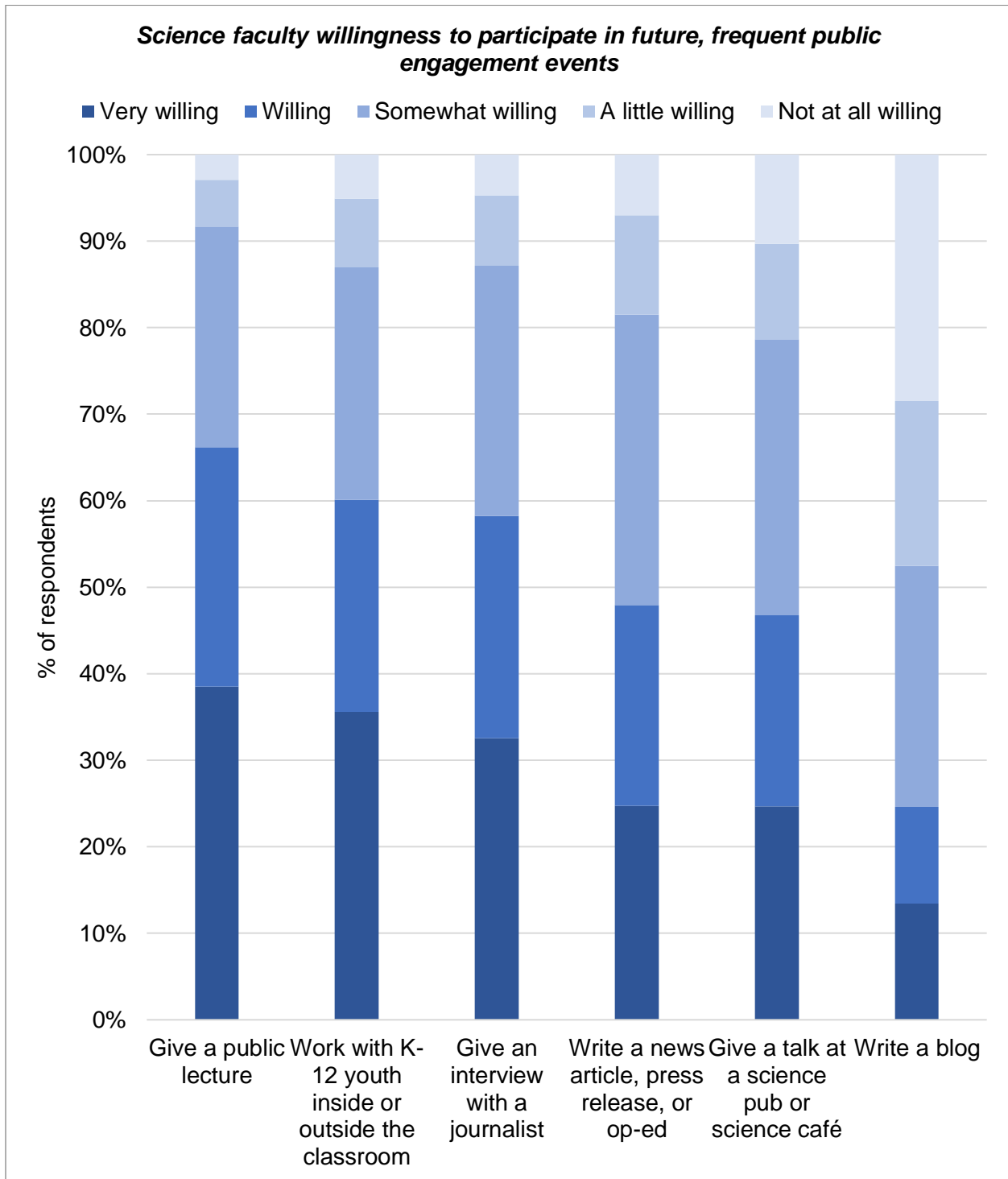
**Figure 3.1.** Science faculty participation in infrequent public engagement efforts over their careers



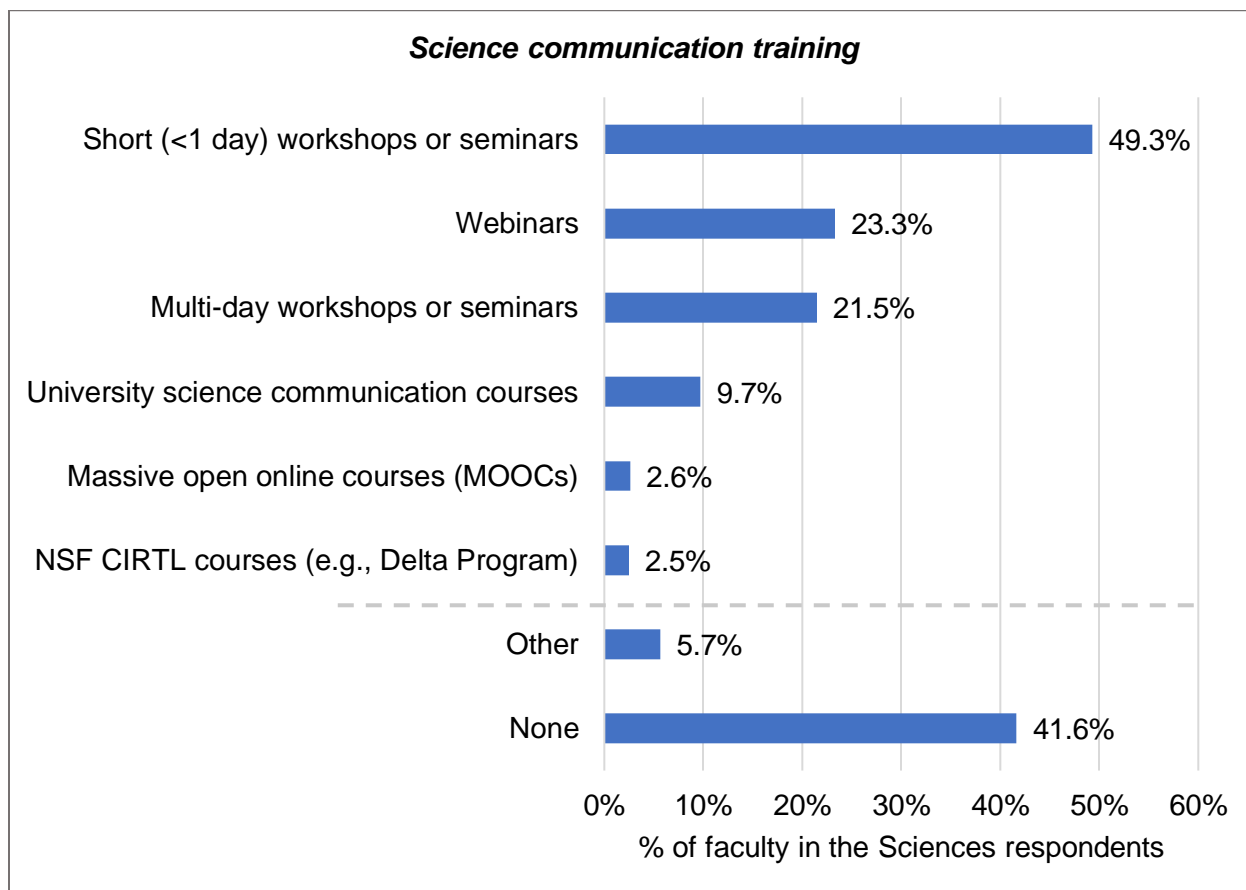
**Figure 3.2.** Science faculty participation in frequent public engagement efforts over the previous year



**Figure 3.3.** Science faculty willingness to participate in infrequent public engagement efforts in the future



**Figure 3.4.** Science faculty willingness to participate in frequent public engagement efforts in the future



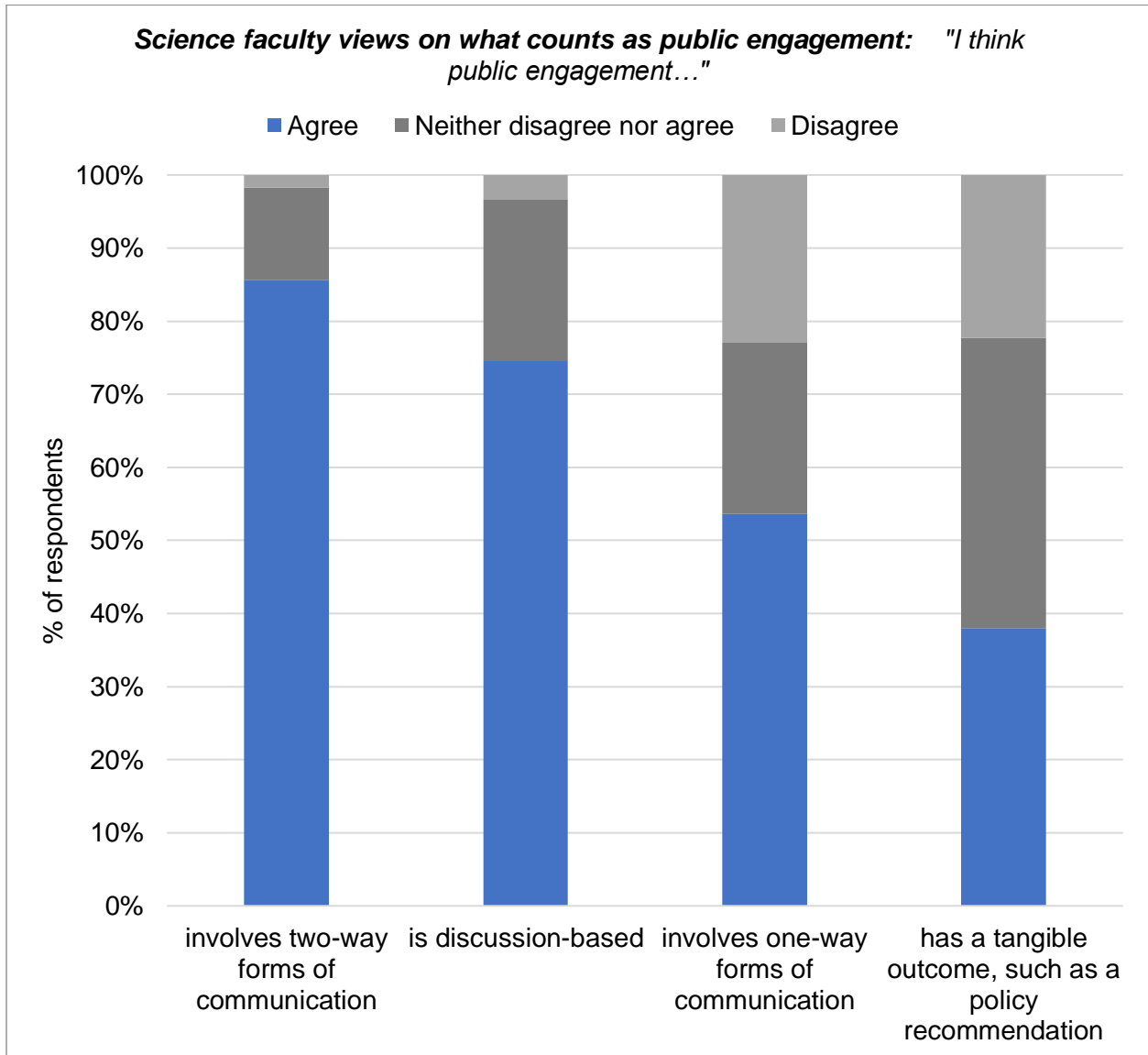
**Figure 3.5.** Participation in science communication trainings by faculty in the Sciences

#### **Section 4: Defining public engagement**

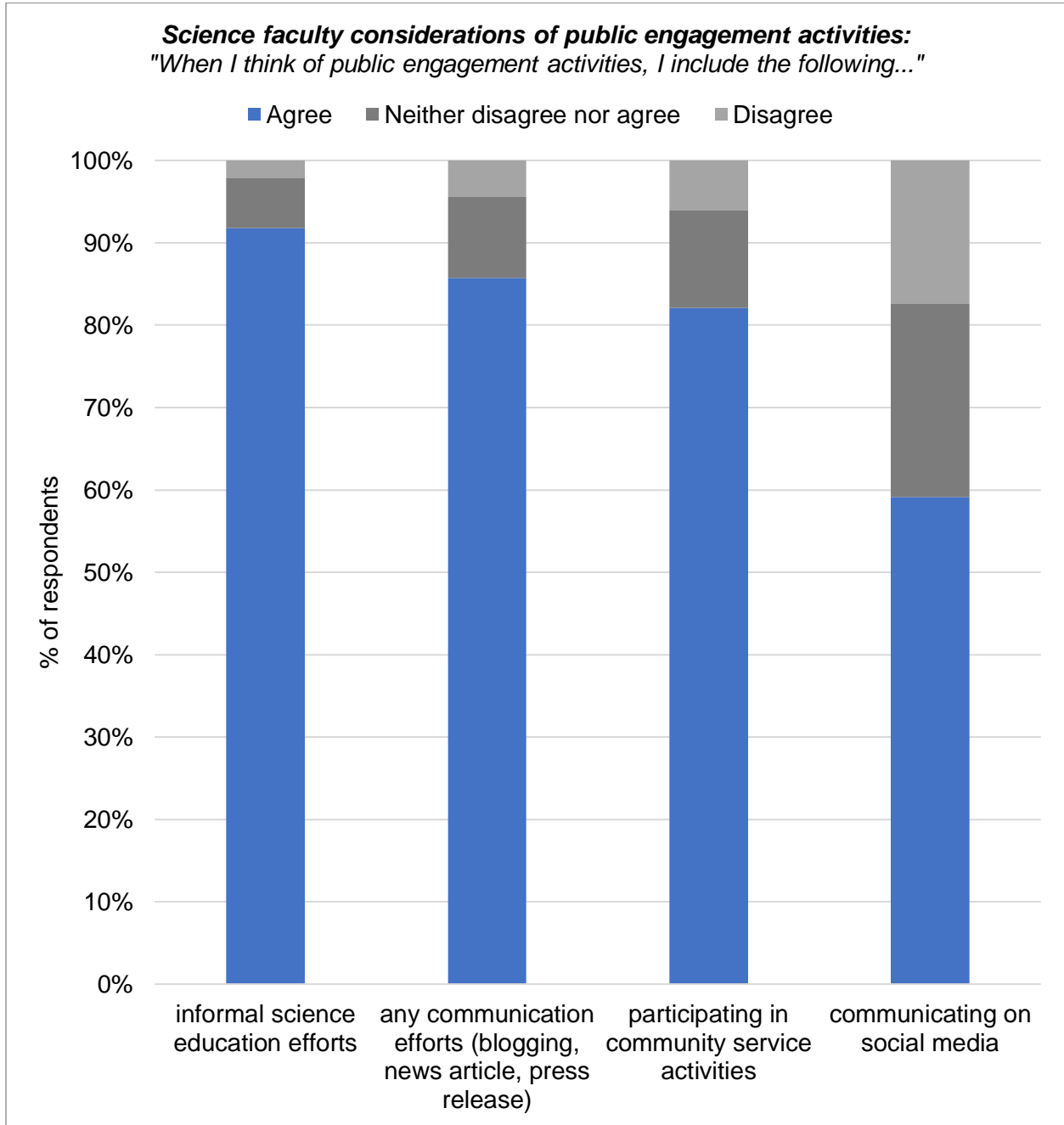
In the field of science communication, activities categorized as public engagement differ from those under the broader umbrella of public outreach. Specifically, public engagement activities involve two-way forms of communication which emphasize discussion and mutual learning. Using this definition, we assess Science faculty respondents' understanding of public engagement (Figure 4.1). Most respondents from the Sciences understand that public engagement emphasizes two-way communication (86% agree) and discussion (75% agree), but over half of the respondents also align engagement activities with elements of traditional outreach, such as one-way forms of communication (54% agree). Moreover, there is less consensus among respondents as to what role, if any, direct policy recommendations or other tangible outcomes play for engagement. Around four-in-ten respondents are ambivalent (40% neither disagree nor agree) as to whether a tangible outcome is necessary for an activity to be considered engagement.

When asked about specific types or characteristics of activities that fall into the category of public engagement (Figure 4.2), Science faculty respondents identify community service (82% agree) and informal science education (92% agree) as public engagement, as well as any communication efforts more broadly (86% agree). Interestingly, respondents are less sure of the inclusion of social media: around 40% of respondents either disagree (17%) or are unsure (24% neither disagree nor agree) as to whether communicating on social media is a public engagement activity.





**Figure 4.1.** Definition of public engagement from faculty in the Sciences



**Figure 4.2.** Types of events considered public engagement from faculty in the Sciences

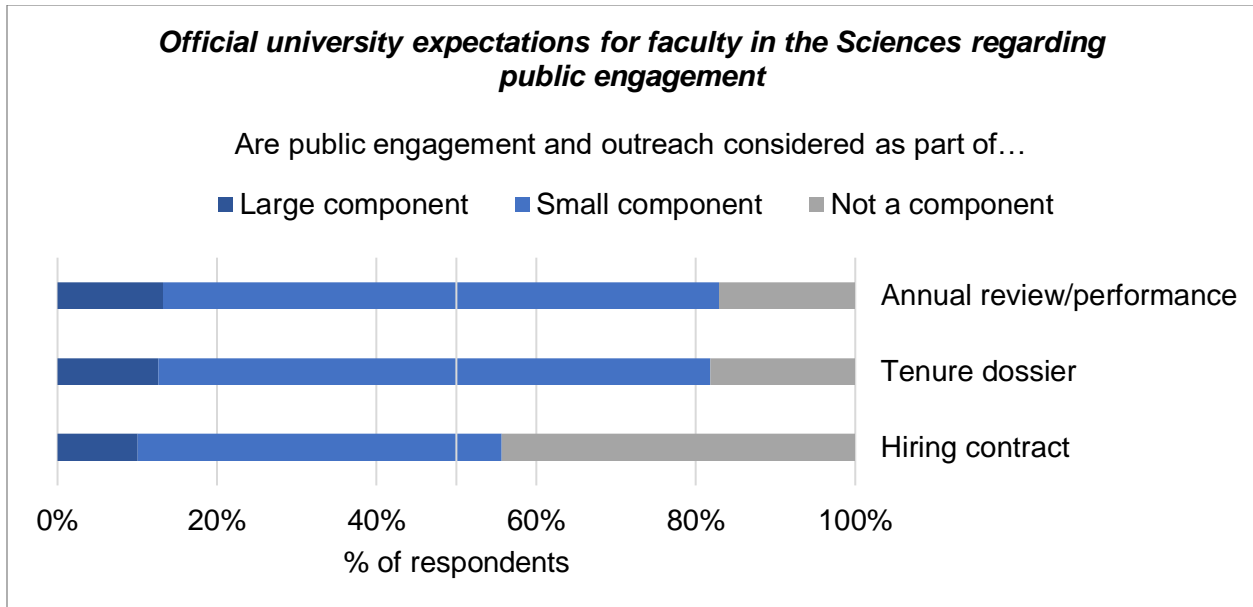
## Section 5: Engagement climate and culture at universities

Next, we turn to Science faculty respondents' perceptions of the university climate regarding public engagement and outreach efforts. In terms of official university expectations for public engagement and outreach (Figure 5.1), many Science faculty respondents indicate that public engagement and outreach activities are considered as at least a small part of their annual or performance review process (83%), tenure dossier (82%), and hiring contract (56%). Yet, this leaves a considerable portion of respondents in the Sciences for which public communication efforts are not part of their official university expectations. In line with this, Science respondents are mixed in their views of the importance assigned to public engagement by their universities, with just under half disagreeing (47%) with the statement that public engagement is treated as a core component of the work expected of faculty at their university, as important as research and/or teaching (Figure 5.2).

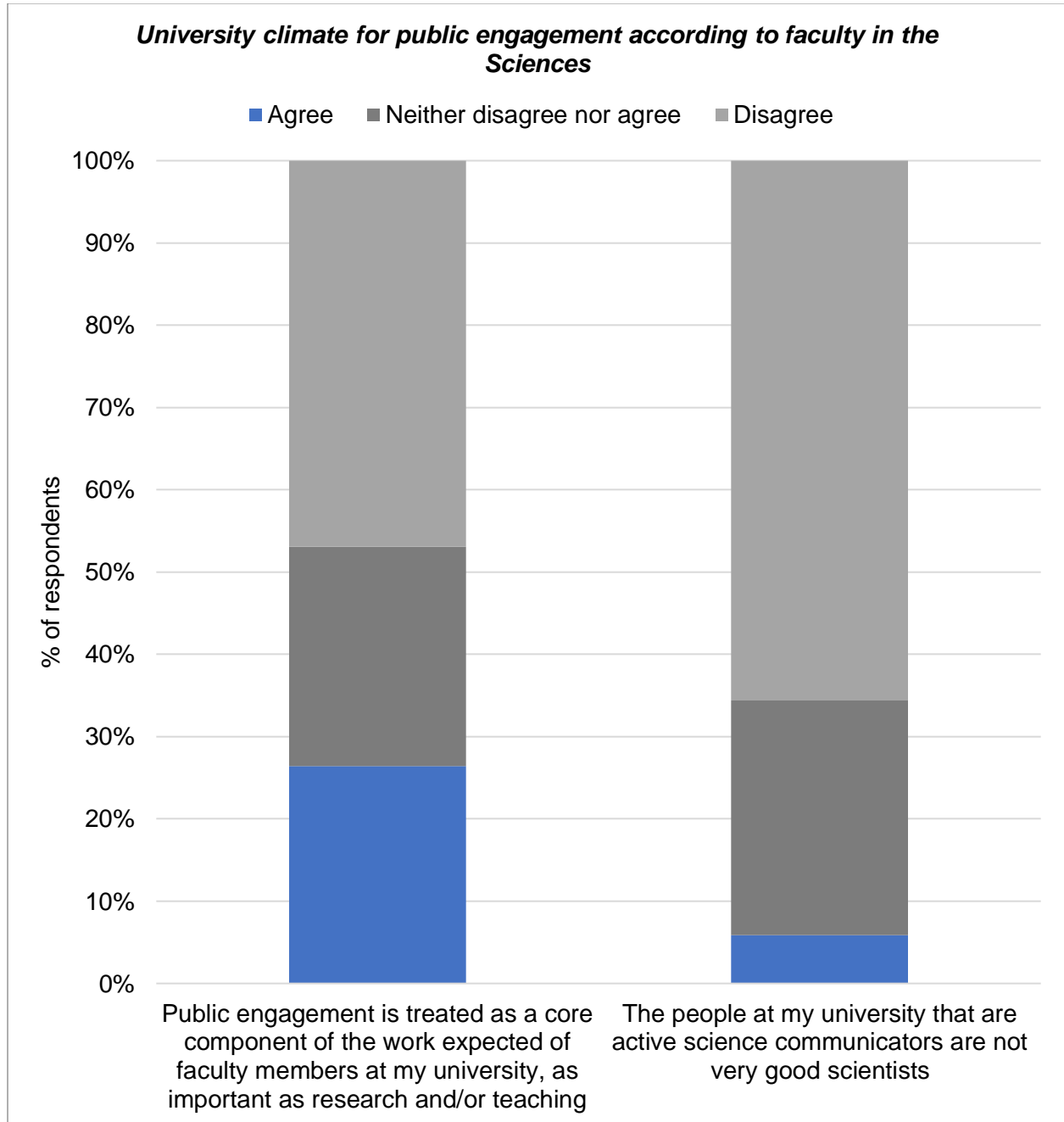
Science faculty respondents are mostly supportive of their active communicator peers, with 66% rejecting with the idea that people at their university who are active communicators are not very good researchers (Figure 5.2). Further, most respondents in the Sciences do not think (81% disagree) that public engagement is incompatible with the scientific culture (Figure 5.3).

As additional indicators of university's engagement climate, Science faculty give mixed responses as to whether they stopped participating in engagement based on how overwhelmed they felt by other responsibilities or with whether they've seen their colleagues get burned out from participating in engagement (Figure 5.3). Just over a third of respondents in the Sciences (36% agree) indicate that they sacrifice engagement when they are overwhelmed with other responsibilities, while another third (33% disagree) reject this strategy. Almost a quarter of respondents (22%) also indicate they have seen colleague burnout attributable to outreach and engagement, with more disagreement with this statement occurring among those who are more willing to participate in the future (Figure 5.4).

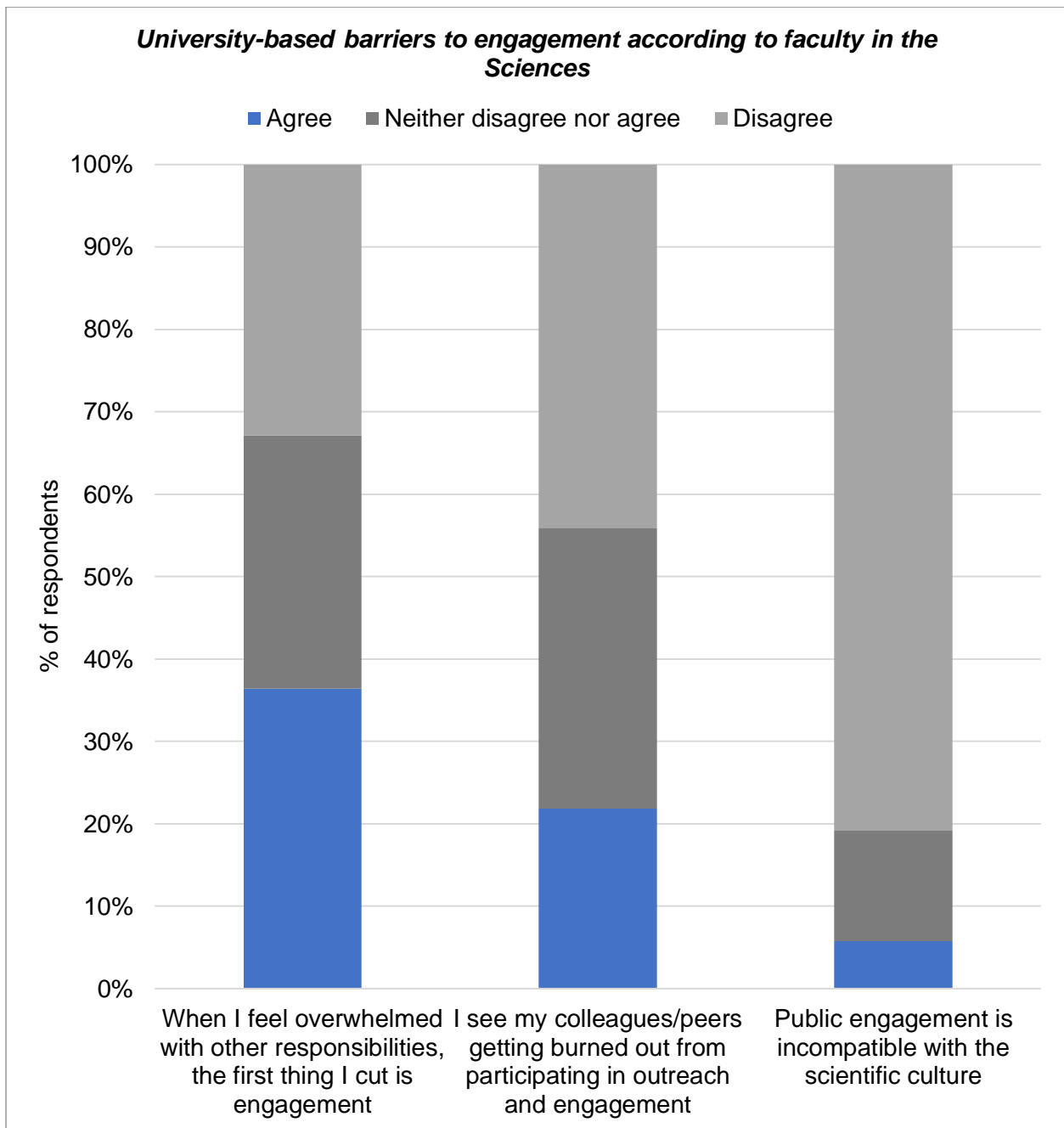
Lastly, responses from the Science faculty indicate there may be a change occurring over time regarding the culture of public engagement support (Figure 5.5). When asked about support for engagement from their advisors during their time as graduate students, half of respondents indicate they were not encouraged to get involved in engagement (50% disagree). Despite the lack of encouragement from their advisors, most Science faculty respondents indicate they support their own graduate students' participation in engagement activities (88% agree).



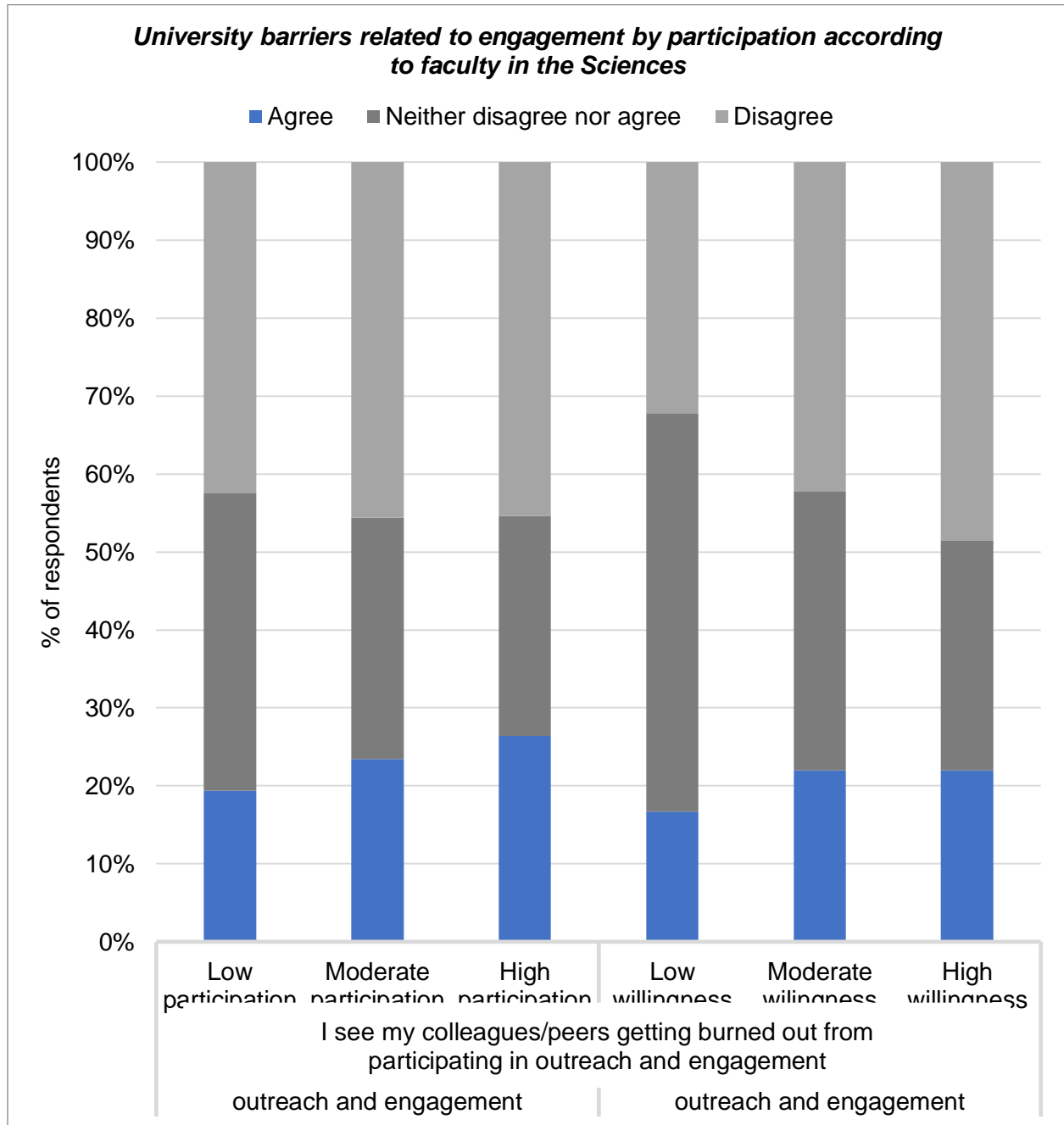
**Figure 5.1.** University expectations for public engagement and outreach for Science faculty



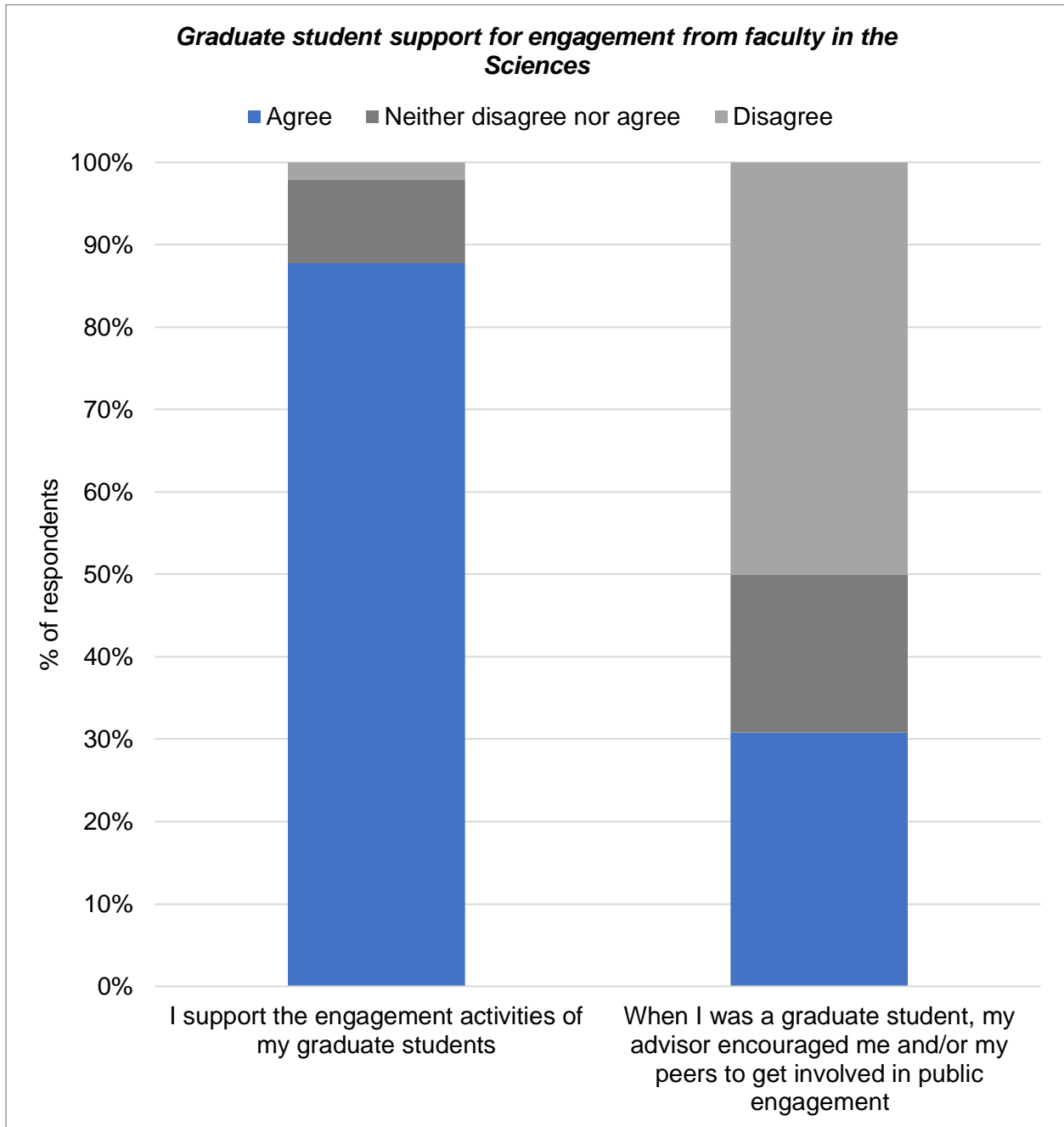
**Figure 5.2.** University climate for public engagement according to Science faculty



**Figure 5.3.** University barriers related to public engagement from Science faculty



**Figure 5.4.** University barriers related to engagement by participation from Science faculty



**Figure 5.5.** Graduate student support for public engagement for faculty in the Sciences

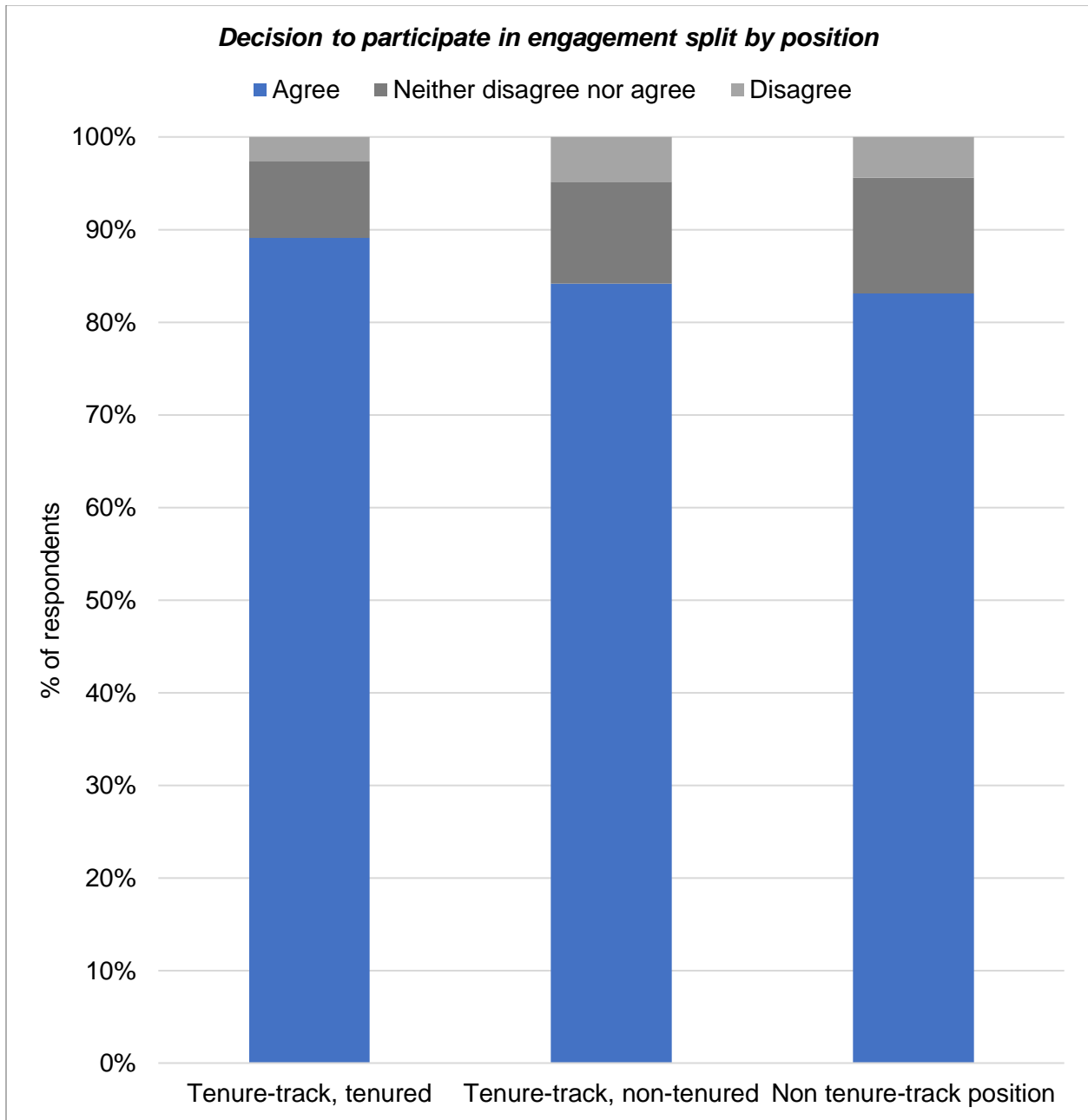


## Section 6: Perceptions of self-efficacy related to engagement

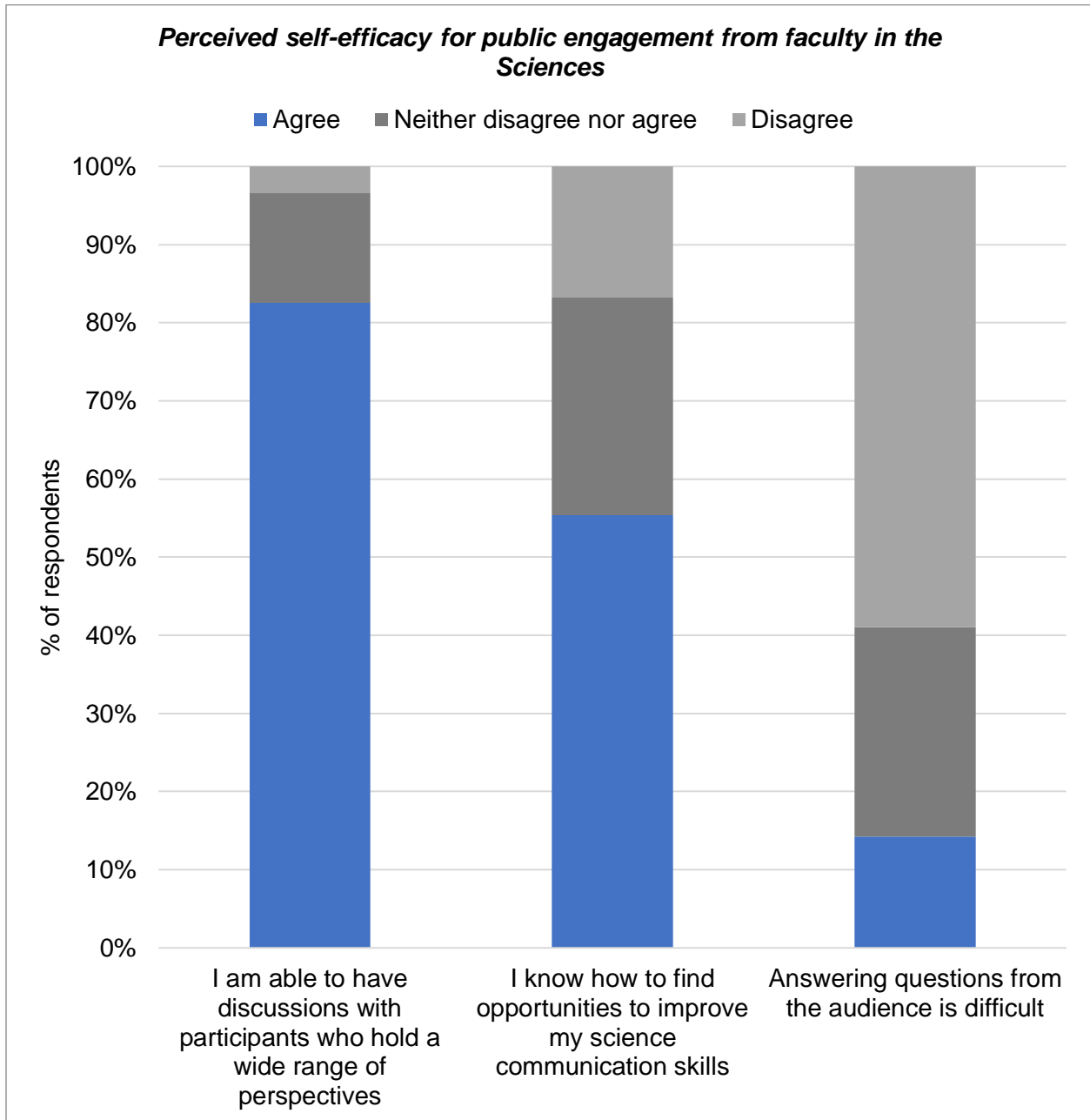
In addition to the cultural climate surrounding engagement at universities, faculty members' perceptions of their own self-efficacy or abilities to participate in public engagement can influence their involvement. Overall, 87% of Science faculty respondents feel they have autonomy over the decision to participate in engagement activities, with only around 4% indicating otherwise. The primary university position held by respondents in the Sciences does appear to influence how much autonomy they feel they have over this decision, with tenured faculty members (89%, N=4,699) reporting the greatest autonomy compared to their non-tenure track position (83%, N=1,914) and tenure-track, non-tenured (84%, N=1,460) colleagues (Figure 6.1).

Regarding their abilities to effectively participate in engagement and outreach (Figure 6.2), the majority of respondents in the Sciences feel capable of having discussions with diverse audiences (83% agree) and most respondents reject the assertion that answering questions from the audience is difficult (59% disagree). A notable number of Science faculty respondents are ambivalent about being able to find opportunities for science communication training (28% neither disagree nor agree). Looking at the effects of science communication training on scientists' self-efficacy (Figure 6.3), those who have received training (one training type, N=2,068; 2+ training types, N=2,700) are, unsurprisingly, more knowledgeable about how to find opportunities to improve their communication skills compared to those with no training (N=3,396). Those with training are also more confident in their abilities to hold discussions with diverse audiences and, to a lesser extent, handle audience questions.

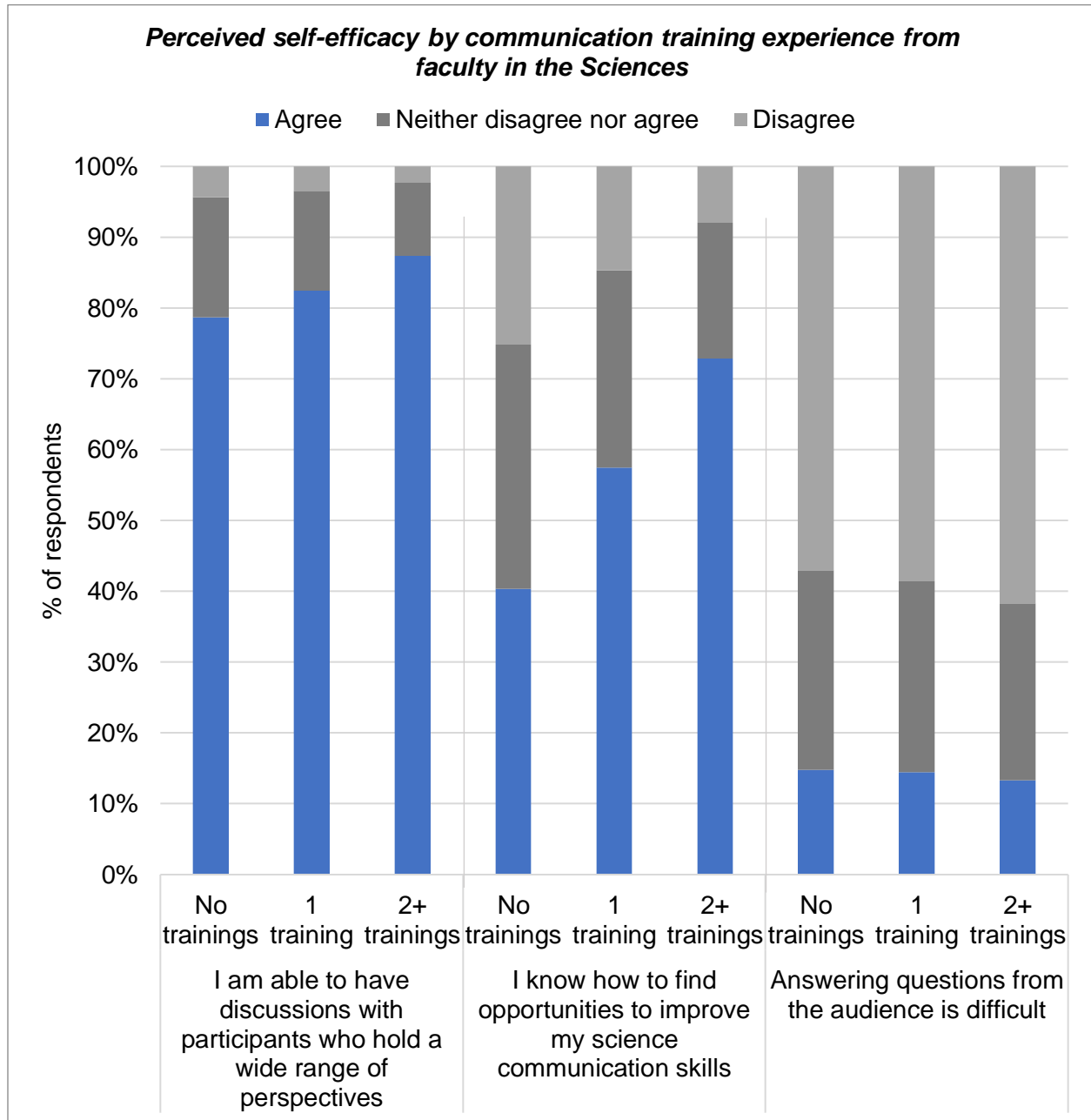
The growing body of social science research on science communication provides insights for effective science communication outreach and engagement efforts. Science faculty respondents indicate mixed use of this research when asked about whether they pay attention to social science research on the topic (Figure 6.4). Around half of respondents (52% agree) report paying attention to science communication research while a full quarter of respondents indicate they do not (24% disagree). Yet, the majority of respondents (78%) agree that insights from social science research should be used to inform science communication efforts.



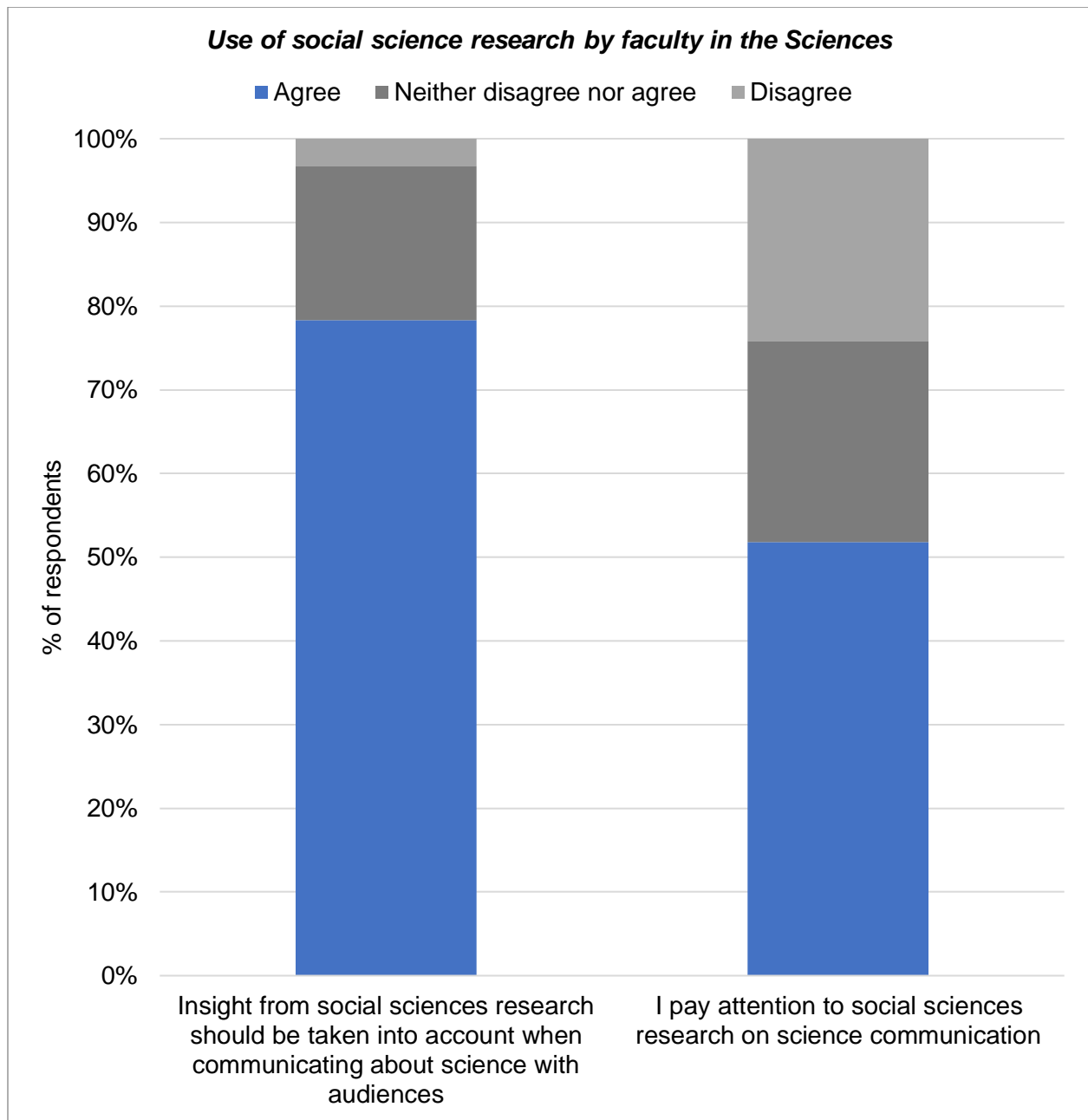
**Figure 6.1.** Science faculty members' autonomy to participate in engagement split by position



**Figure 6.2.** Self-efficacy related to public engagement from Science faculty



**Figure 6.3.** Self-efficacy related to public engagement by communication training experience from faculty in the Sciences



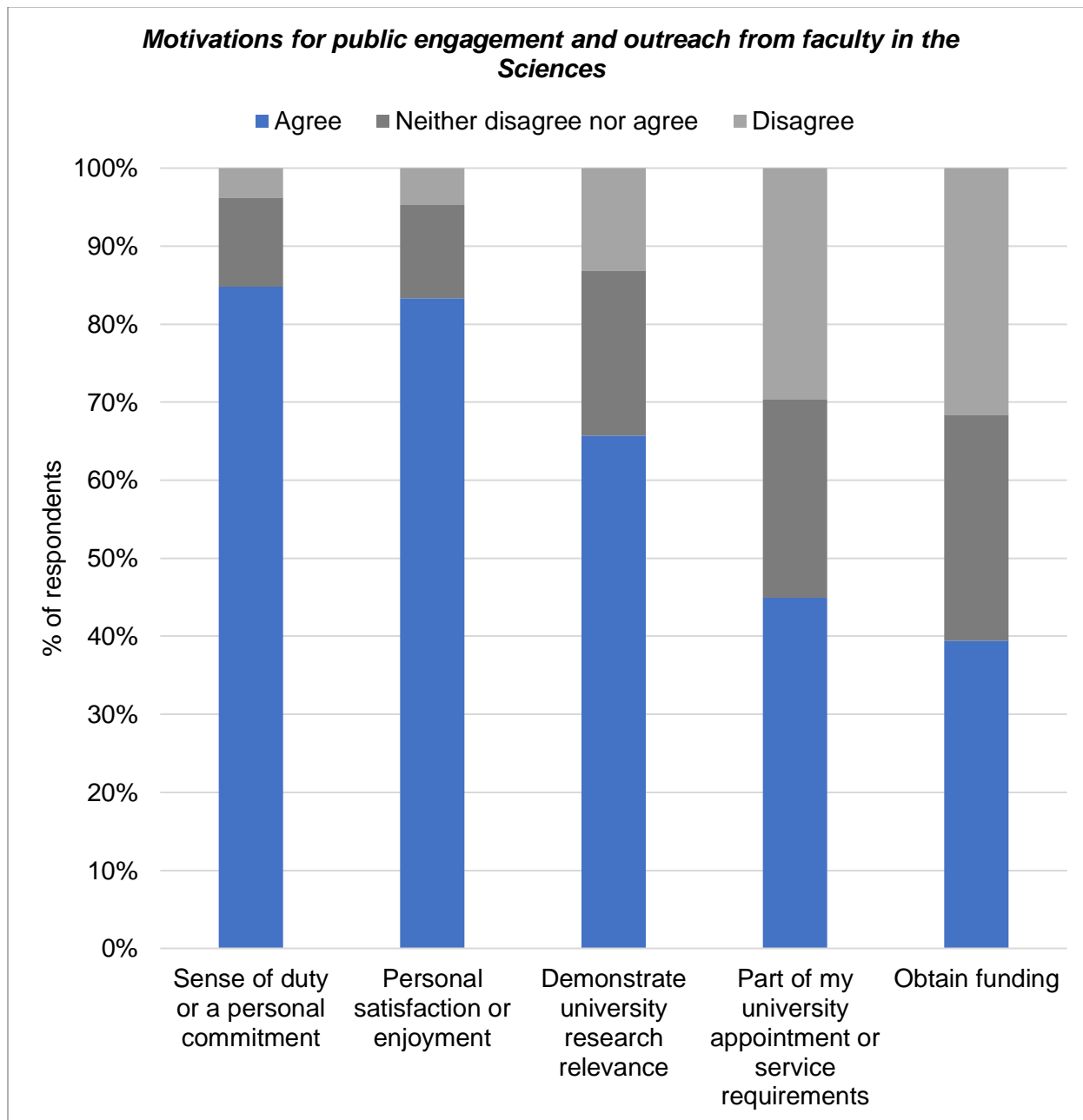
**Figure 6.4.** Use of social science research for science communication by faculty in the Sciences

## **Section 7: Engagement motivations, drawbacks, and barriers**

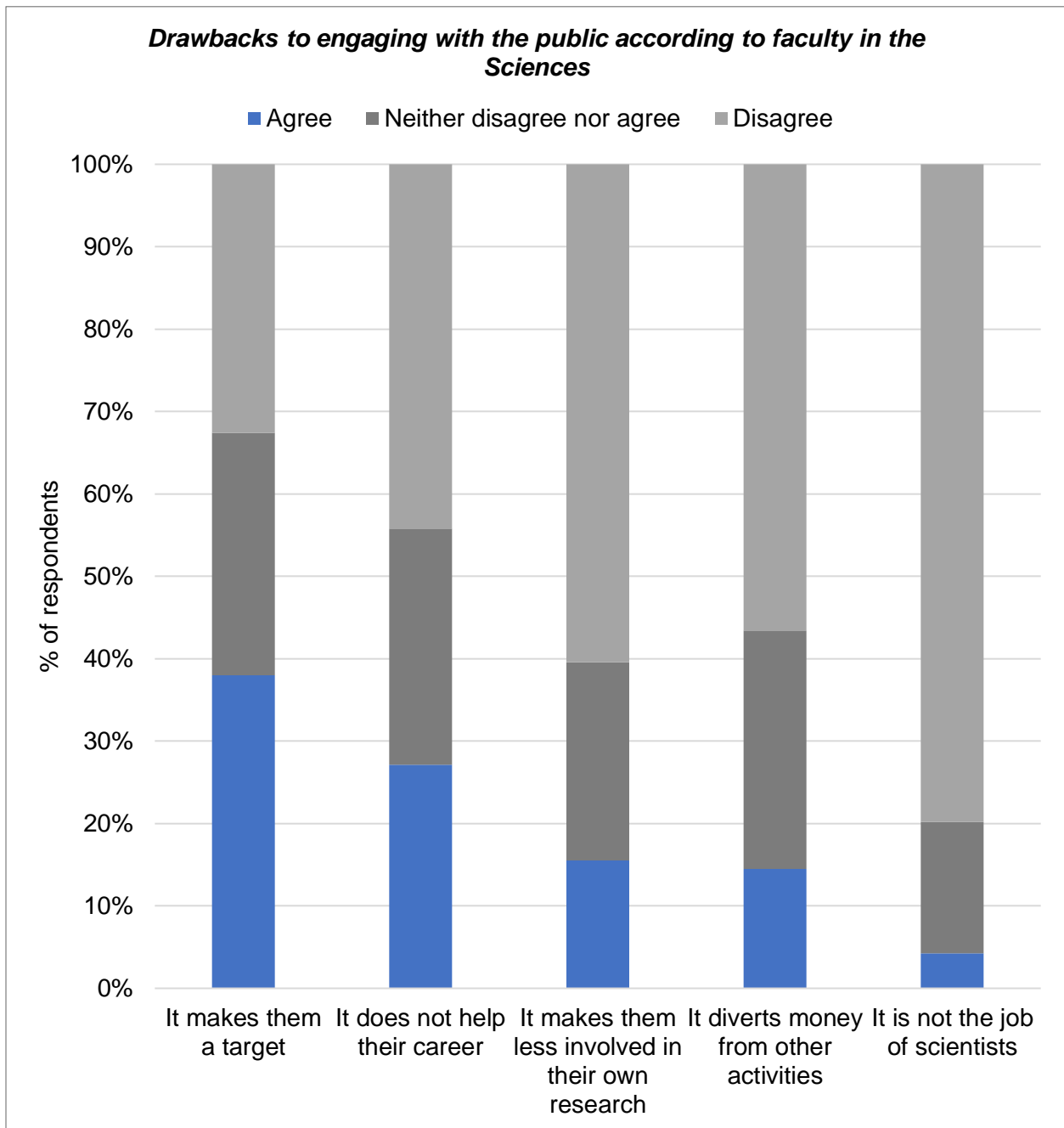
Numerous motivations, drawbacks, and barriers to public engagement and outreach have been suggested by science communication researchers and practitioners. For personal motivations (Figure 7.1), faculty respondents in the Sciences indicate that a sense of duty (85% agree) and personal enjoyment (83% agree) are strong motivators for participating in engagement. Respondents also believe that demonstrating their university's research relevance is a motivating factor (66% agree). Opinions are more mixed about motivations related to fulfilling university appointment requirements (45% agree) and obtaining funding (40% agree).

Science faculty respondents mostly reject the drawbacks commonly associated with public engagement (Figure 7.2). Respondents reject the assertions that engagement is not their job (80% disagree), it distracts from research (60% disagree), and it diverts money from other activities (57% disagree). Opinions are more mixed about the potential drawbacks that engagement does not help their careers (27% agree; 44% disagree) and makes them a target (38% agree; 33% disagree).

Finally, faculty respondents in the Sciences are more ambivalent about some of the common potential barriers to public engagement (Figures 7.3). Respondents are ambivalent about the reasons preventing their colleagues from participating in public engagement being that most researchers are bad at engagement (40% neither disagree nor agree) and that they may have had bad experiences in the past (45% neither disagree nor agree). There is more consensus around the barrier that there is a lack of institutional incentives to engage (54% agree).

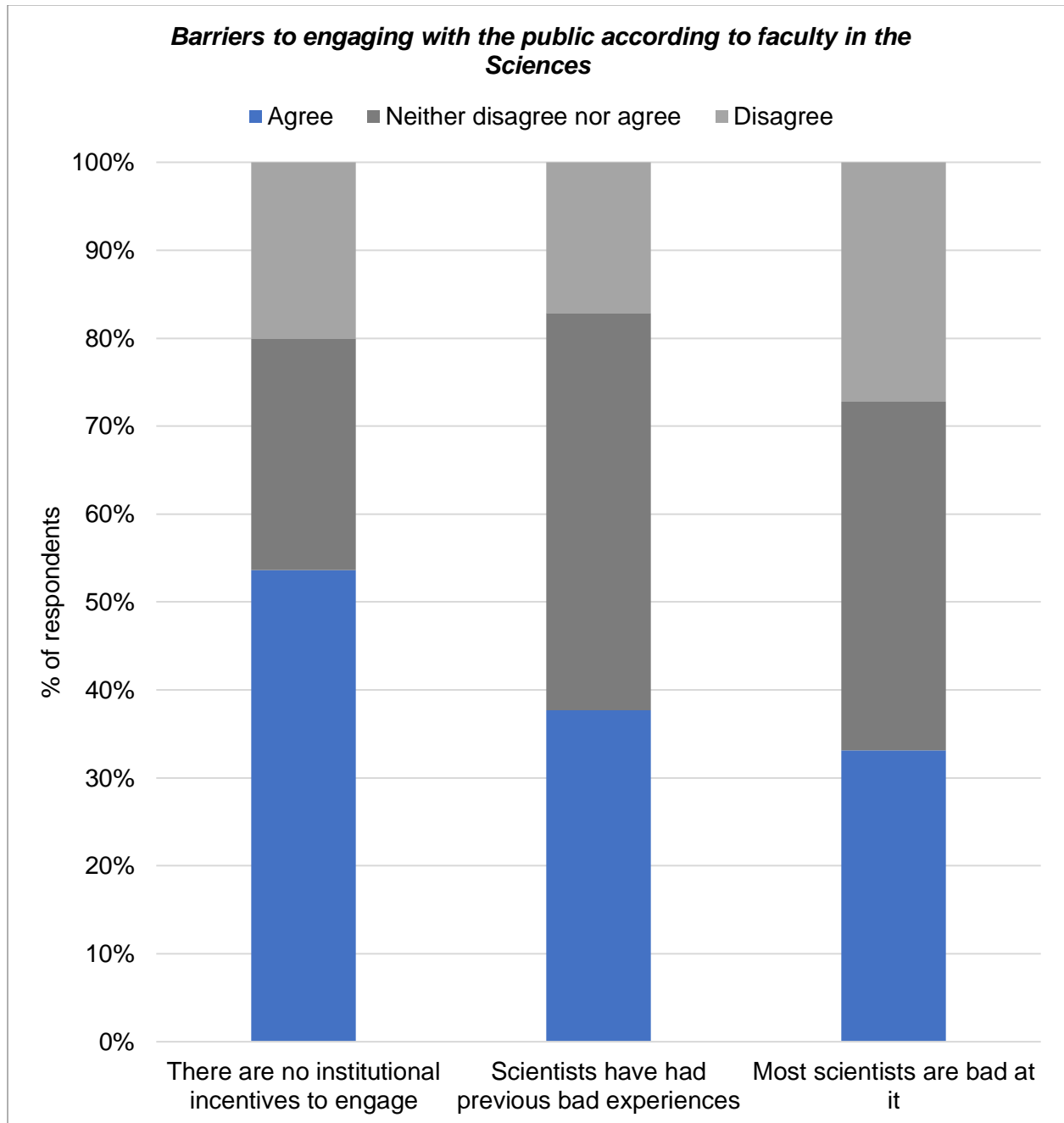


**Figure 7.1.** Motivations for engagement, according to respondents in the Sciences



**Figure 7.2.** Scientist drawbacks to engagement, according to respondents in the Sciences





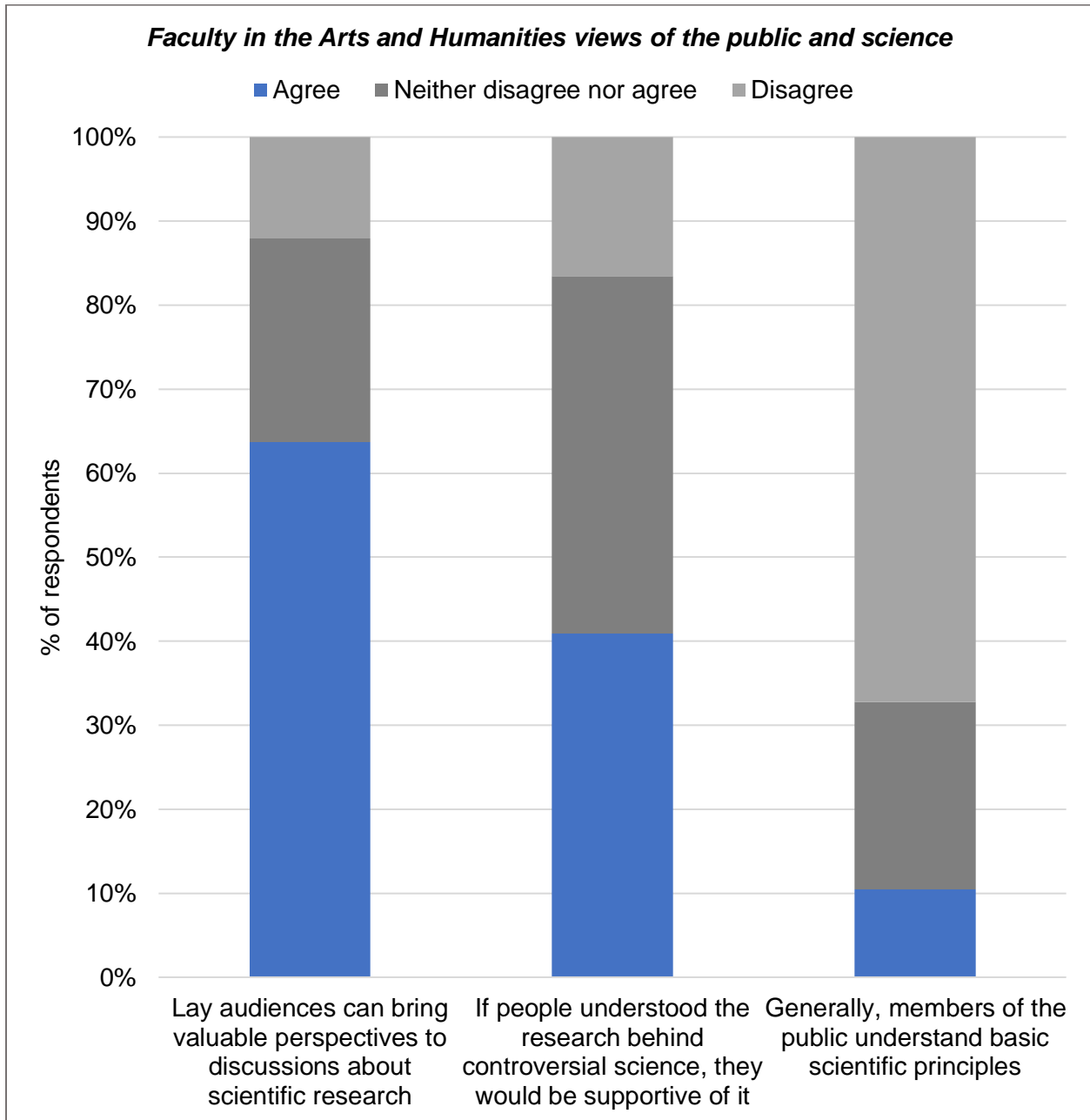
**Figure 7.3.** Scientist barriers to engagement, according to respondents in the Sciences

## **Part 2: Faculty in the Arts and Humanities**

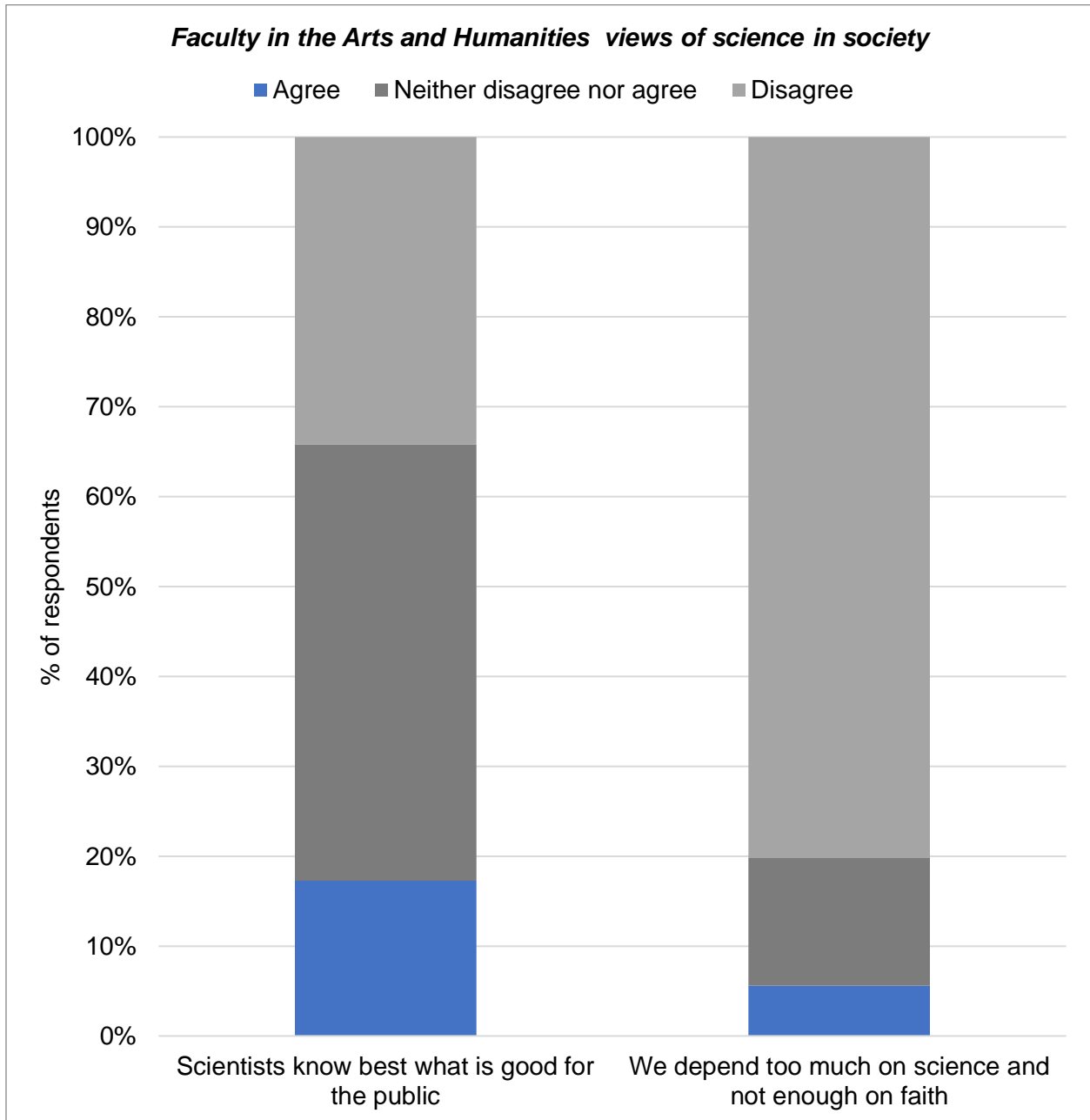
## Section 8: Views of science and the public

Similar to their colleagues in the Sciences, faculty respondents in the Arts and Humanities hold mixed views of members of the public (Figure 8.1). In line with those in the Sciences, most Arts and Humanities respondents do not think that members of the public understand basic scientific principles (67% disagree). They do, however, believe that lay audiences can bring valuable perspectives to science discussions (64% agree), although they are not as confident in lay audiences as respondents in the Sciences. While still a considerable proportion, fewer faculty respondents in the Arts and Humanities prescribe to a deficit model of thinking about public attitudes toward controversial science, with over 41% agreeing that people would be more supportive of science if they understood it and only 17% disagreeing.

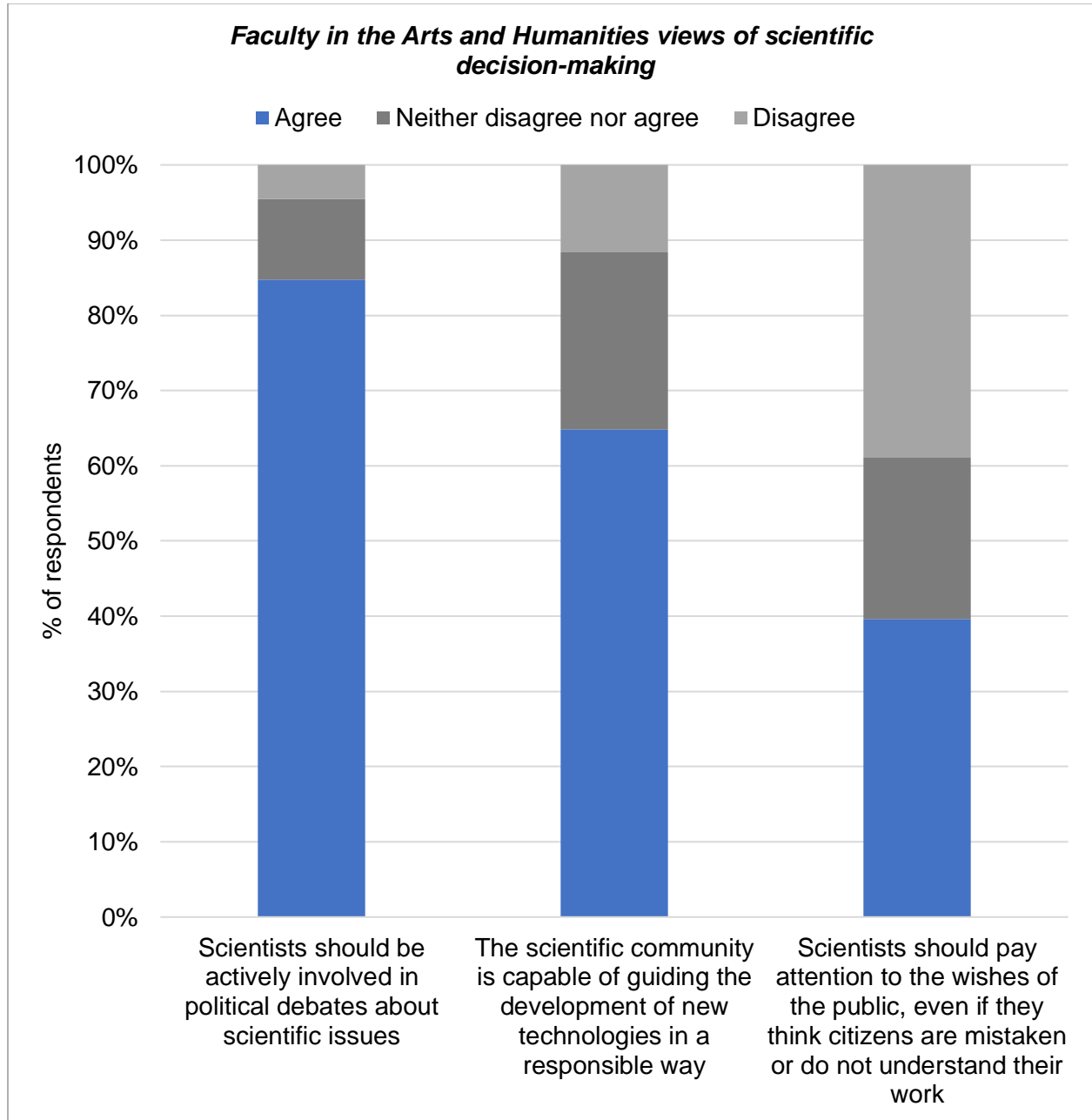
Faculty respondents in the Arts and Humanities hold similar views to those in the Sciences regarding science in society (Figure 8.2) but differ in who they think should be responsible for scientific issue decision-making (Figure 8.3). The respondents are mostly ambivalent about the idea that scientists know best what is good for the public (49% neither disagree nor agree), however, they do agree that scientists should be actively involved in political debates about science (85% agree). Interestingly, Arts and Humanities faculty respondents are less confident in the abilities of both the public and the scientific community to make decisions about science compared to Science respondents. Most Arts and Humanities respondents still do agree that the scientific community is capable of guiding the responsible development of new technologies (65% agree), but under half (40% agree) felt scientists have a responsibility to pay attention to the wishes of the public.



**Figure 8.1.** Arts and Humanities faculty views of the public regarding science



**Figure 8.2.** Arts and Humanities faculty views of science in society



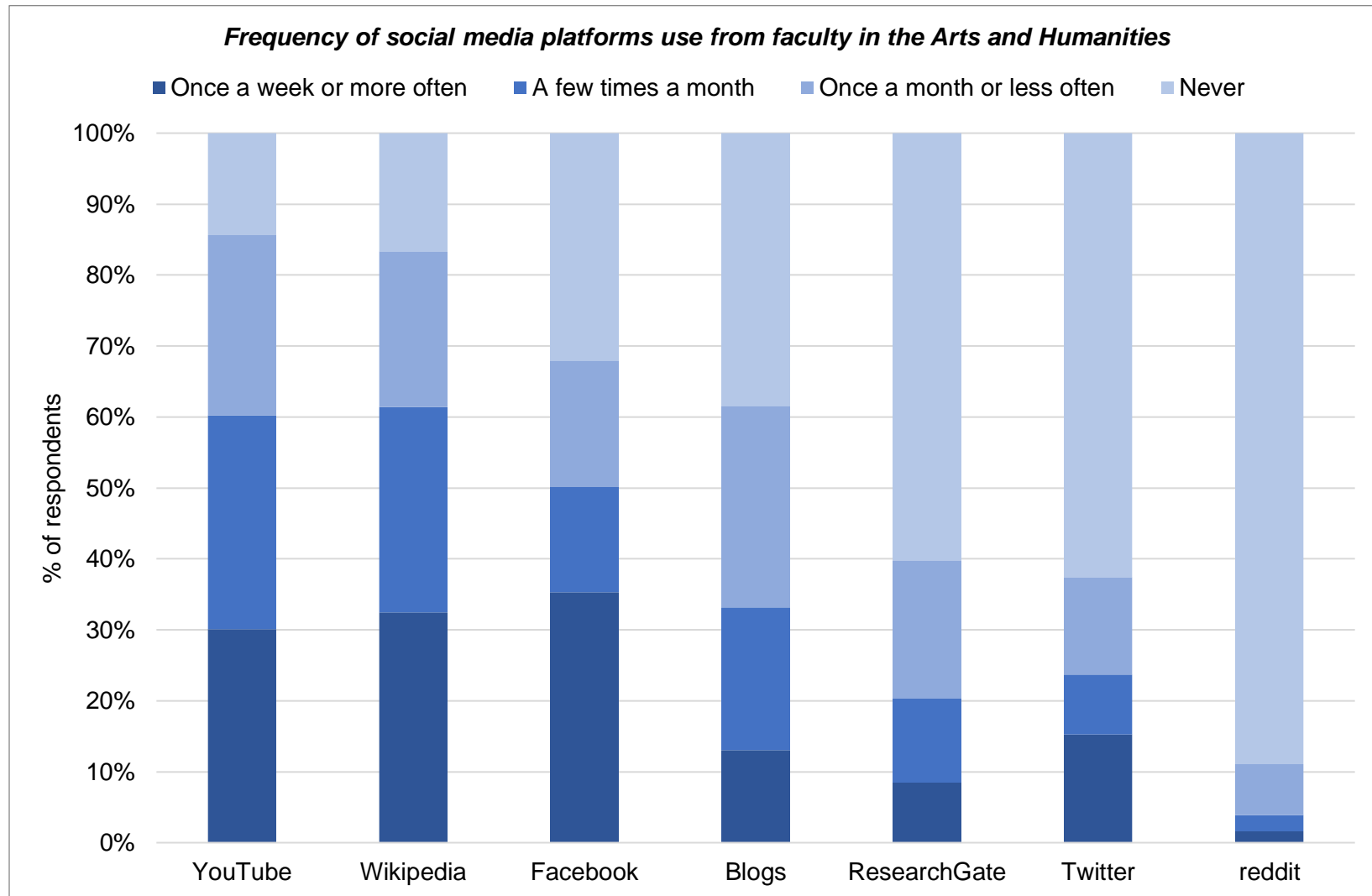
**Figure 8.3.** Arts and Humanities faculty views of scientific decision-making

## Section 9: Social media use and attitudes

Of the faculty respondents in the Arts and Humanities, 87% report using social media. Along with their Science colleagues, those in the Arts and Humanities do not report high frequency social media use for work-related purposes, although they do use most social media platforms slightly more frequently. The Arts and Humanities respondents' use varies by social media platform (Figure 9.1), with the most universally used platforms including Wikipedia, YouTube, and Facebook. Perhaps unsurprisingly, the largest difference in platform use between respondents in the Arts and Humanities and those in the Sciences is for restricted online communities (e.g., ResearchGate), with those in the Sciences using the platforms considerably more frequently.

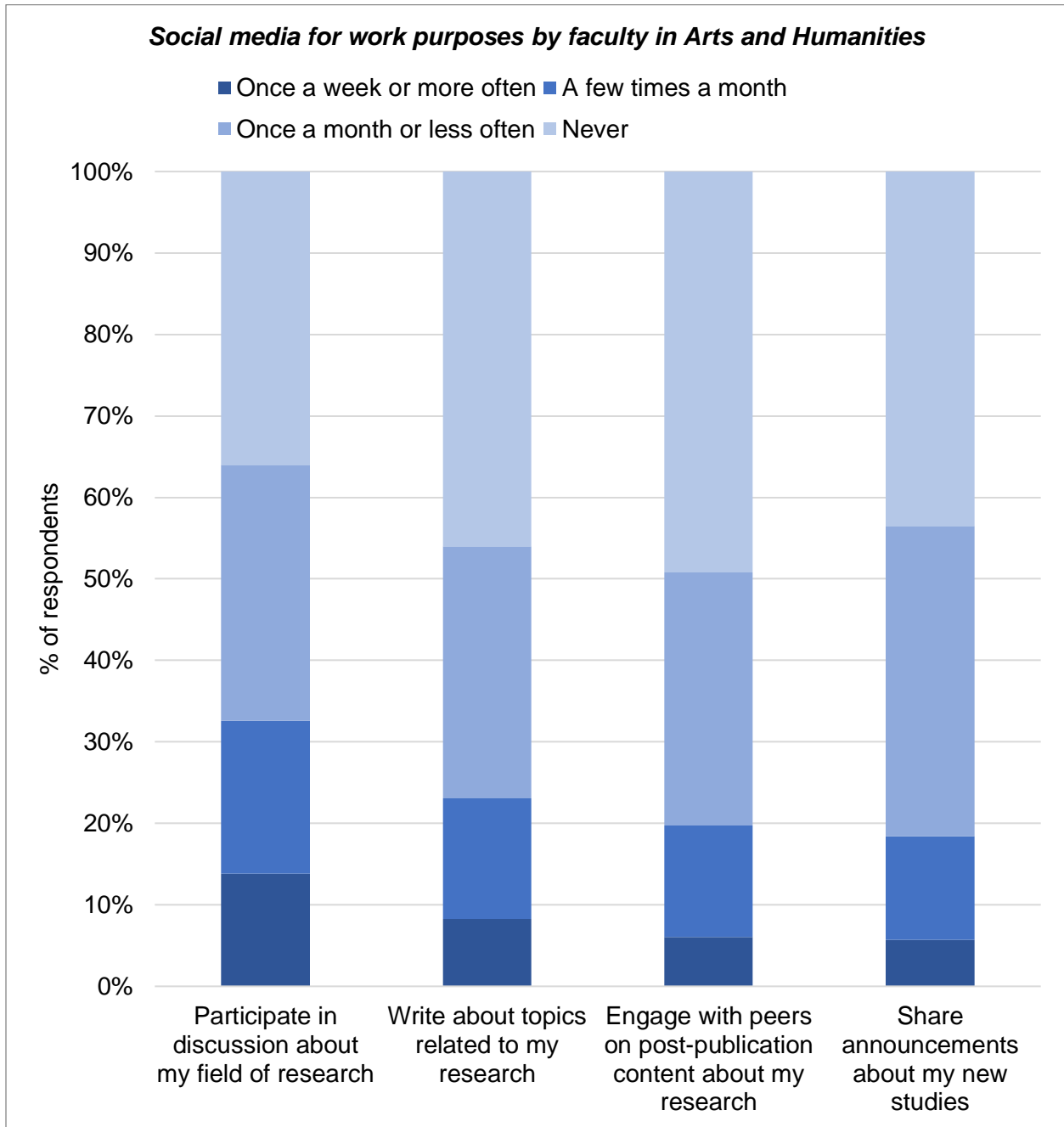
Faculty in the Arts and Humanities report a similar lack of engagement when asked about their general use of social media for specific work-related purposes (Figure 9.2). Around half of Arts and Humanities respondents report that they never engage with peers on post-publication content about their research (49%), write about topics related to their research (46%), share announcements about their new studies (44%), or participate in discussions about their research (36%). There is still a sizeable number of faculty who report that they engage on social media, but they participate only once a month or less frequently in the listed activities (around a third for each activity). Once again, faculty in the Arts and Humanities report slightly higher levels of engagement.

The social media attitudes of Arts and Humanities faculty members (Figure 9.3) indicate similar concerns and support as those in the Sciences. Over six-in-ten Arts and Humanities respondents (64%) disagree that scholars should not discuss potentially controversial topics on social media. Yet, they also express a disconnect where considerably fewer respondents reject the idea that using social media negatively impacts a scholar's reputation (41% disagree). Many respondents find social media to be time-consuming (47% agree) and they are ambivalent about whether using social media positively affects their academic impact (46% neither disagree nor agree). Most Arts and Humanities faculty respondents do, however, believe that there are lay audiences interested in what scholars share about the arts and humanities on social media (80% agree).

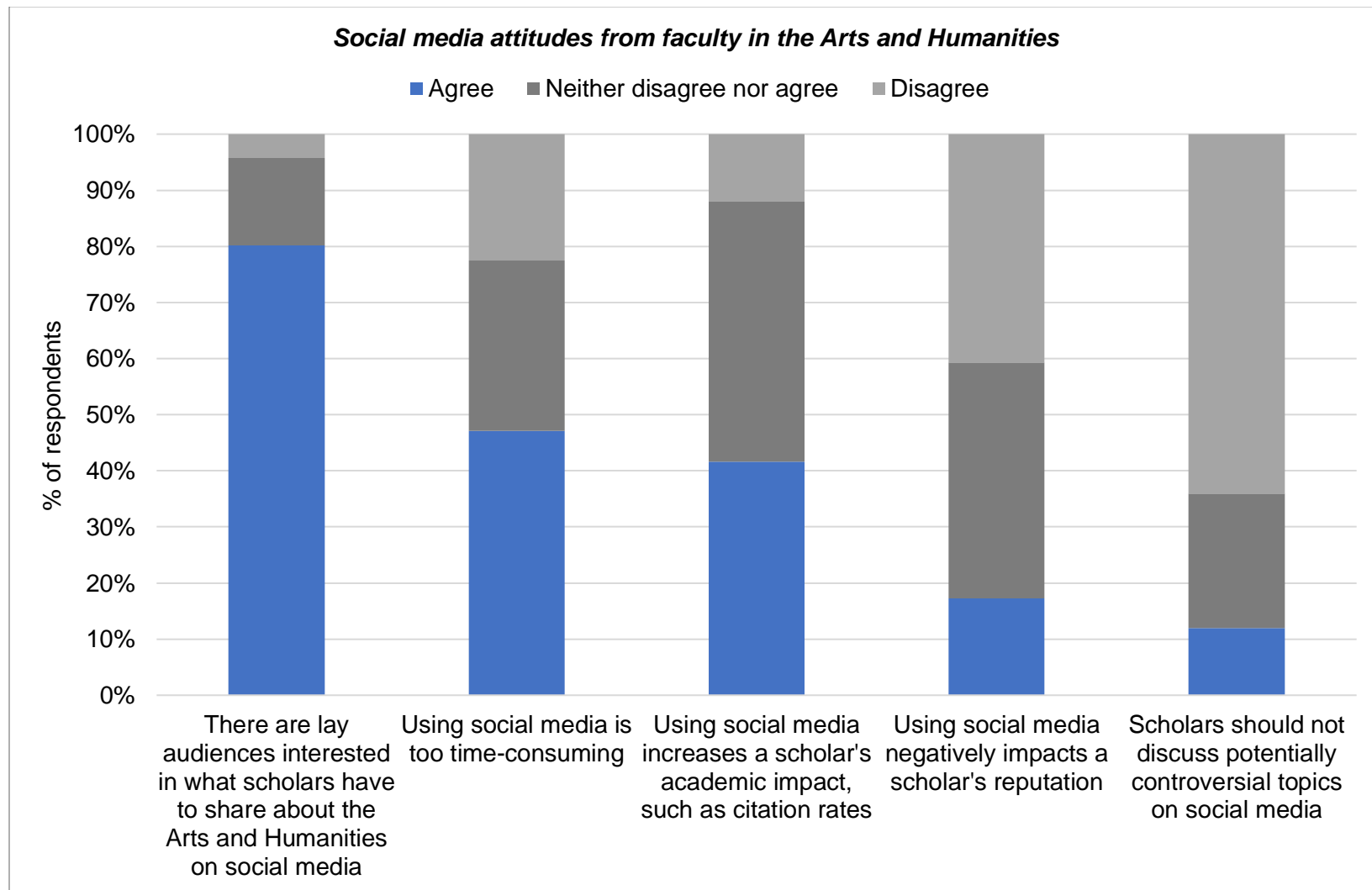


**Figure 9.1.** Frequency of social media platforms use by faculty in the Arts and Humanities





**Figure 9.2.** Frequency of social media use for specific work-related purposes from faculty in the Arts and Humanities



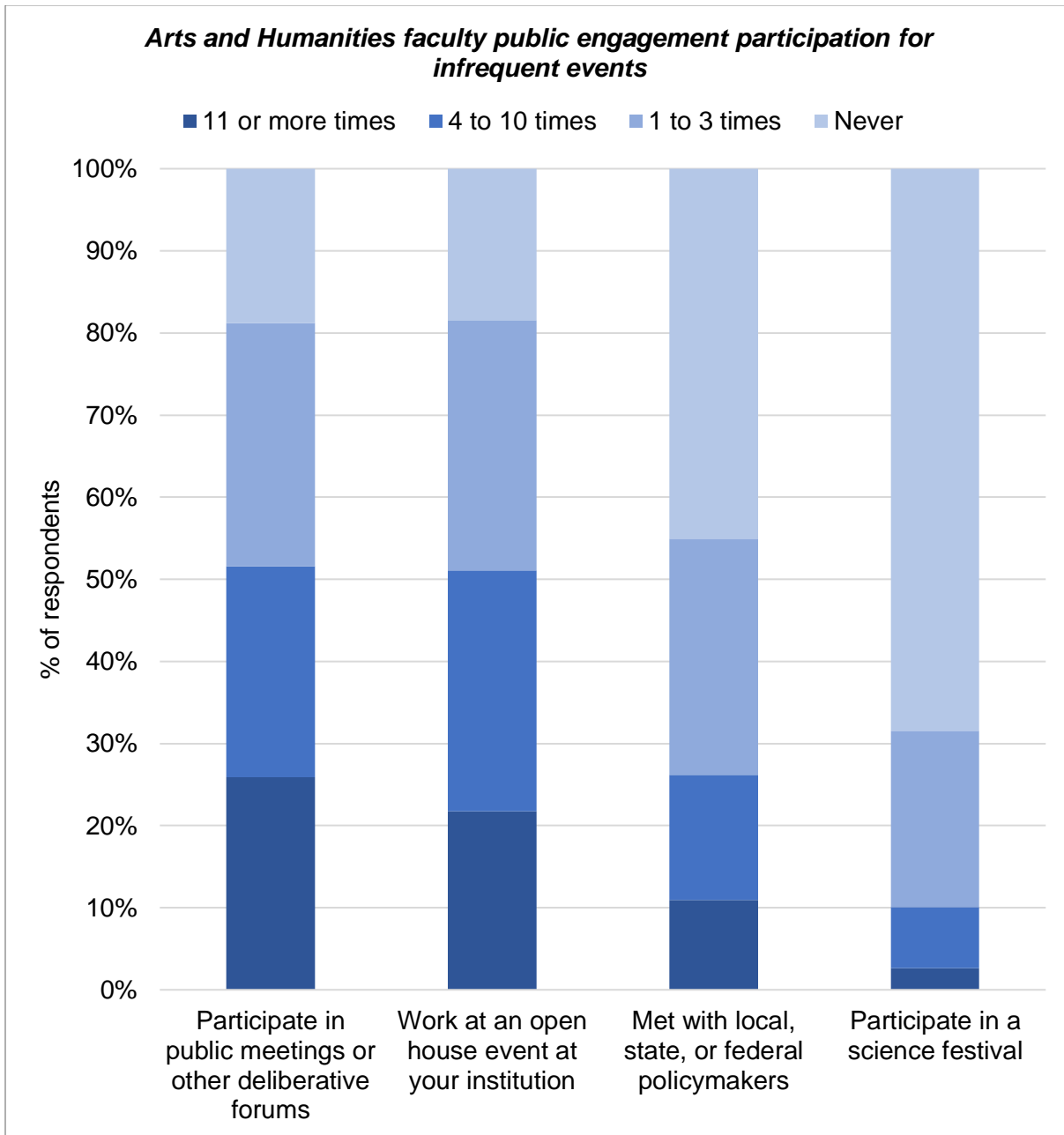
**Figure 9.3.** Social media attitudes from faculty in the Arts and Humanities

## **Section 10: Engagement activities and participation**

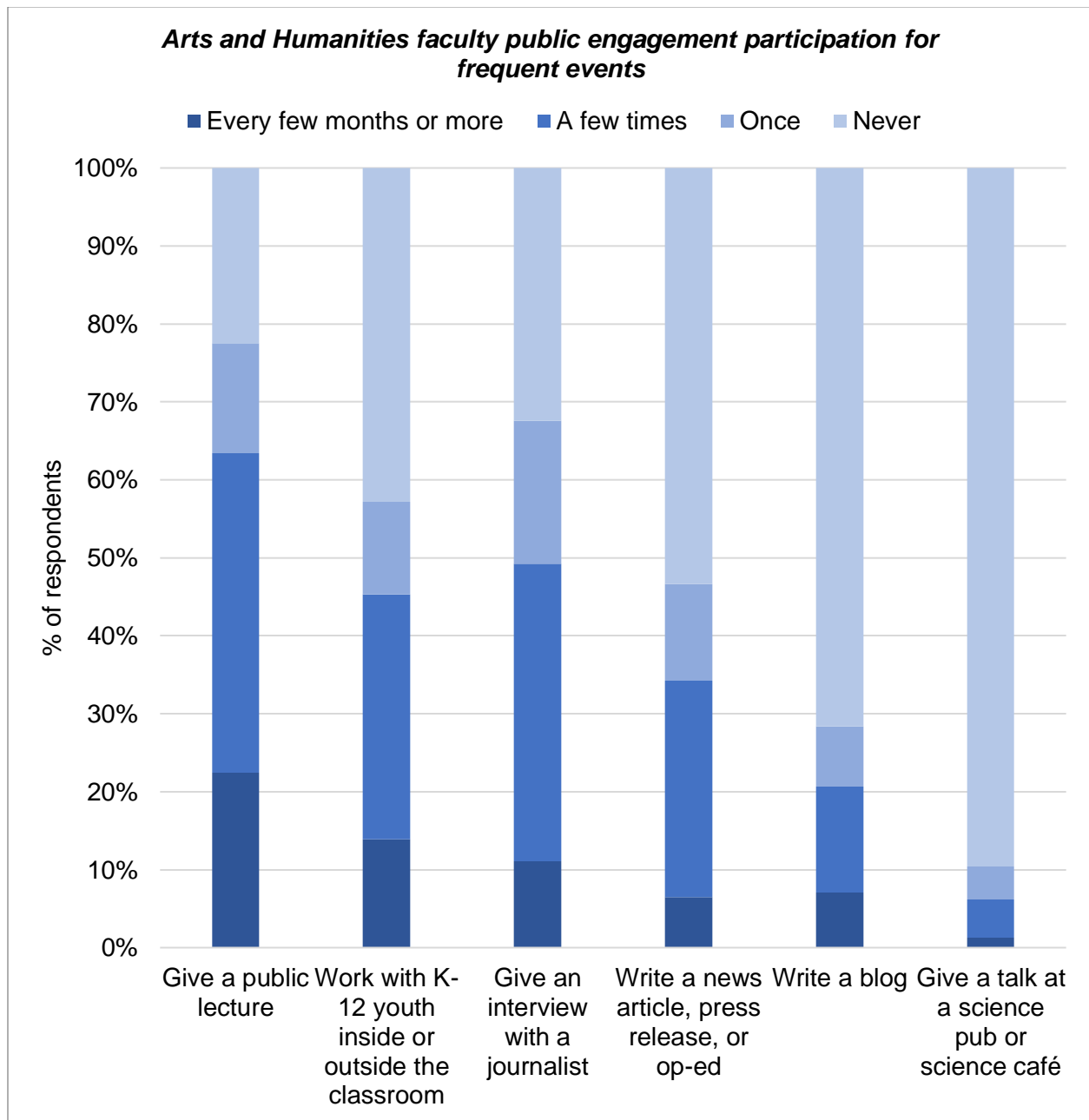
Faculty in the Arts and Humanities report participating in a variety of public engagement and outreach activities (Figures 10.1 and 10.2), although their level of involvement varies by activity.

Majority faculty in the Arts and Humanities have worked at open house events (82%), participated in public meetings (81%), met with policymakers (55%), given public lectures (78%), given interviews to journalists (68%), or worked with K-12 youth (57%) at least once in their careers. Along with their Science colleagues, Arts and Humanities faculty most frequently (i.e., more than once in the past year) participate in activities such as giving public lectures, giving interviews, and working with K-12 youth. Activities such as meeting with policymakers occurred less often. Given their specific focus, those in the Arts and Humanities unsurprisingly participate less often in science festivals and science pubs or cafés than their Science colleagues, although some Arts and Humanities faculty do regularly participate in these activities.

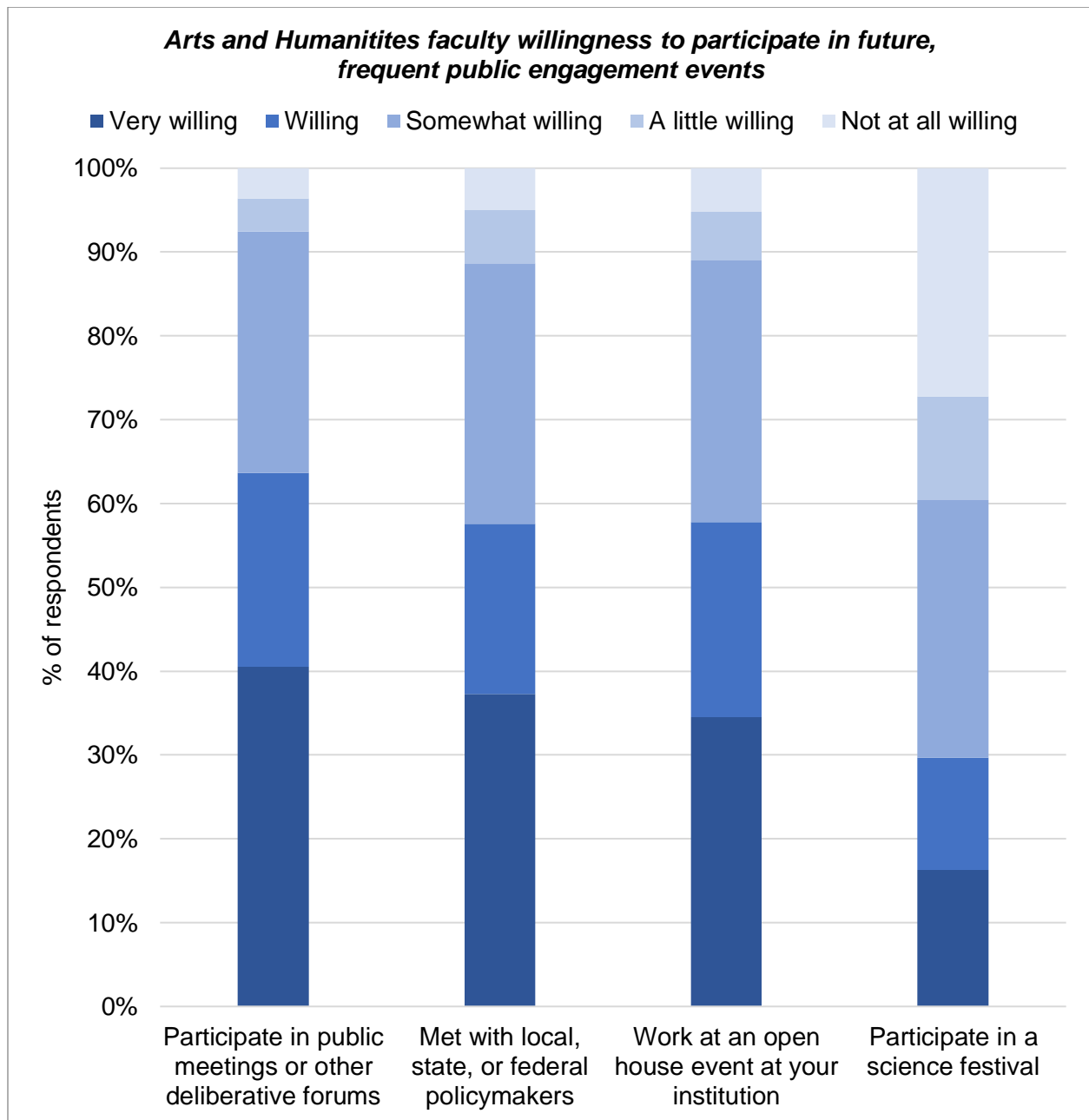
When asked about their participation in public engagement and outreach in the future, Arts and Humanities faculty respondents are willing to take part in a variety of activities (Figures 10.3 and 10.4). The most popular choices (over 85% of respondents were at least somewhat willing to participate) are more traditional activities that many are already actively involved in: giving public lectures, giving interviews, meeting with policymakers, participating in public meetings, working at open houses, and working with K-12 youth. Respondents are relatively less open to and enthusiastic about writing blogs, giving talks in science pubs or cafés, and participating in science festivals.



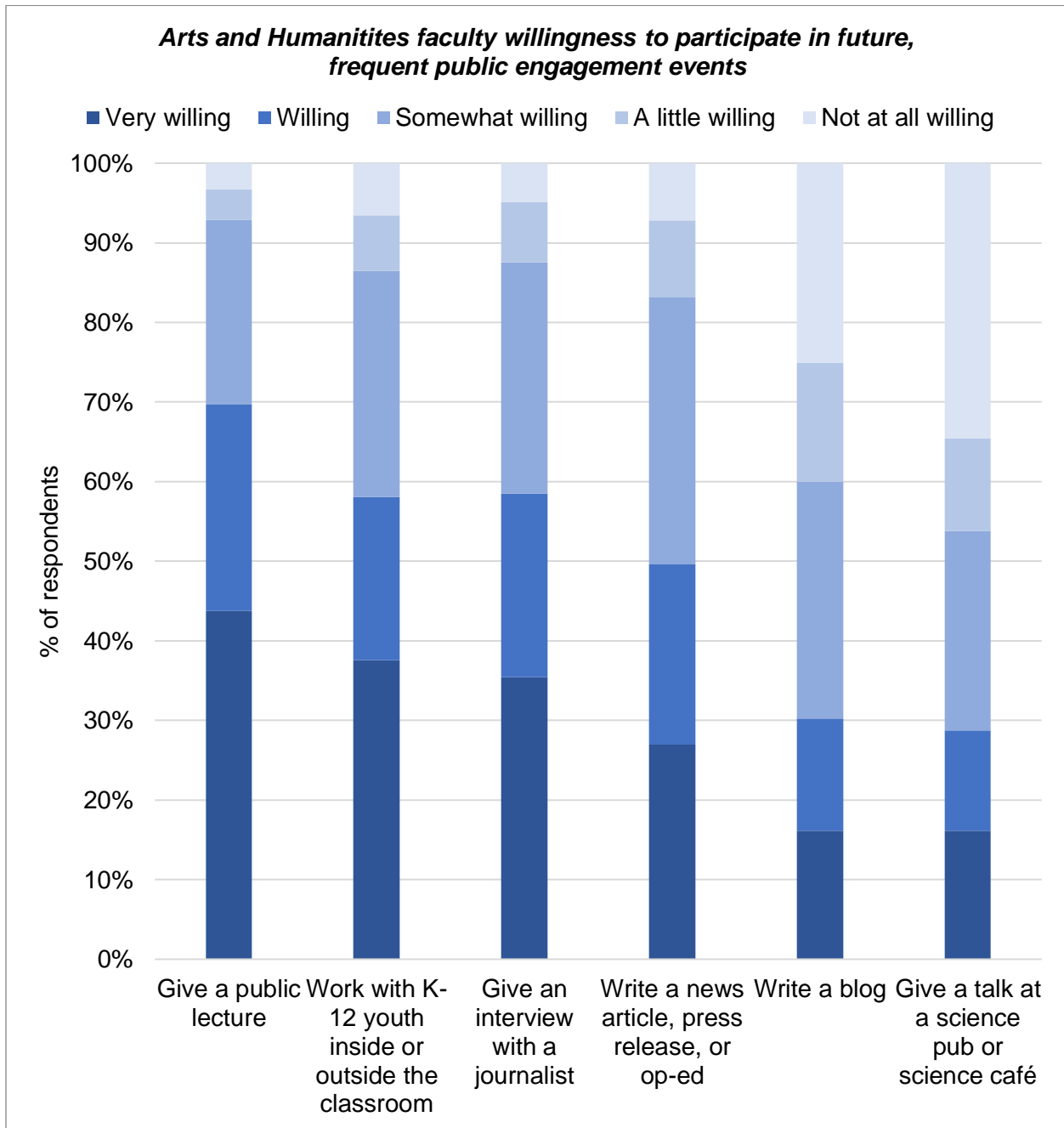
**Figure 10.1.** Arts and Humanities faculty participation in infrequent public engagement efforts over their careers



**Figure 10.2.** Arts and Humanities faculty participation in frequent public engagement efforts over the previous year



**Figure 10.3.** Arts and Humanities faculty willingness to participate in infrequent public engagement efforts in the future



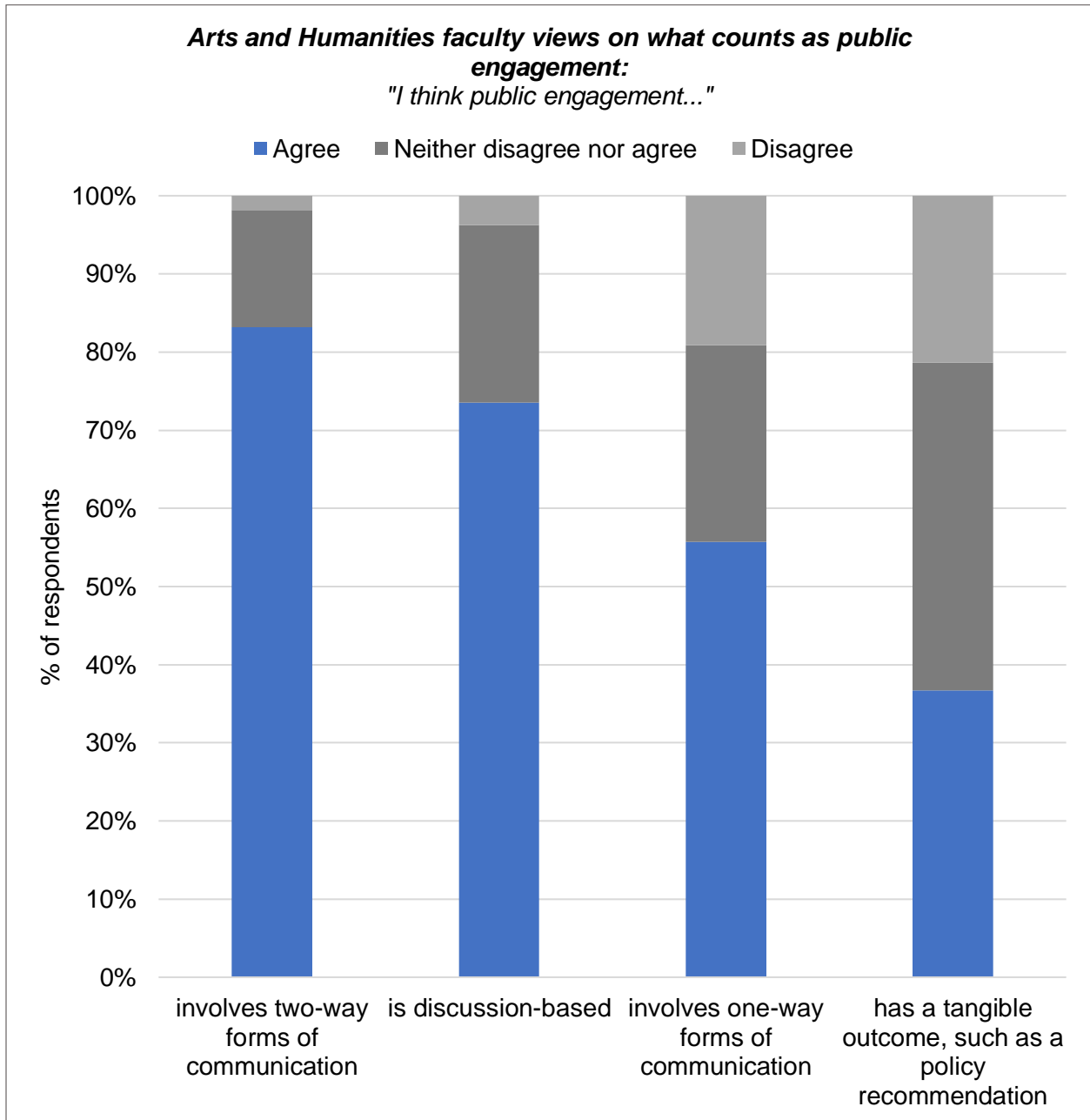
**Figure 10.4.** Arts and Humanities faculty willingness to participate in frequent public engagement efforts in the future

## Section 11: Defining public engagement

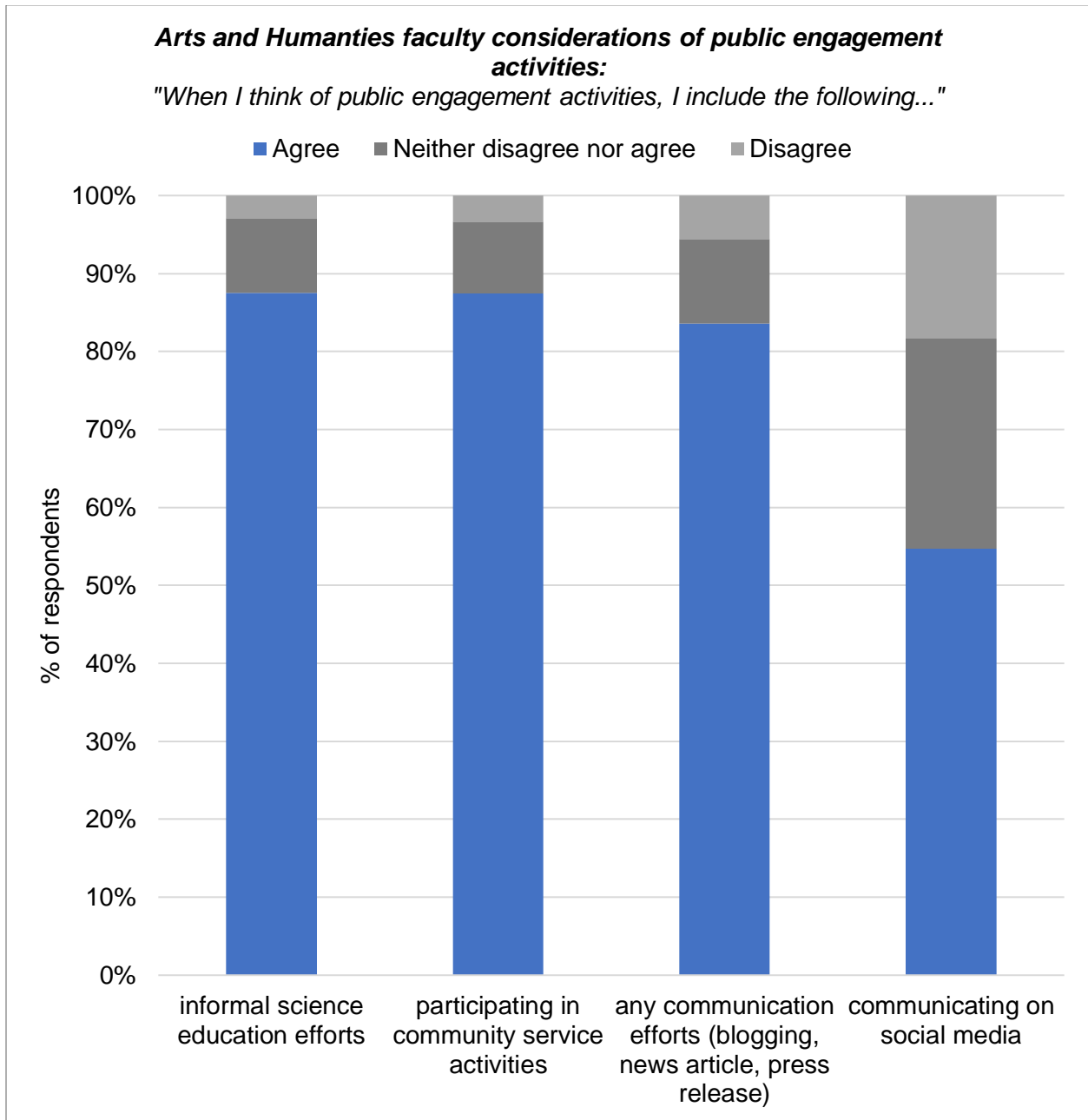
Using a definition of public engagement focused on activities involving two-way forms of communication which emphasize discussion and mutual learning, we assess Arts and Humanities faculty respondents' understanding of public engagement (Figures 11.1 and 11.2). While there is general alignment among all faculty respondents based on the characteristics of activities considered to be public engagement, respondents in the Arts and Humanities are more selective than Sciences respondents about the specific events. For general characteristics (Figure 11.1), most respondents from the Arts and Humanities understand that public engagement emphasizes two-way communication (83% agree) and discussion (74% agree), but over half of the respondents also align engagement activities with elements of traditional outreach, such as one-way forms of communication (56% agree). Moreover, there is less consensus around what role, if any, direct policy recommendations or other tangible outcomes play for engagement. Around four-in-ten respondents are ambivalent (42% neither disagree nor agree) about the necessity of a tangible outcome for public engagement.

For specific types of activities that fall into the category of public engagement (Figure 11.2), Arts and Humanities faculty respondents identify community service (88% agree) and informal science education (88% agree) as public engagement, as well as any communication efforts more broadly (84% agree). Along with those in the Sciences, Arts and Humanities respondents are also less sure about whether social media could be included: almost half of respondents either disagree (19%) or are unsure (27% neither disagree nor agree) as to whether communicating on social media was a public engagement activity.





**Figure 11.1.** Definition of public engagement from faculty in the Arts and Humanities



**Figure 11.2.** Types of events considered public engagement by Arts and Humanities faculty

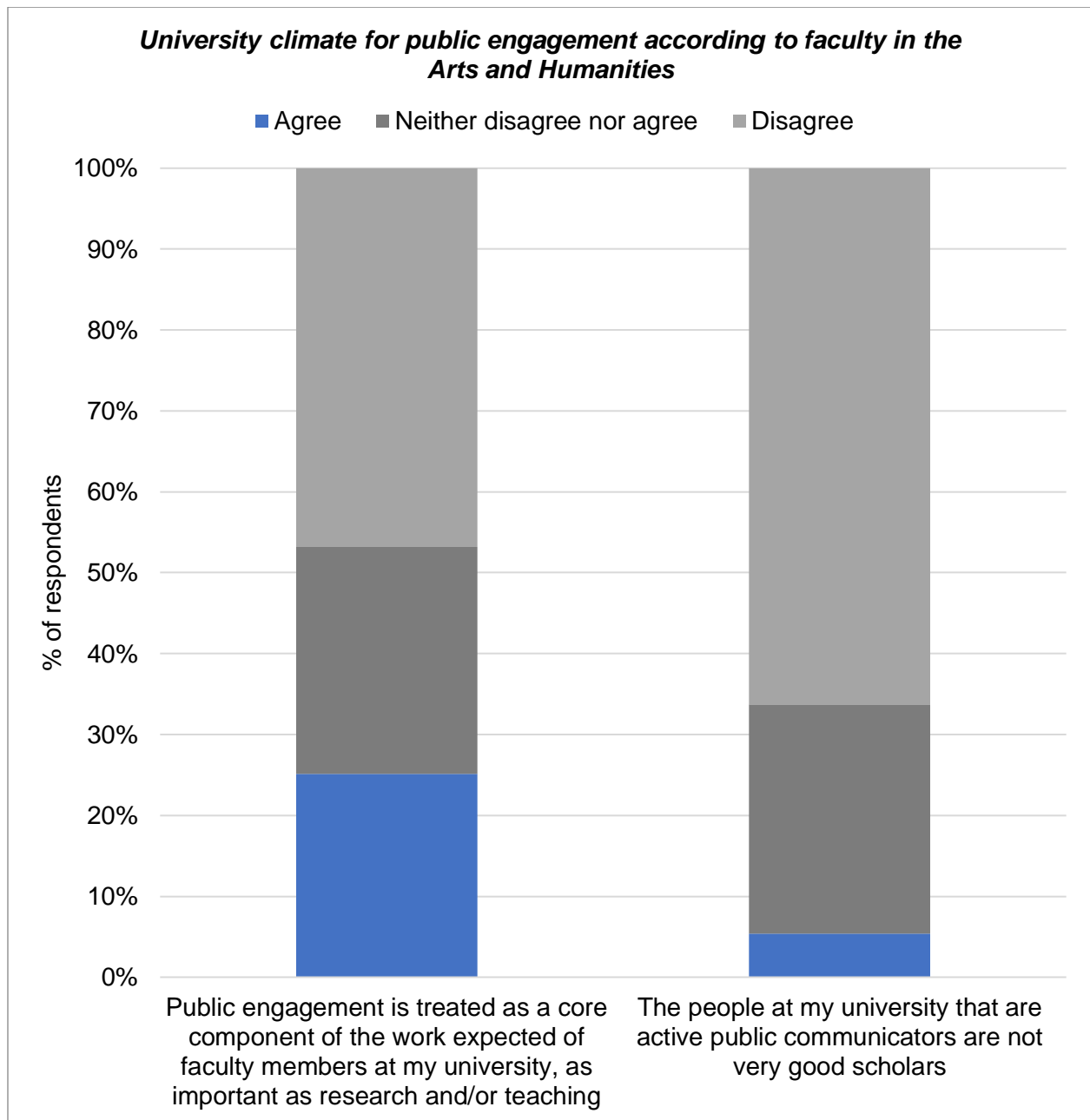
## **Section 12: Engagement climate and culture at universities**

Next, we address Arts and Humanities faculty respondents' perceptions of the university climate regarding public engagement and outreach efforts.

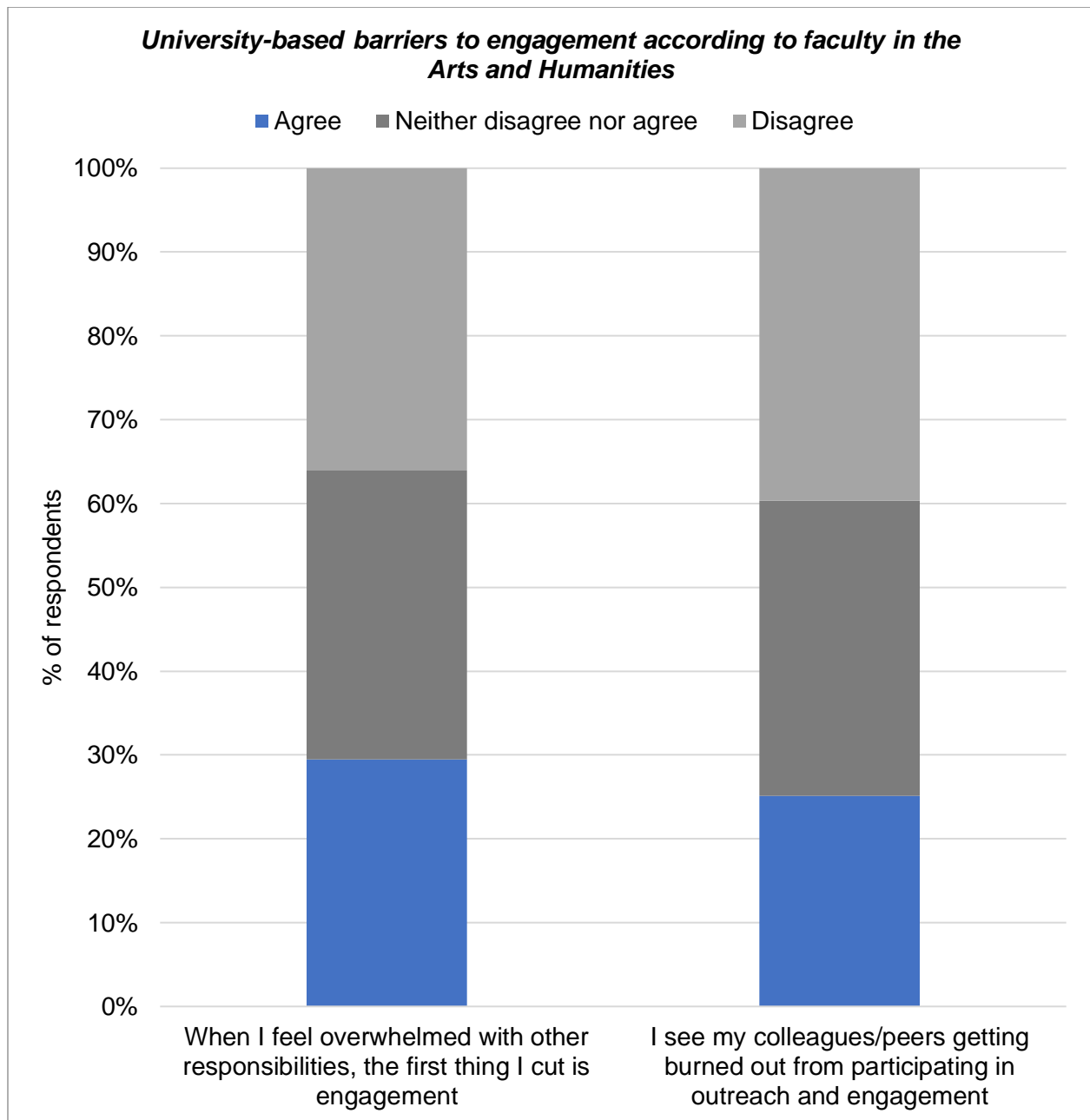
As with Science faculty, Arts and Humanities respondents have mixed views of how public engagement is viewed at their universities and by their colleagues (Figure 12.1): 25% agree that public engagement is treated as a core component of the work expected of faculty at their university compared to the 47% who disagree. Arts and Humanities faculty respondents also reject (66% disagree) the idea that people at their university who are active communicators are not very good researchers.

As additional indicators of university's engagement climate, Arts and Humanities faculty were asked whether they stopped participating in engagement based on how overwhelmed they felt by other responsibilities or whether they've seen their colleagues get burned out from participating in engagement (Figure 12.2). Just under a third of Arts and Humanities respondents (30% agree) indicate that they give up engagement when overwhelmed with other responsibilities, while over a third (36% disagree) reject this strategy. Almost a quarter of respondents (25%) also indicate they have seen colleagues getting burned out from outreach and engagement.

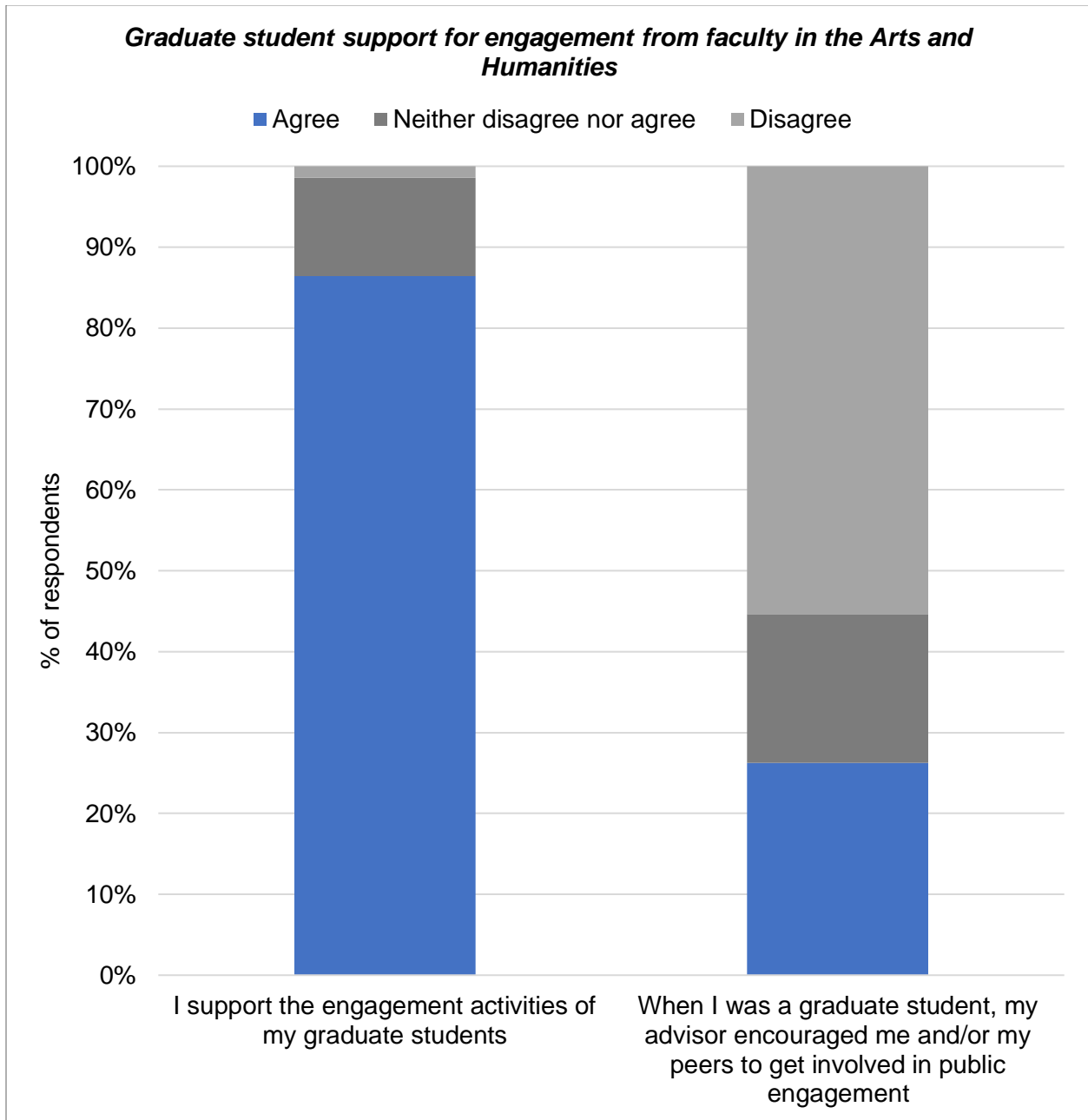
Lastly, responses from the Arts and Humanities faculty supplement the potential change in the culture of public engagement indicated by those in the Sciences (Figure 12.3). When asked about support for engagement from their advisors when they were graduate students, most respondents indicate they were not encouraged to get involved in engagement (56% disagree). In contrast to the lack of encouragement from their advisors, most Arts and Humanities faculty respondents indicate they support their own graduate students' participation in engagement activities (87% agree).



**Figure 12.1.** University climate for public engagement according to Arts and Humanities faculty



**Figure 12.2.** University barriers related to public engagement according to Arts and Humanities faculty

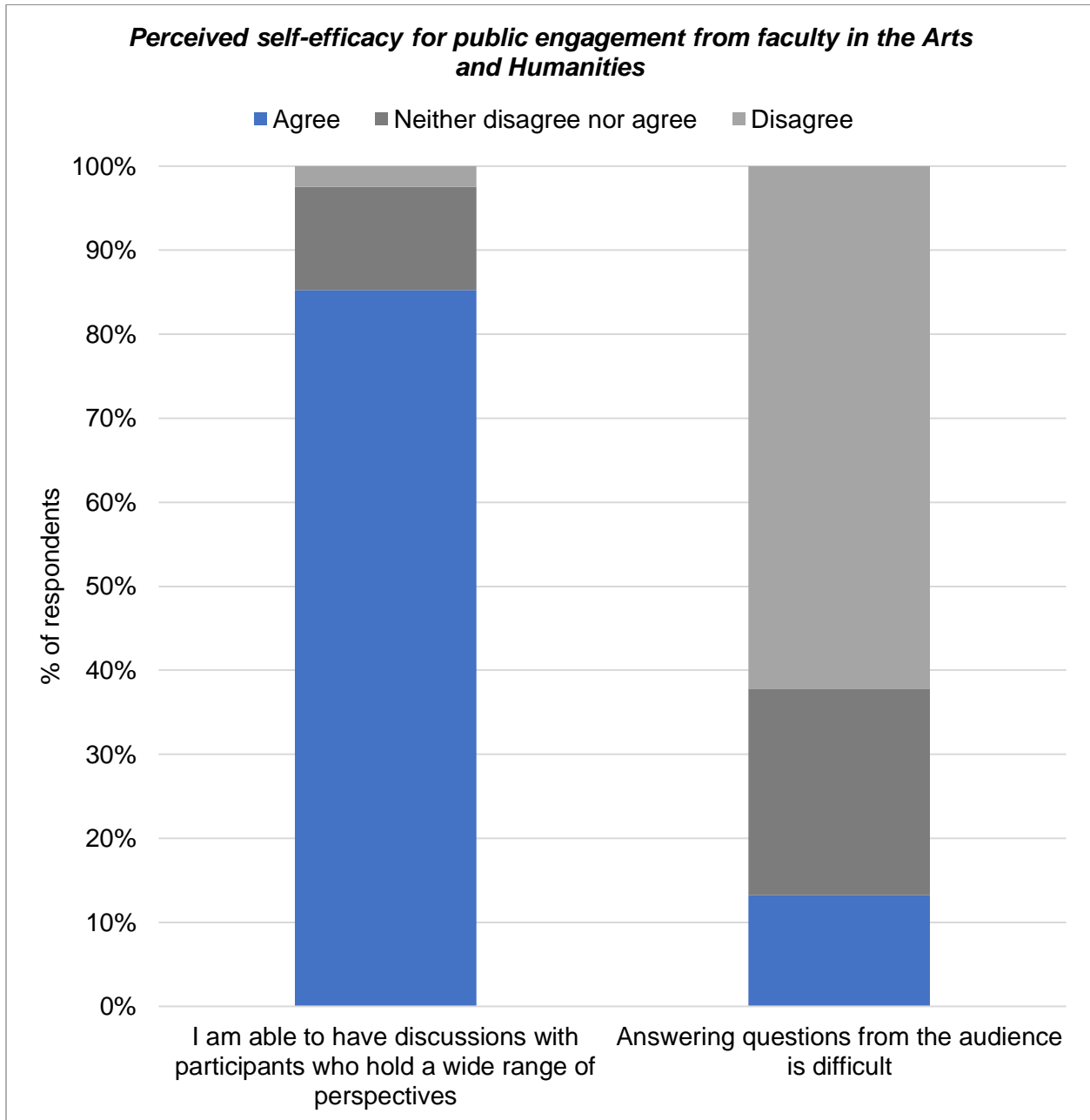


**Figure 12.3.** Arts and Humanities faculty graduate student support for public engagement

**Section 13: Perceptions of self-efficacy related to engagement**

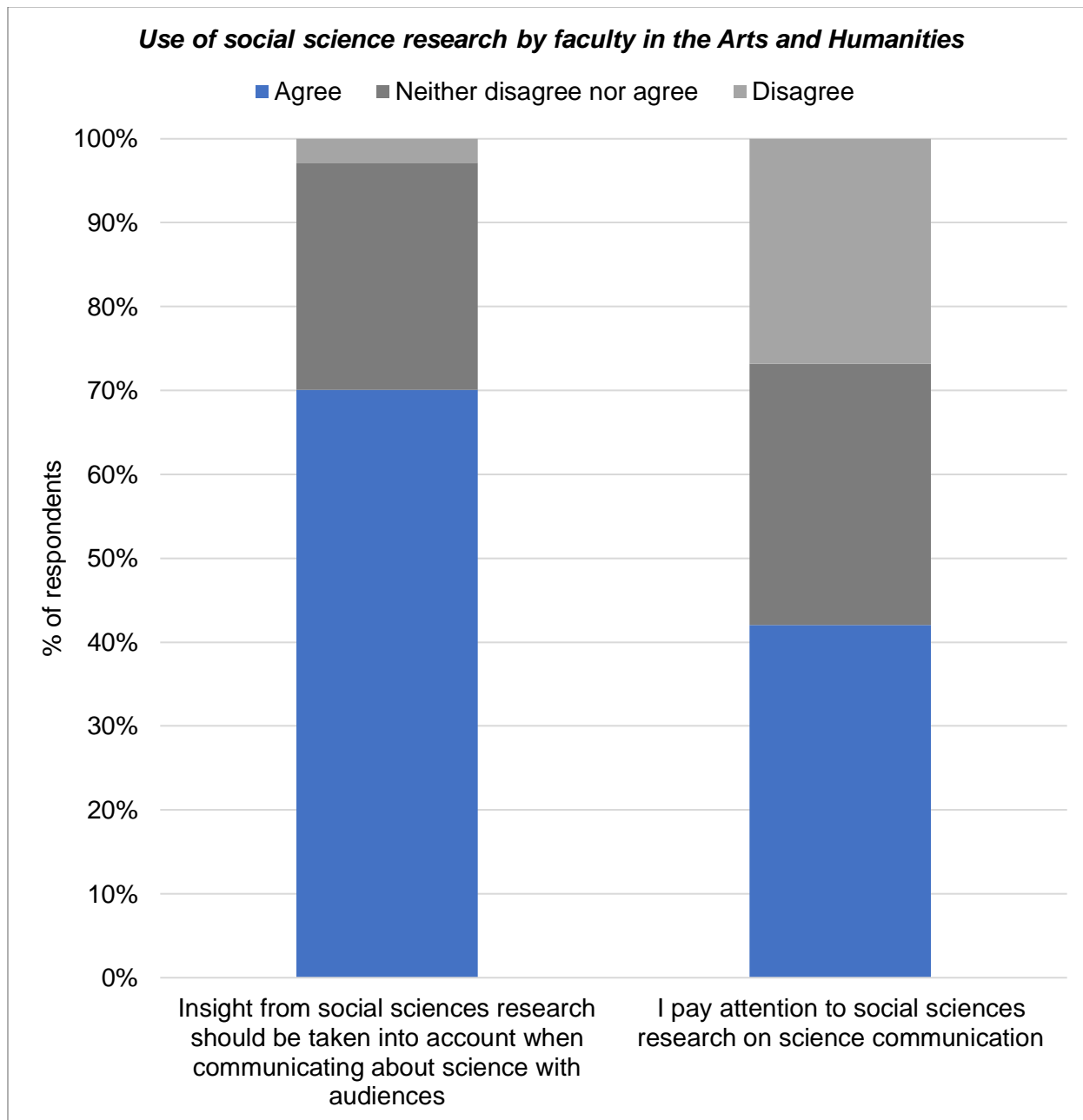
Faculty members' perceptions of their own self-efficacy or abilities to participate in public engagement can also influence their involvement. Overall, 88% of Arts and Humanities faculty respondents feel they have autonomy over the decision to participate in engagement activities, with only 3% indicating they do not. Regarding their abilities to effectively participate in engagement and outreach (Figure 13.1), respondents in the Arts and Humanities feel capable of having discussions with diverse audiences (85% agree) and do not think that answering questions from the audience is difficult (62% disagree).

Compared to Science faculty, those in the Arts and Humanities are more hesitant of using social science research to inform science communication efforts (Figure 13.2). Fewer than half of Arts and Humanities respondents (42% agree) report paying attention to science communication research while over a quarter of respondents indicate they do not (27% disagree). Considerably more respondents (70%) agree that insights from social science research should be used to inform science communication efforts.



**Figure 13.1.** Self-efficacy related to public engagement from Arts and Humanities faculty





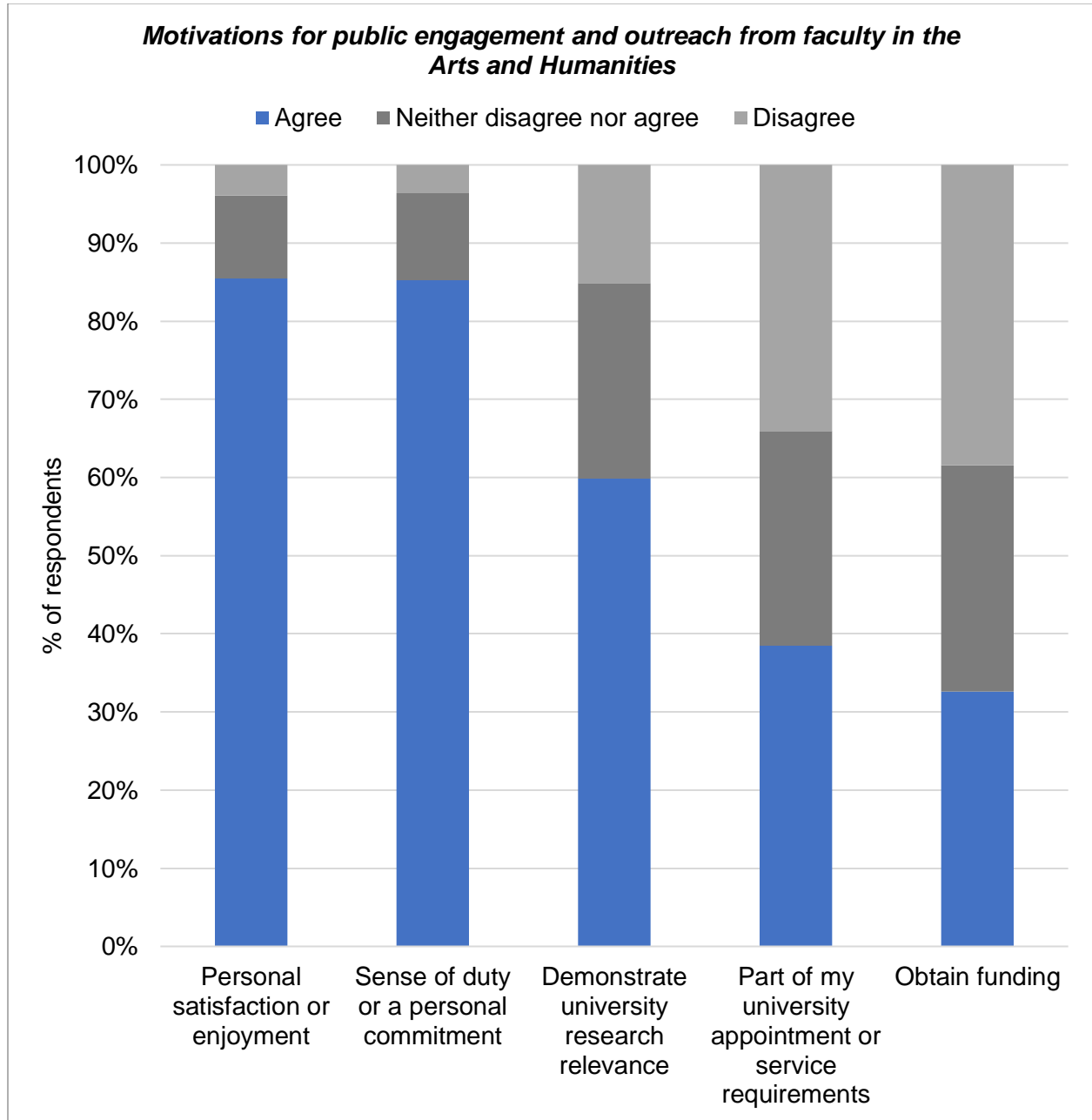
**Figure 13.2.** Use of social science research for science communication by Arts and Humanities faculty

## Section 14: Engagement motivations, drawbacks, and barriers

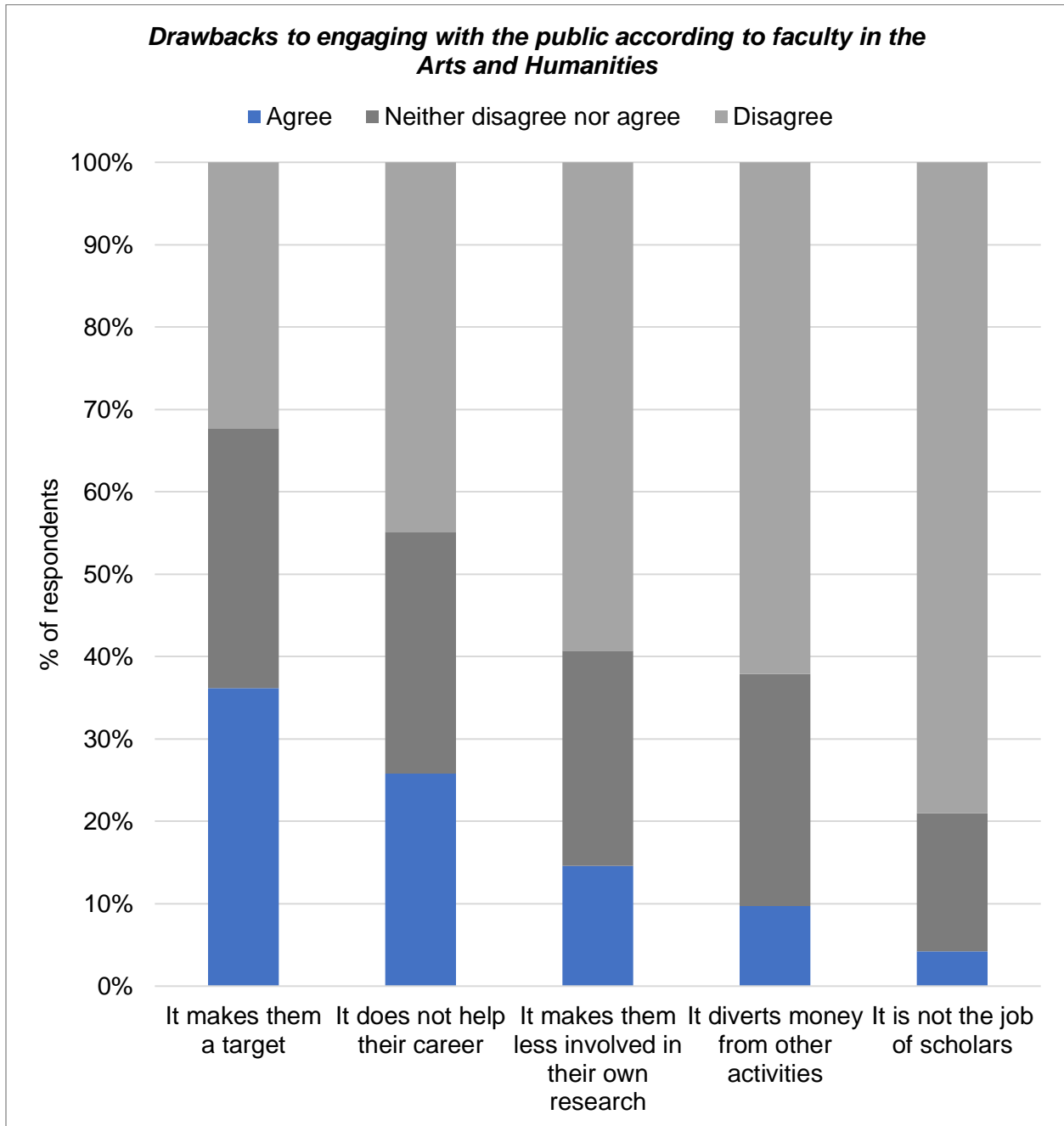
Faculty in the Arts and Humanities were also asked about the potential motivations, drawbacks, and barriers to public engagement and outreach. For personal motivations (Figure 14.1), faculty respondents in the Arts and Humanities indicate that a sense of duty (85% agree) and personal enjoyment (85% agree) are strong motivators for participating in engagement. Many respondents are also driven by demonstrating their university's research relevance (60% agree). Opinions are more mixed about motivations attributable to fulfilling university appointment requirements (39%) and obtaining funding (33%). Compared to their Scientist colleagues, those in the Arts and Humanities focus less on demonstrating their university's research relevance, fulfilling university appointment requirements, or obtaining funding as motivators.

As with the Science faculty, Arts and Humanities respondents mostly reject the drawbacks commonly associated with public engagement (Figure 14.2). Arts and Humanities faculty do not endorse the assertions that engagement is not their job (79% disagree), it distracts from research (59% disagree), and it diverts money from other activities (62% disagree). Respondents are less certain about the drawbacks that engagement does not help their careers (26% agree; 45% disagree) and makes them a target (36% agree; 32% disagree). Those in the Arts and Humanities are less worried about engagement diverting resources than Science respondents.

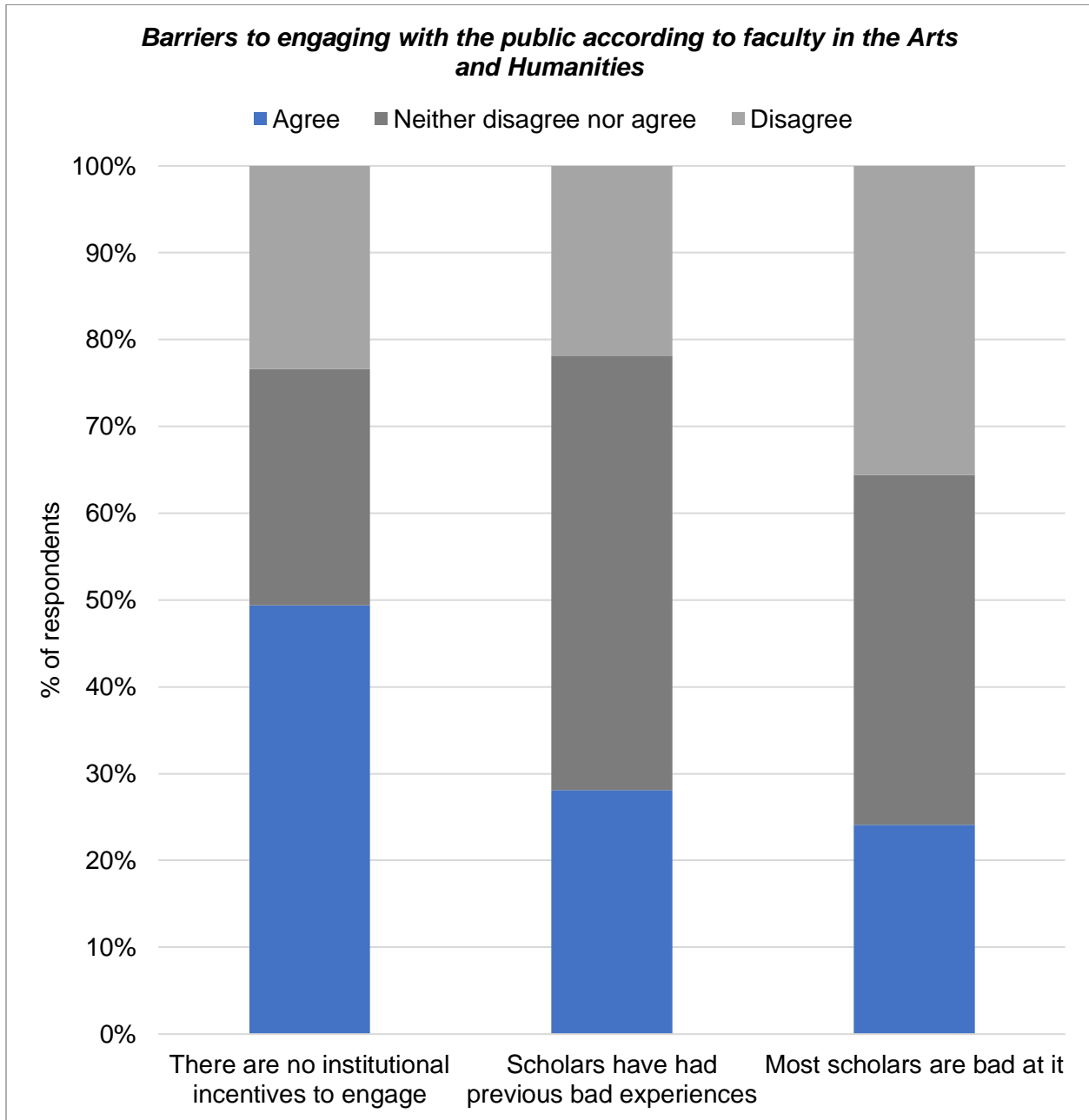
Finally, faculty respondents in the Arts and Humanities are less cynical (lower agreement) about the common potential barriers to public engagement compared to those in the Sciences (Figures 14.3). Arts and Humanities respondents are mostly ambivalent about researchers being bad at engagement (40% neither disagree nor agree) and having bad experiences in the past (50% neither disagree nor agree) as reasons that prevent their colleagues from participating in public engagement. About half (49% agreement) of respondents think that the lack of institutional incentives to engage was a barrier.



**Figure 14.1.** Motivations for engagement according to Arts and Humanities faculty



**Figure 14.2.** Scholar drawbacks to engagement, according to Arts and Humanities faculty



**Figure 14.3.** Scholar barriers to engagement, according to Arts and Humanities faculty

## **Part 3: About the Survey**

## Section 15: Sampling and Procedures

The research team conducted a census survey of faculty members at specific land-grant universities across the U.S. The original university sample pool included 73 land-grant universities (within 69 university systems) established through the Morrill Acts of 1862 and 1890. A team of research assistants manually collected information for all faculty members by department or college from university websites. After compiling the contact lists, any non-eligible positions (non-faculty) were removed. Duplicate records were removed by checking for matching email addresses.

The online Qualtrics-hosted survey was around 20 minutes in length. The survey was conducted from May to July 2018 and had four waves of contact. No incentive was provided. In total, around 103,000 faculty members were contacted in the initial wave.

During the survey period, we removed candidates who were ineligible, including non-faculty members or those unavailable during the survey period. Additionally, we received consistent email bounce-backs from some candidates and removed them from the final sample. A subsequent duplicate record search manually checked first and last names within each university and removed confirmed matches. After the survey closed, 17 universities with a small number of responses (<20 completes) were removed from the sample.

To determine whether our sample is representative of the universities included in our study, we compared our sample to the population of each university (as reported to the Integrated Postsecondary Education Data System (IPEDS), run through the U.S. Department of Education's National Center for Education Statistics). We removed ten universities with problematic gender distribution among respondents (>10% difference of gender distribution between the reported faculty population and the sample). The remaining university comparisons indicate that the samples were representative of their respective universities.

After removing the 27 ineligible universities, the final sample consisted of 46 land-grant universities (within 45 university systems), with N=10,706 survey completes (>80% finished). The final response rate (RR2) was 14.1%.

<b>Land Grant University</b>	<b>Faculty Responses</b>
Auburn University	221
Clemson University	144
Colorado State University	355
Cornell University	132
Iowa State University	209
Kansas State University	218
Louisiana State University	209
Massachusetts Institute of Technology	94
Michigan State University	354
Montana State University - Bozeman	36
New Mexico State University	123
North Carolina State University	371
North Dakota State University	150
Ohio State University	636
Oklahoma State University	126
Oregon State University	260
Pennsylvania State University	351
Purdue University	382
Rutgers, The State University of New Jersey	478
South Dakota State University	119
Tennessee State University	61
Texas A&M University	408
University of Alaska Fairbanks	68
University of Arkansas - Fayetteville	199
University of California - Riverside	116
University of Delaware	170
University of Florida	443
University of Georgia	355
University of Hawaii	170
University of Idaho	116
University of Kentucky	264
University of Maryland - College Park	203
University of Maryland Eastern Shore	43
University of Massachusetts - Amherst	300
University of Minnesota - Twin Cities	447
University of Missouri - Columbia	211
University of Nebraska - Lincoln	310
University of Nevada - Reno	34
University of New Hampshire	174
University of Puerto Rico at Mayagüez	136
University of Rhode Island	139
University of Tennessee	257
University of Wisconsin - Madison	564
University of Wyoming	91
Utah State University	56
Virginia Polytechnic Institute and State University	403

**Figure 15.1.** Total Faculty Responses from Land Grant Universities

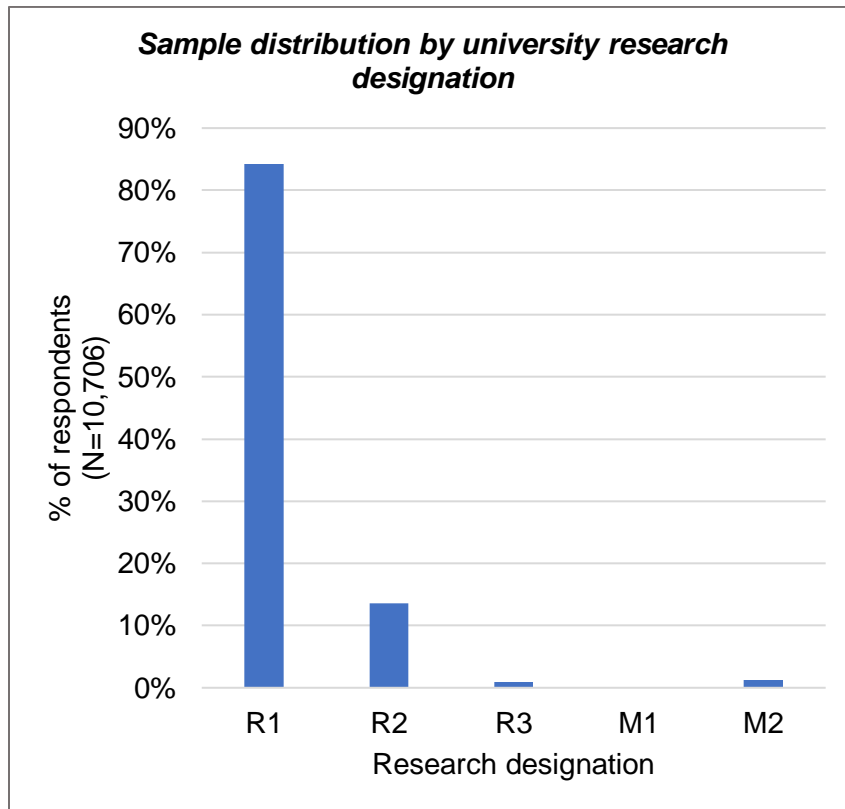


## Section 16: Final Sample information

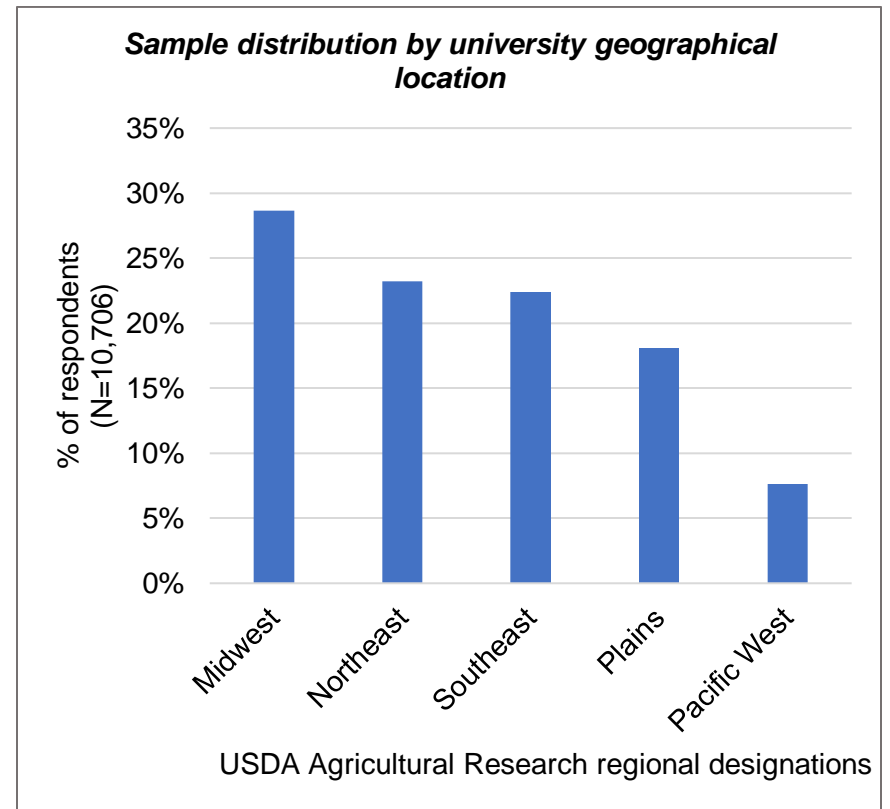
As a sample from a census of land-grant universities, survey respondents represented the range of land-grant universities. Most faculty respondents are located at universities with a Carnegie Classification of Institutions of Higher Education Research 1 designation (Figure 15.1), but they also represent universities with a range of research designations. As with the land-grant universities themselves, respondents are spread across all regions of the U.S. (based on the U.S. Department of Agriculture's Agricultural Research Service regions; Figure 15.2). The largest portion of respondents are employed at midwestern (29%) land-grant universities, followed by respondents at universities in the northeastern (23%) and southeastern (22%) agricultural service regions.

The respondents represent a range of fields (Figure 15.3). After consolidating respondents into the broad categories of Sciences or Arts and Humanities (or other non-science fields), the majority of respondents are in the Sciences (83%) rather than the Arts and Humanities (17%). Within the Sciences, faculty respondents are categorized into social sciences (35%), life sciences (31%), and physical sciences (20%). (For more information about the fields of study, see "Section 17: Fields of Study.")

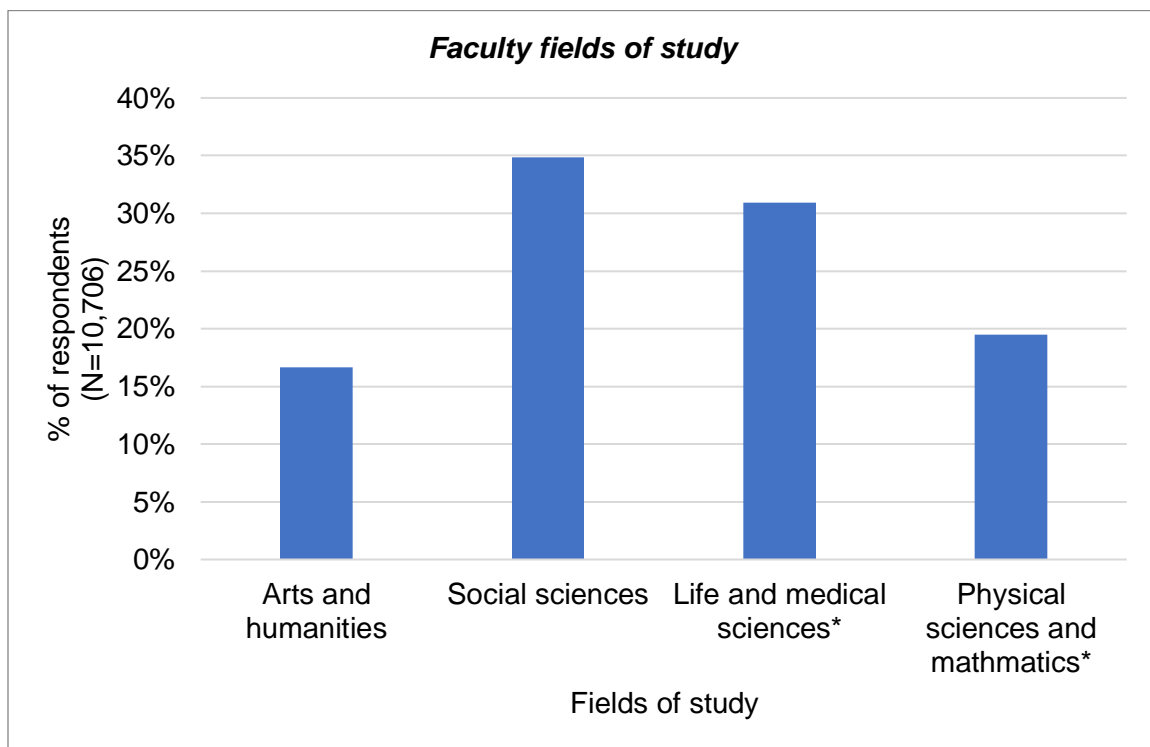
In terms of their primary university positions (Figure 15.4), most faculty respondents are in tenure-track positions (70%). Of those holding a tenure-track position, 77% are tenured. An additional 22% of respondents indicate their primary university position is non-tenure track, such as lecturers or adjunct faculty. Respondents hold a range of additional administrative positions (Figure 15.5): around 15% of respondents are department-level administrators, 5% are college-level administrators, and 2% are university-level administrators. Around 10% of respondents also hold extension appointments (Figure 15.6).



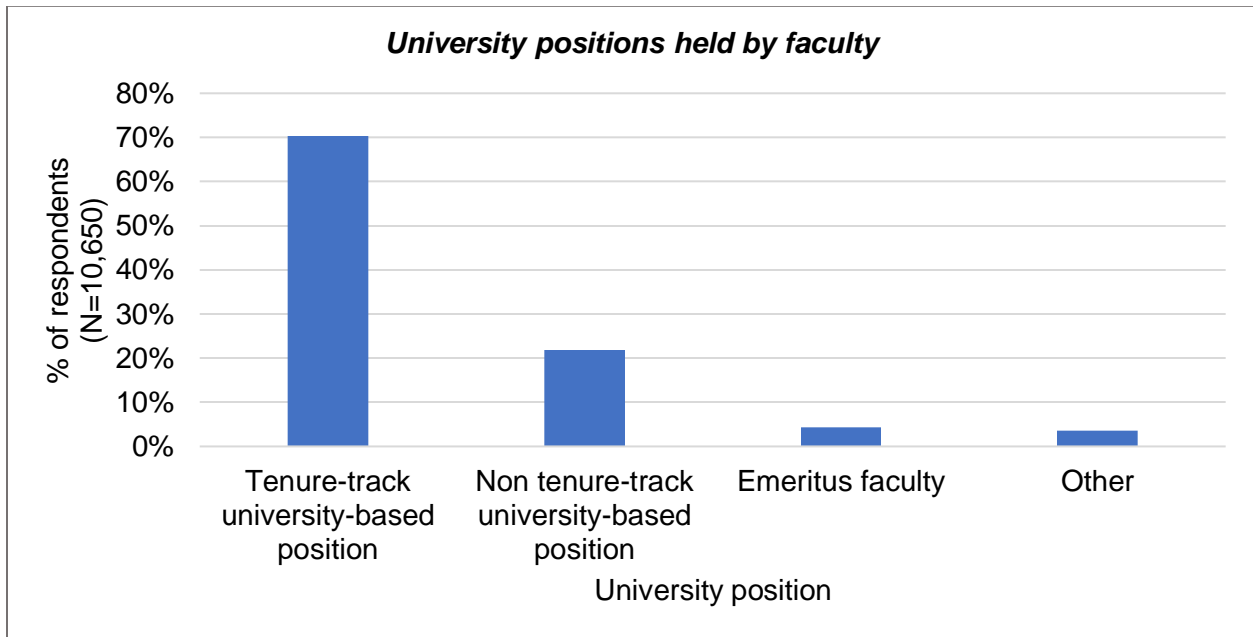
**Figure 16.1.** Distribution by research designations



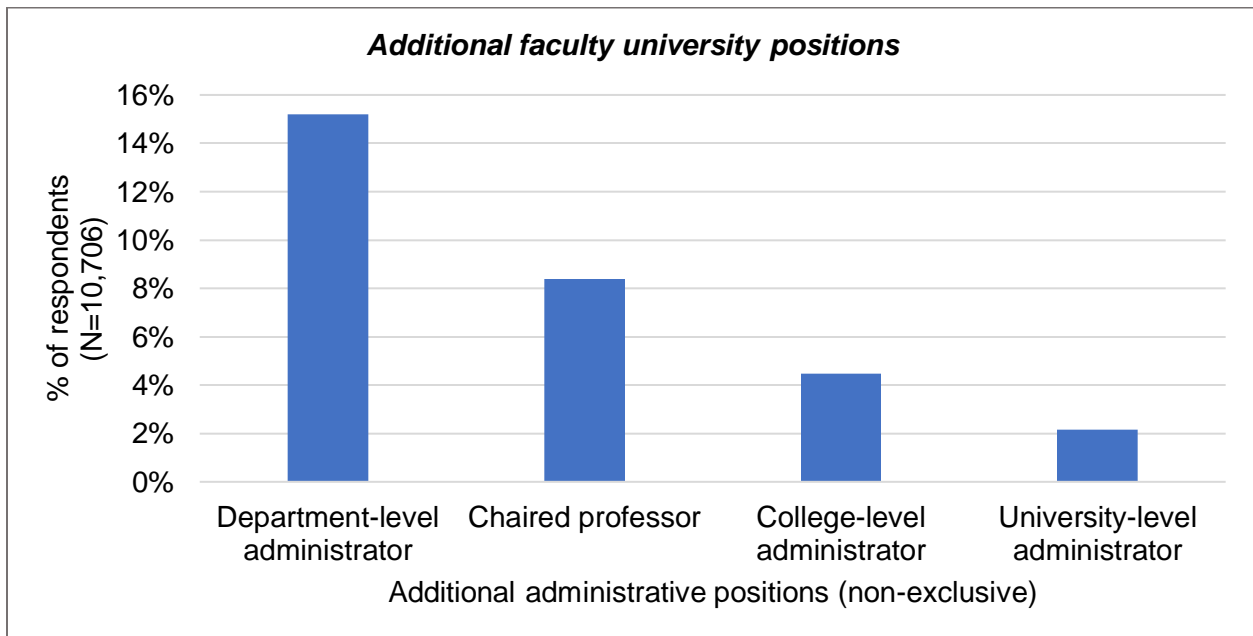
**Figure 16.2.** Distribution by U.S. regions



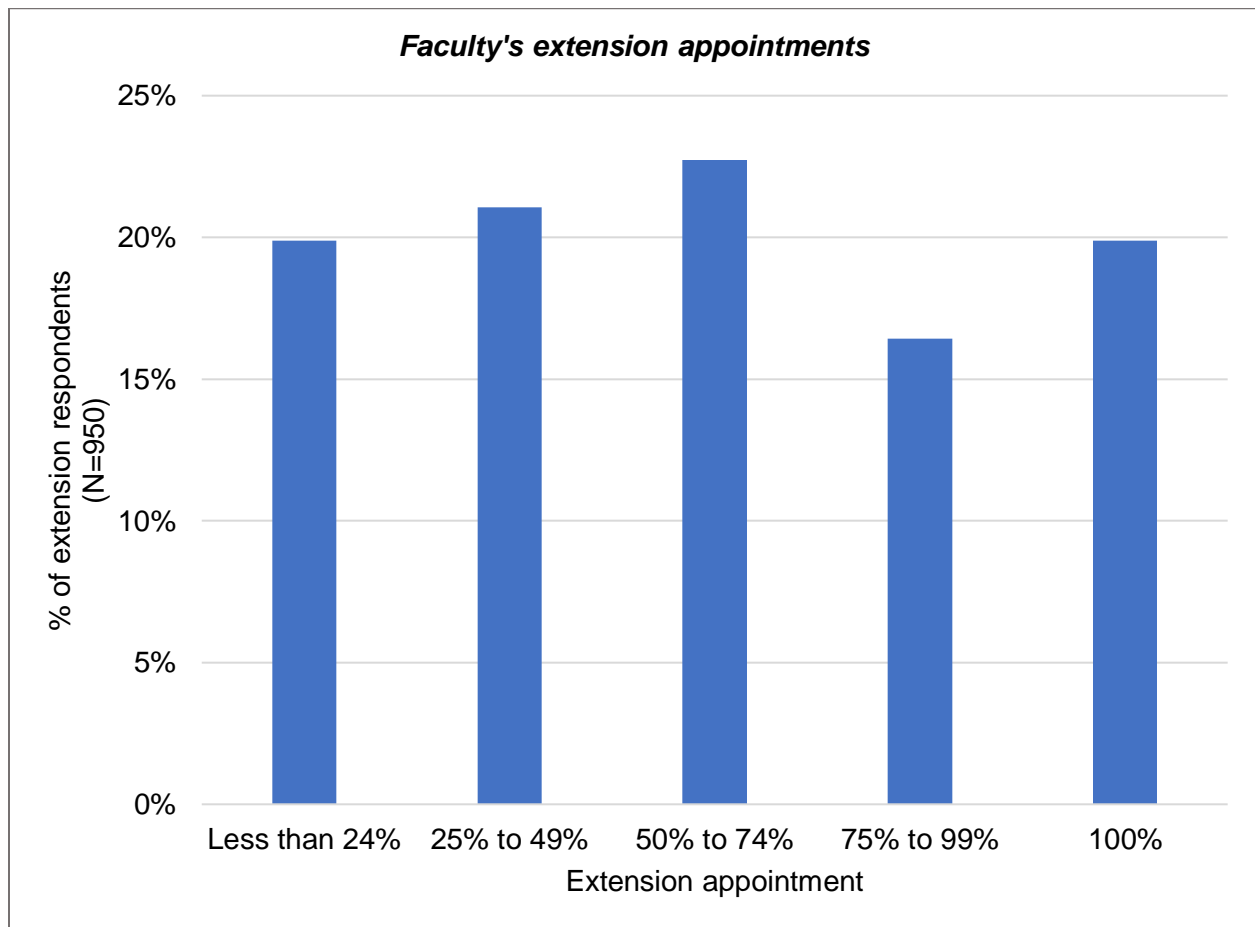
**Figure 16.3.** Respondents' fields of study



**Figure 16.4.** Respondents' primary university position



**Figure 16.5.** Respondents' additional university positions



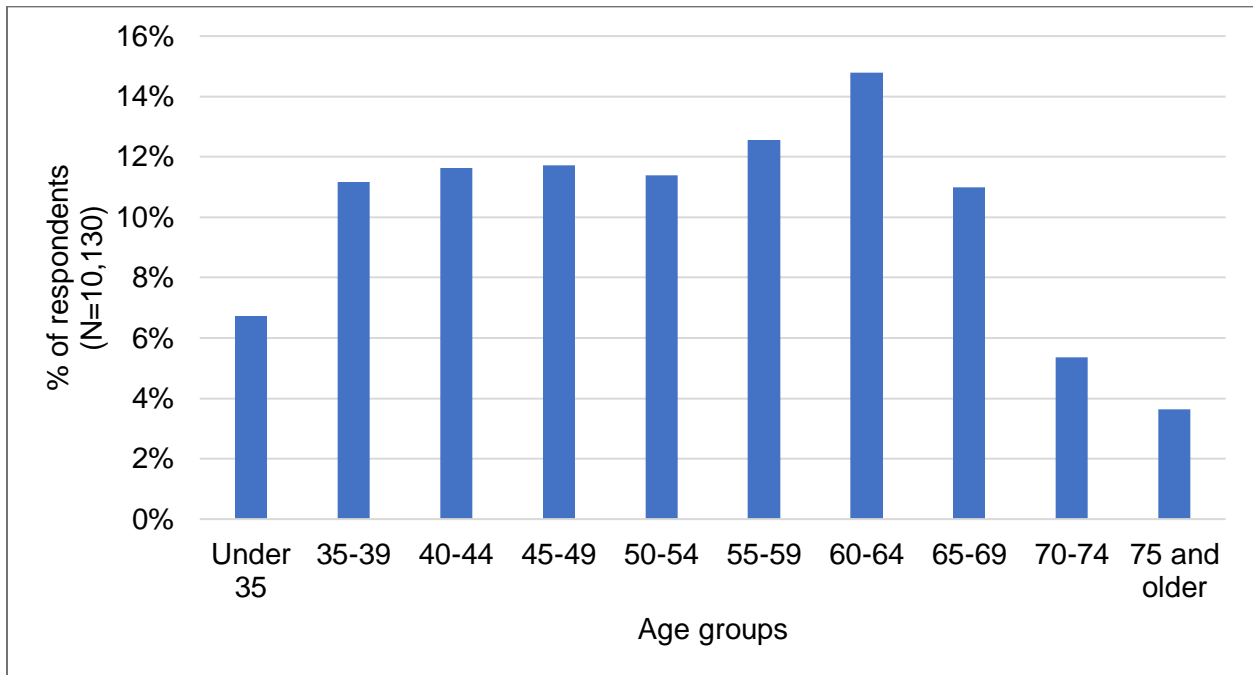
**Figure 16.6.** Respondents' extension appointments

### **Section 17: Fields of study**

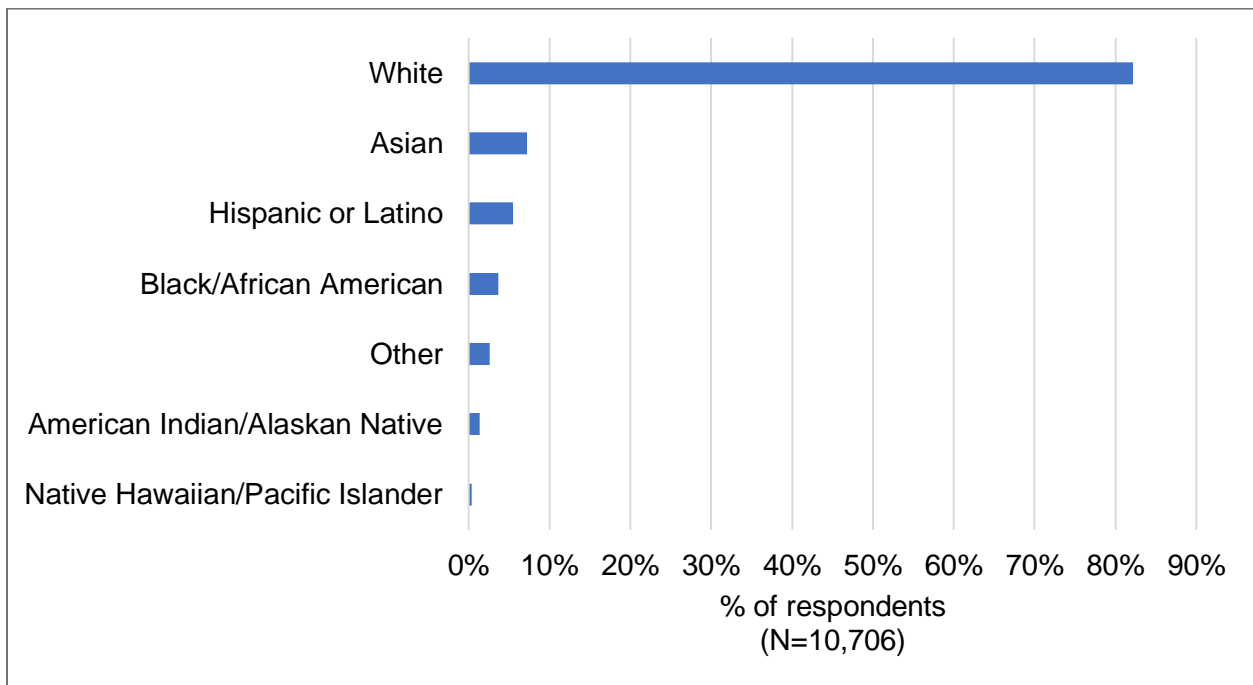
In the survey, respondents are asked to indicate their field of research. The *Arts and Humanities* are included as a broad group (N=1,783) and consisted of those in the arts and humanities or other non-science, profession-based fields. For those in a *Science-related* field (as defined by the research areas identified by the National Science Foundation), respondents' fields of study was split into: 1) *life sciences* (N=3,313) – agriculture and food; biological sciences; and medical sciences, 2) *physics and maths* (N=2,087) – computer and information sciences; engineering; geoscience; and math and physics, and 3) *social sciences* (N=3,730) – environmental resources and education; social, behavioral, and economic sciences; education and human resources (removing those who also selected arts and humanities). Social sciences fields were given a priority over the other fields (i.e., if respondents selected a social sciences field, they were placed in that category), while life and physical sciences are non-exclusive (N=207 overlap).

### **Section 18: Respondent demographics**

Over half of the survey respondents are male (58%). The average (median) age of respondents is 53 years old with respondents distributed across all age groups (Figure 18.1). As seen in Figure 18.2, most respondents report their race as White (82%), followed by Asian (7%), Hispanic or Latino (6%), and Black (4%).



**Figure 18.1.** Respondents' ages

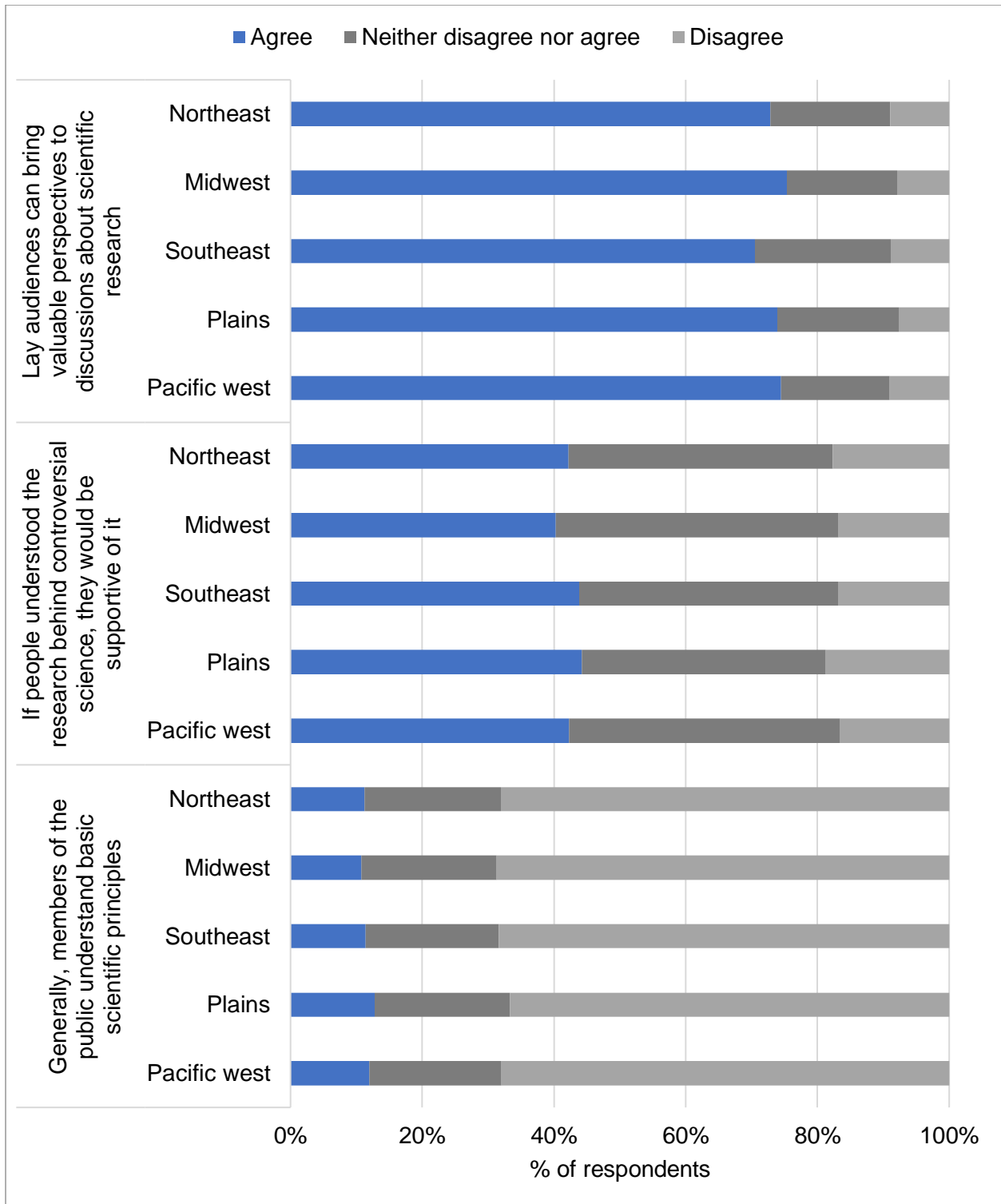


**Figure 18.2.** Respondents' races

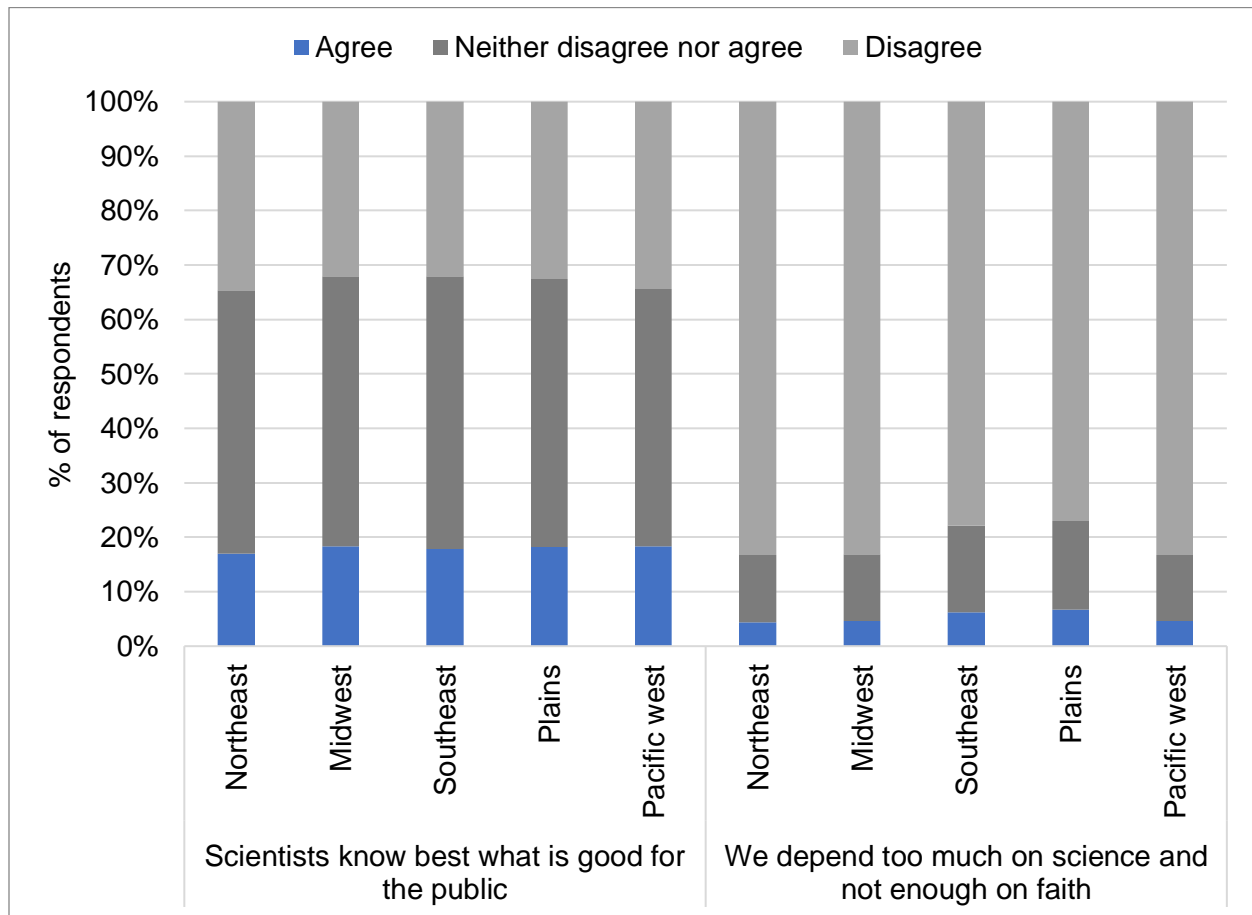


## **Appendix A: Responses across regions of the U.S.**

In addition to the field-based sections presented above, we also looked at survey responses across different regions of the U.S., using the U.S. Department of Agriculture's Agricultural Research Service regions. Responses were generally comparable across the regions. (For more information about the regional distributions, see "Section 15: Sampling and Procedures.")



**Figure A.1.** Views of the public regarding science by U.S. regions



**Figure A.2.** Views of science in society by U.S. regions

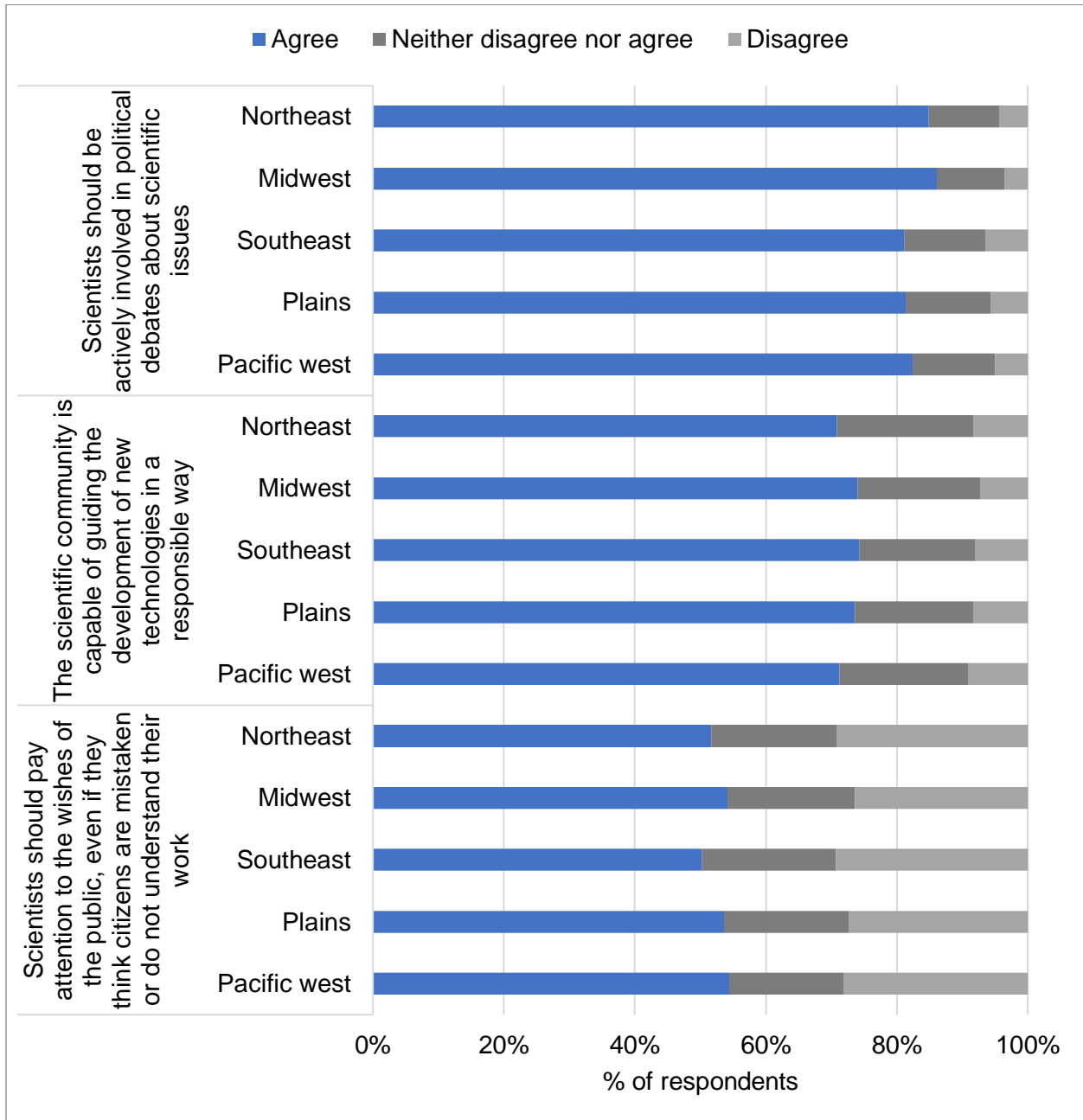
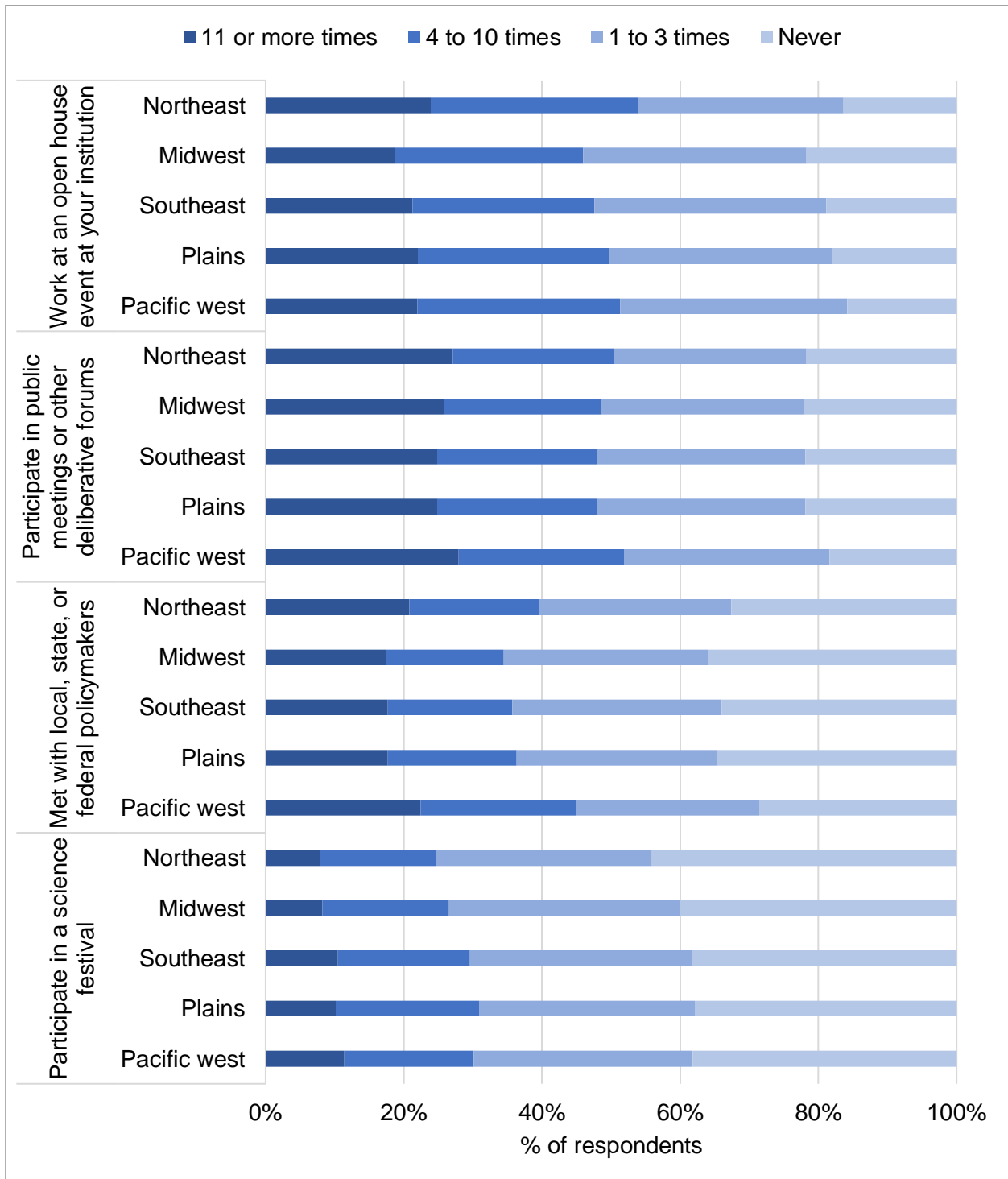
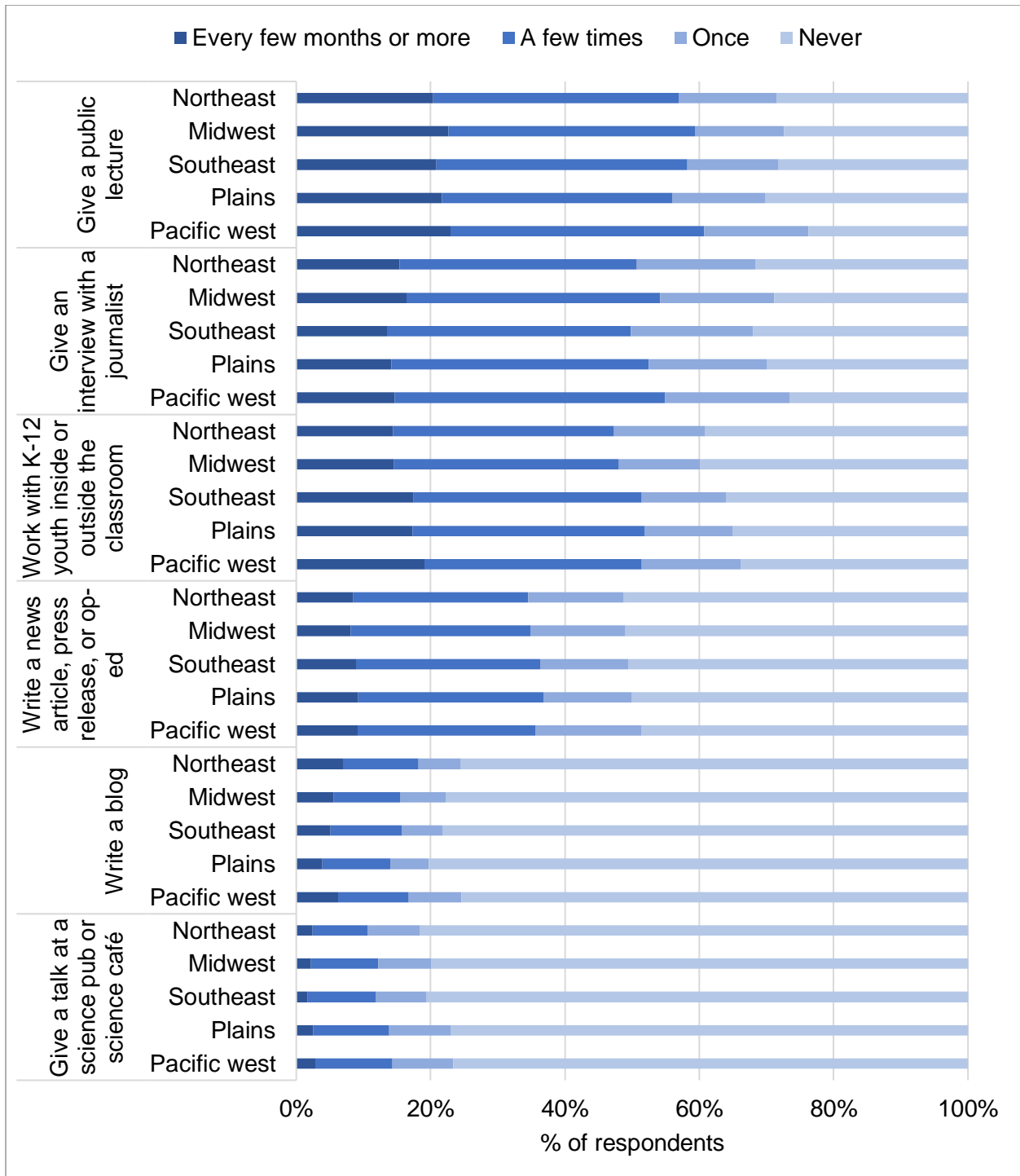


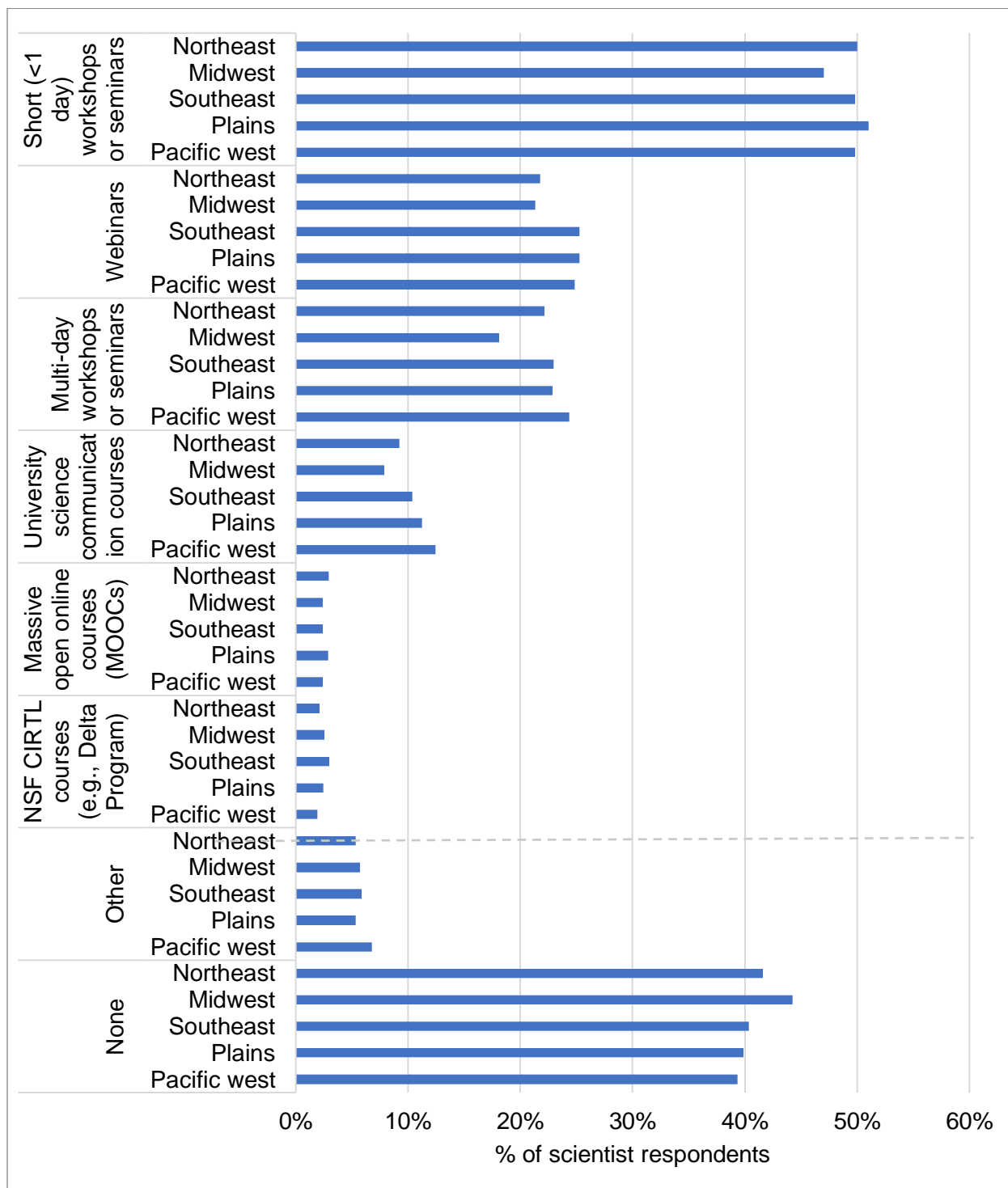
Figure A.3. Views of scientific decision-making by U.S. regions



**Figure A.4.** Participation in infrequent public engagement efforts by U.S. regions



**Figure A.5.** Participation in frequent public engagement efforts by U.S. regions



Note: Only scientists received this question. CIRTl=Center for the Integration of Research, Teaching, and Learning

**Figure A.6.** Participation in science communication trainings by U.S. regions

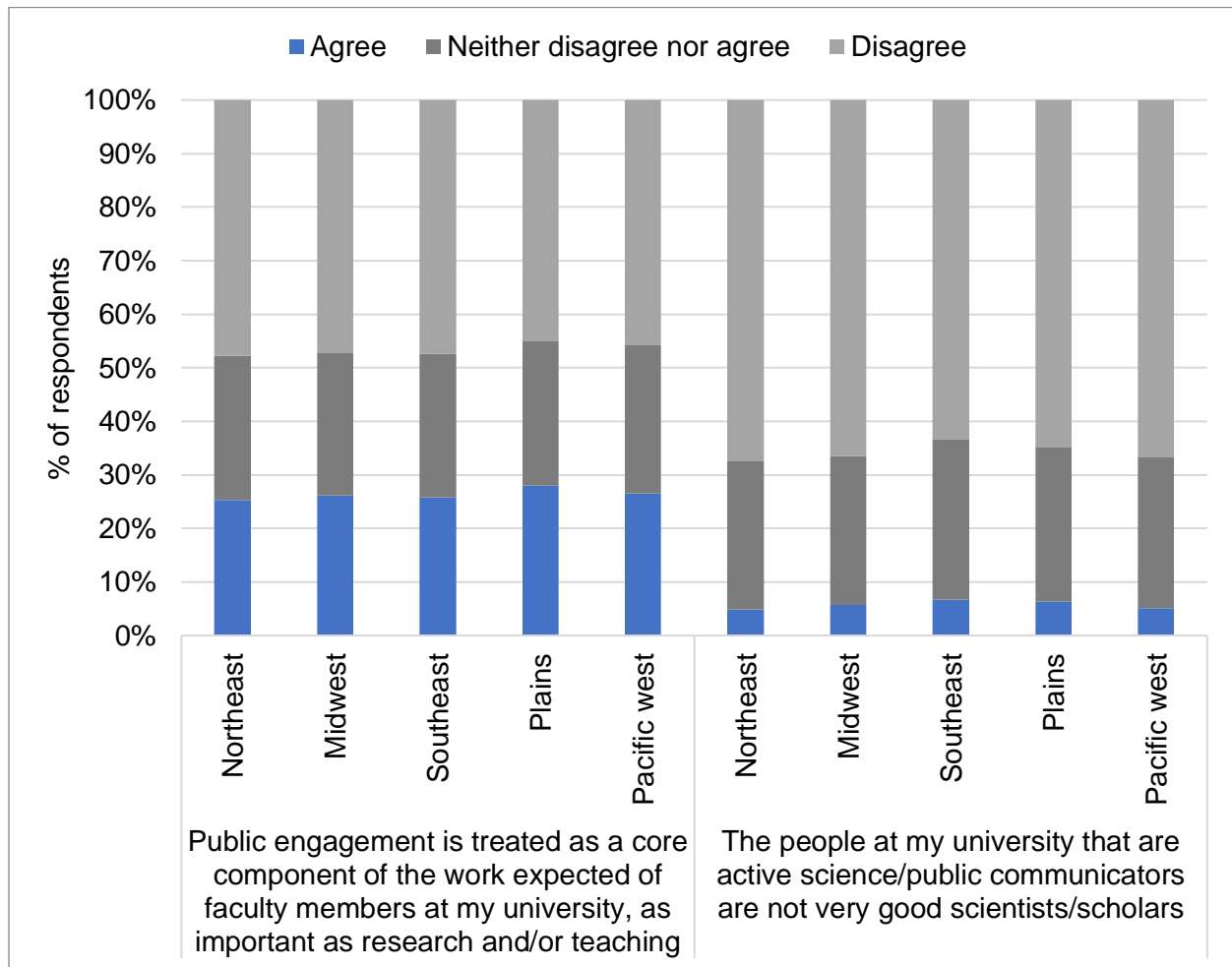
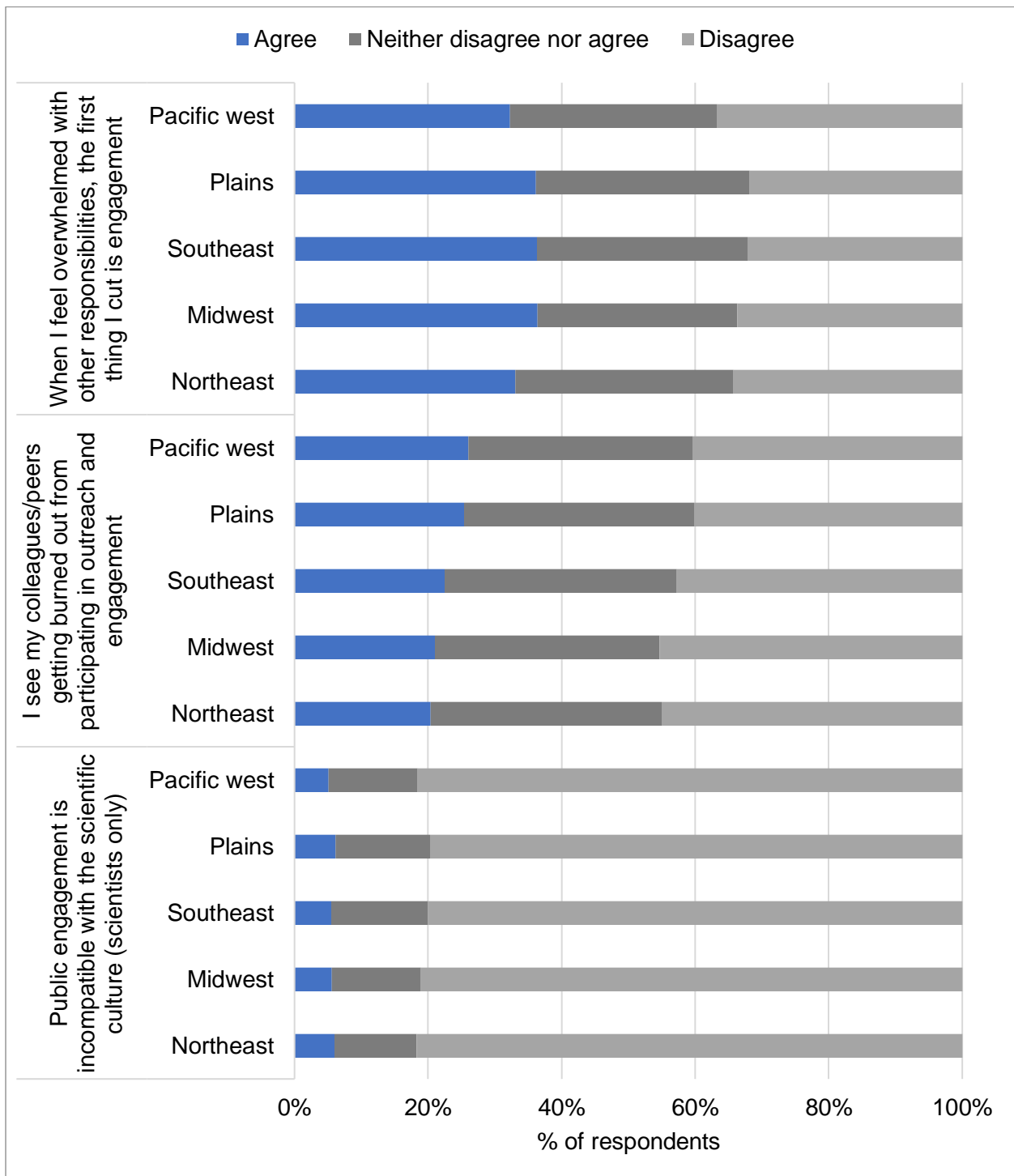


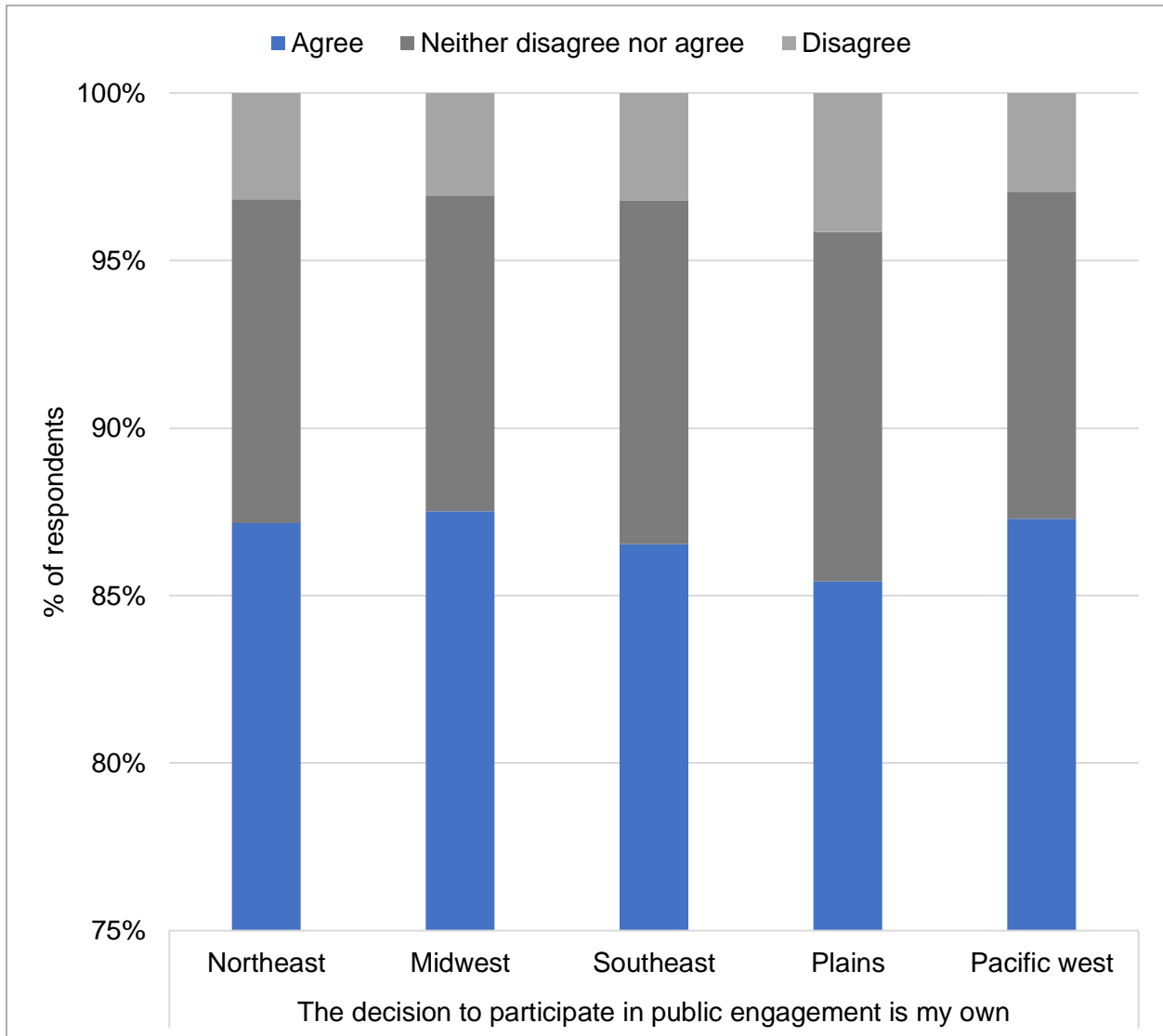
Figure A.7. University climate for public engagement by U.S. regions



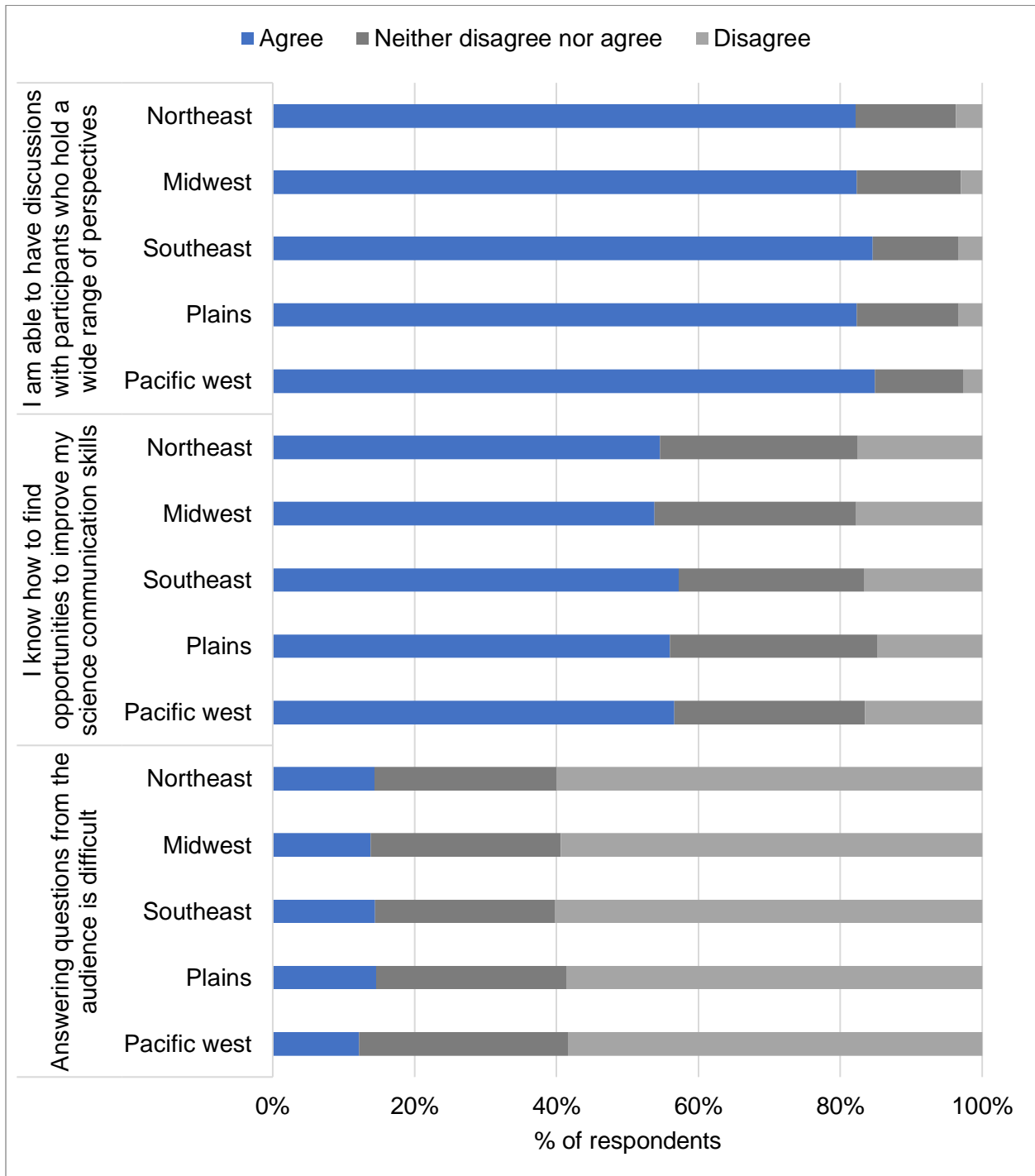


Note: Only scientists were asked “Public engagement is incompatible...”

**Figure A.8.** University barriers related to public engagement by U.S. regions



**Figure A.9.** Autonomy to participate in engagement by U.S. regions



**Figure A.10.** Self-efficacy related to public engagement by U.S. regions

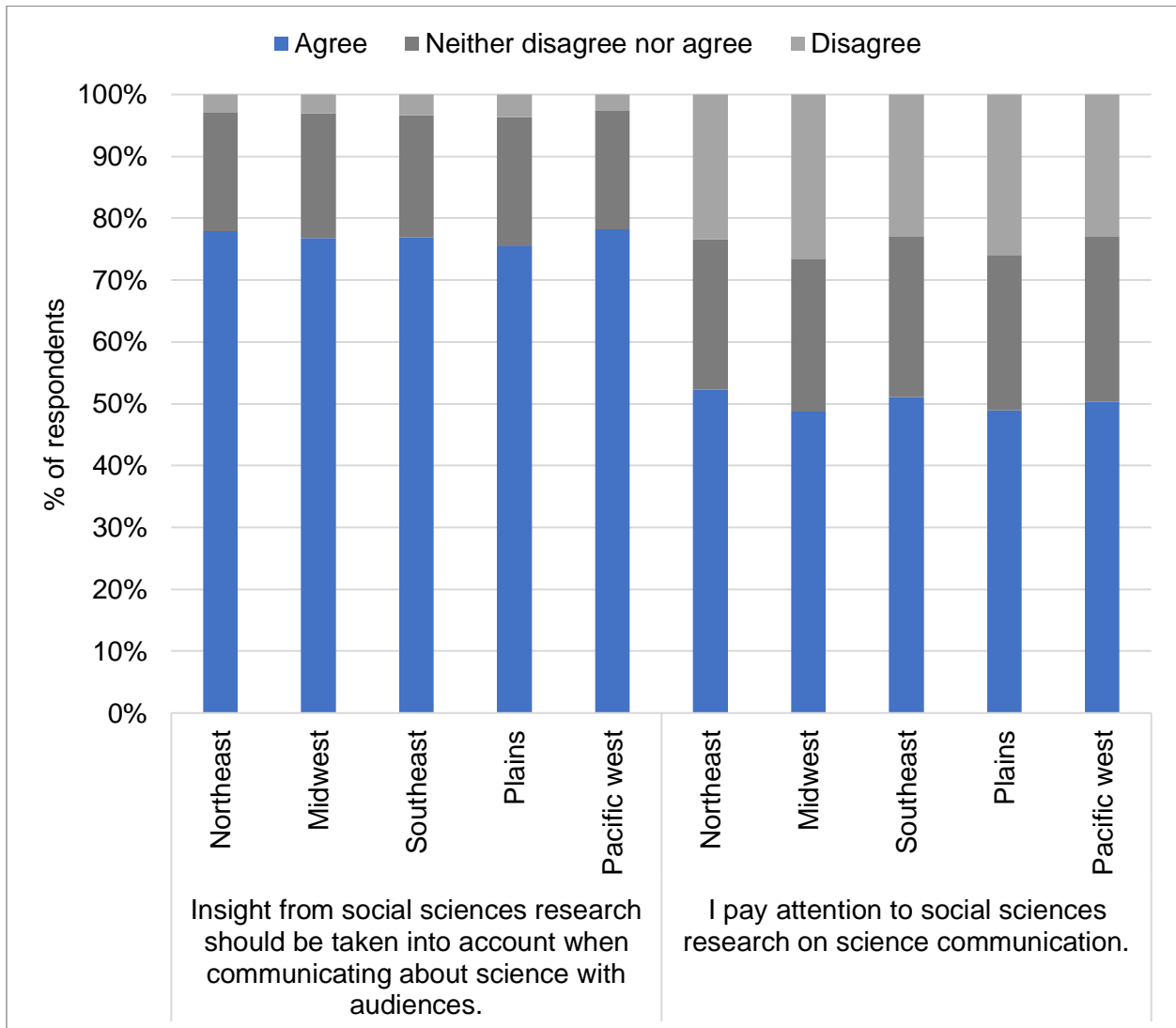


Figure A.11. Use of social science research for science communication by U.S. regions

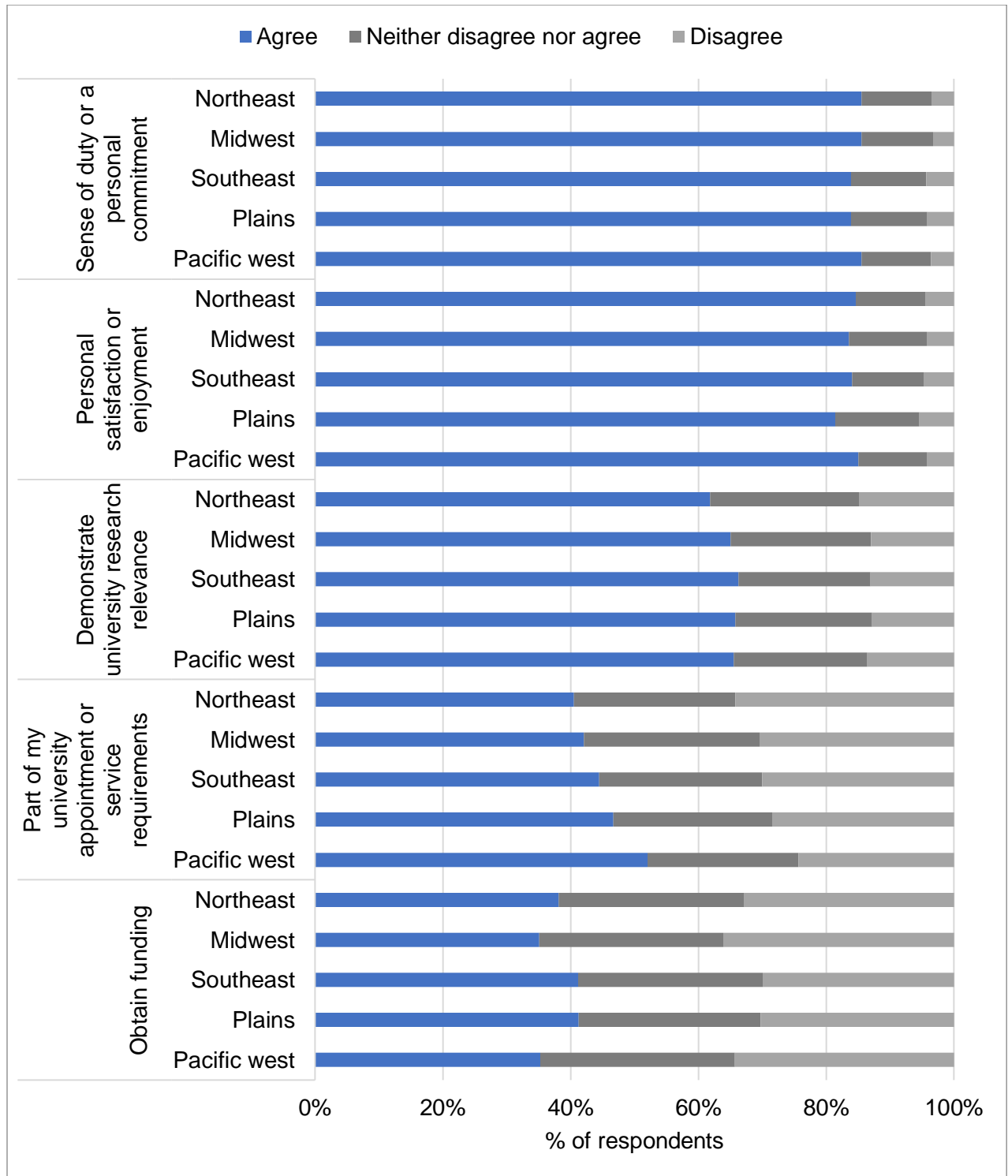


Figure A.12. Motivations for engagement by U.S. regions

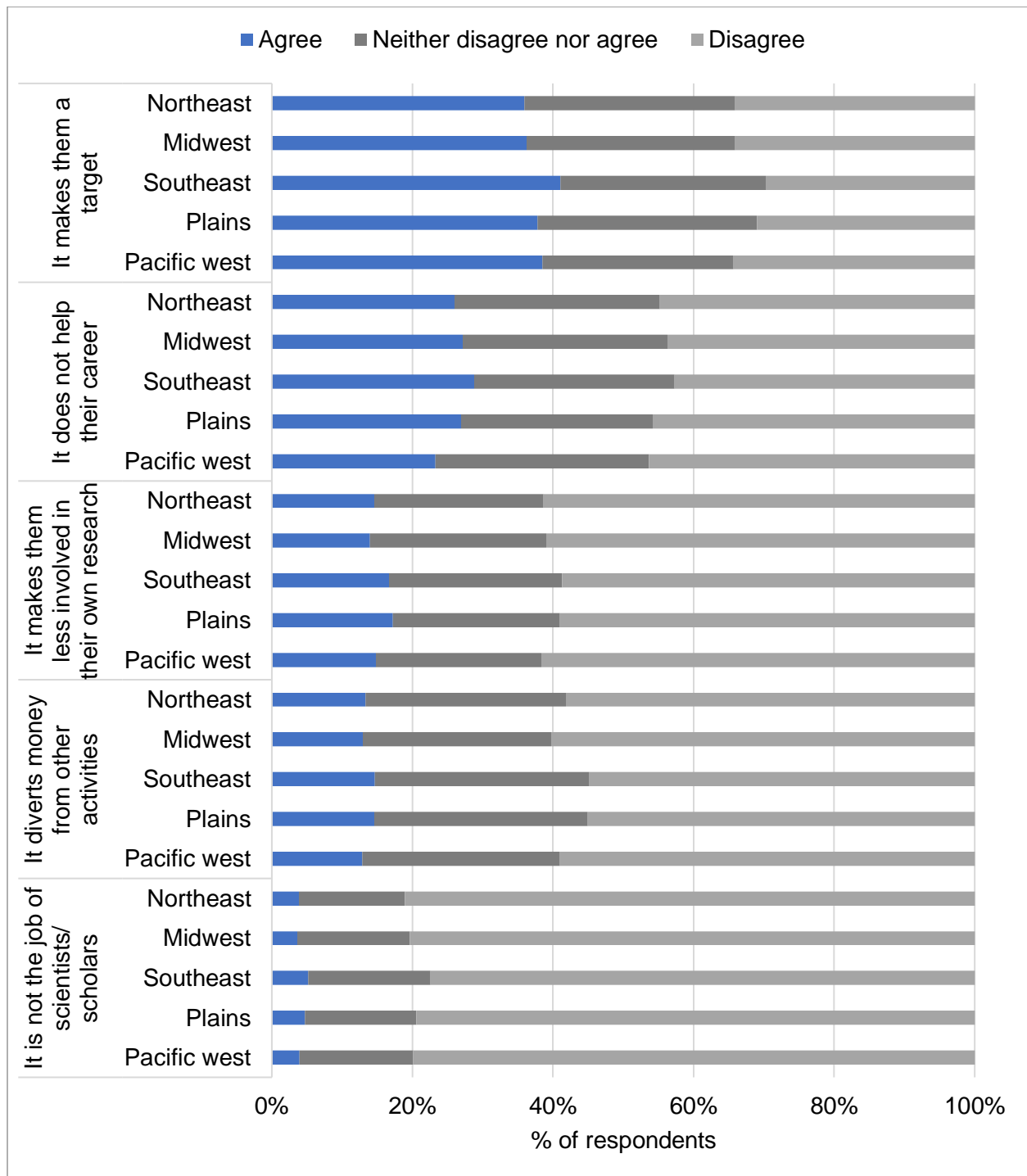


Figure A.13. Drawbacks to engagement by U.S. regions

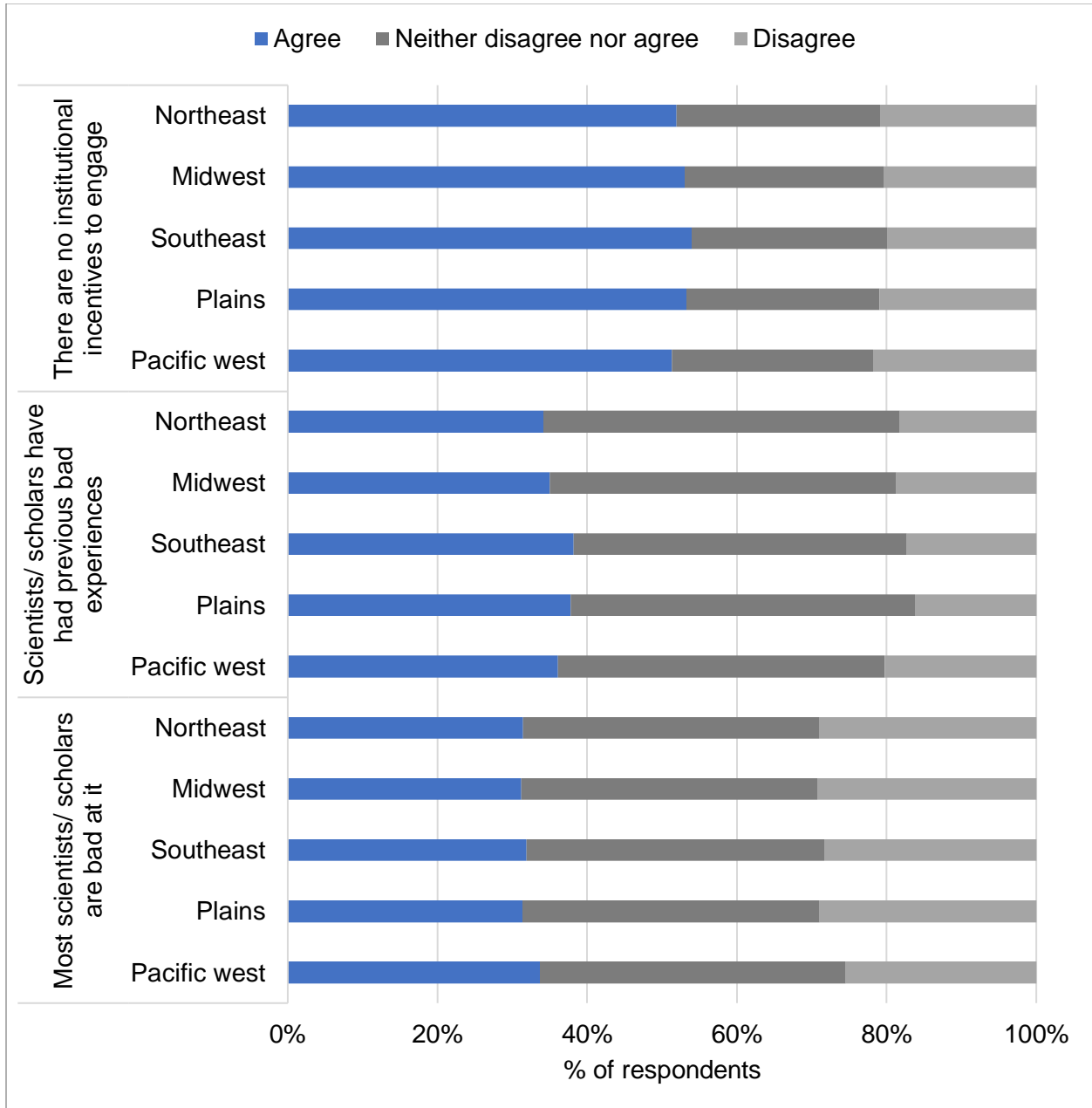


Figure A.14. Barriers to engagement by U.S. regions