An Investigation into Scientist Involvement in Science Communication Activities

July 2013

Center for Science Communication
Japan Science and Technology Agency

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I. Overview

1. Overview of Survey

1-1 Objective

The Center for Science Communication (directed by Mamoru Mohri) of the Japan Science and Technology Agency (hereafter, "JST") carries out investigative research as part of its efforts to implement timely measures and strategically promote projects from a long-term perspective, according to the 4th Science and Technology Basic Plan (approved by the Cabinet on August 19, 2011).

The Basic Plan states that "researchers who have received a certain amount or more of national research funds are required to actively engage in communication with the public on the content and results of their research activities." Also, the Great East Japan Earthquake and incident at the Fukushima Daiichi Nuclear Power Plant have raised new questions about the current status of experts in science and technology.

Within this social context, the objective of this investigative research (hereafter, "survey") is to highlight the current state and issues of scientist involvement in science communication[1] activities, and clarify the support required for promoting science communication activities. The survey was carried out by the survey research unit (JST Fellow and National Institute for Physiological Sciences Associate Professor Amane Koizumi) of the Science Communication Center, focusing on the science communication activities of scientists at universities and research institutes in Japan.

In fiscal 2010, an identical survey on science communication activities of scientists was carried out as part of the JST Public Consultation Activities 2010 "Communication between Society and Science and Technology." The 2010 survey was referred to when designing the current survey.

1-2 Method

1-2-1 Subjects

This survey was sent to 122,164 email addresses recorded in the ReaD & Researchmap, the largest national database of 220,000 Japanese academic scientists, operated by the JST.

1-2-2 Method, Period and Number Collected

The survey was conducted from March 8 to 16, and the number of responses collected was 8,964 (7.3%), while the number of valid responses was 7,908 (6.5%).

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[1] This refers to activities with the goal of having scientists (experts) and non-scientists engage in the mutual exchange of information and opinions on science and technology and related issues thereof, and to share these issues as even larger social problems. Accordingly, as an academic field, these activities include not only scientific, agricultural, medical and pharmaceutical areas but also the humanities and social sciences, and their format covers a broad range from outreach to participation in policy making.

2. Overview of Results

2-1 Experience in Science Communication (see Fig. 8 on page 15)

Persons with experience in science communication activities (hereafter, "With Experience") accounted for 64.4% (5,769 persons) of the total number collected, while persons with no experience in science communication activities (hereafter, "With No Experience") accounted for 35.6% (3,195 persons).

2-2 Activity Type (see Fig. 10 on page 17)

The typical content of science communication activities of the With Experience group is as follows: open lectures, lecture presentations, symposiums and seminars for the general public (77.4%); opening research facilities to the public, open campus (66.0%); special classes at elementary, junior and senior high schools (52.0%); participating in town meetings, citizen councils and citizen juries, etc. (9.4%); collaborative surveys and research with citizens (8.9%).

2-3 Impetus for Activities (see Table 2 on page 17 and Fig. 11 on page 18)

Regarding the impetus for carrying out science communication activities, the response rate for "by request (other than from work)" (hereafter, "agree, "somewhat agree" ratio) was the highest (80.7%), followed by "as ancillary work or duty to own research" (75.5%), and then "started activities voluntarily" (55.6%).

2-4 Objectives of Activities (see Table 3 on pages 19-20, and Fig. 12 on pages 21-24)

Regarding the objectives of carrying out science communication activities, the response rate for both the With Experience and With No Experience groups was more than 80% for the following: "fulfill my original duty as a scientist to publish in society the background and results of my research" (With Experience 89.0%, With No Experience 90.1%); "stimulate interest in science, technology and academia" (With Experience 86.8%, With No Experience 84.1%); "use my abilities to help solve social issues as a scientist" (With Experience 82.0%, With No Experience 82.0%). Meanwhile, the response rate was around 50% for the following: "prevent children from losing interest in science" (With Experience 53.5%, With No Experience 53.3%).

Comparing the results by the presence or absence of experience in science communication activities, the response rate was higher in the With Experience group than in the With No Experience group for the following objectives: "raise the knowledge level of non-experts" (With Experience 62.9%, With No Experience 53.0%); "enjoy communicating with non-experts" (With Experience 57.9%, With No Experience 45.6%).

Meanwhile, the response rate was higher in the With No Experience group than in the With Experience group for the following objectives: "fulfill my accountability to the providers of the acquired research funding, as a duty to my affiliated institution" (With Experience 70.2%, With No Experience 82.3%); "fulfill my accountability to taxpayers" (With Experience 57.7%, With No Experience 64.9%).

2-5 Achievements Made (With Experience), Achievements to Be Made (With No Experience) (see Table 4 on page 25 and Fig. 13 on pages 26-27)

Regarding the achievements made by the With Experience group in carrying out science communication

activities, the response rates in order of the highest were as follows: “communicating my message” (86.1%); “understanding what the other persons wanted to say” (69.2%); “sharing ideas and thoughts” (67.5%); “acquiring new knowledge and realizations” (67.5%).

As for the achievements to be made by the With No Experience group when carrying out science communication activities, the response rates in order of the highest were as follows: “acquiring new knowledge and realizations” (84.1%); “communicating my message” (82.1%).

Comparing the results by the presence or absence of experience in science communication activities, the response rate was notably higher in the With No Experience group than the With Experience group for the following: “contributing to solving social issues” (With Experience 35.6%, With No Experience 68.7%).

2-6 Barriers (see Table 5 on pages 28-29, Fig. 14 on pages 30-33, Fig. 15 on page 34, and Fig. 16 on page 35)

Regarding the barriers to carrying out science communication activities, irrespective of the With Experience group or With No Experience group, the response rates in order of the highest were as follows: “lack of time” (With Experience 82.9%, With No Experience 86.2%); “too much paperwork” (With Experience 74.5%, With No Experience 85.8%). Continuing on from this, in the With Experience group the response rates in order of the highest were as follows: “no rewards” (51.2%); “funding restrictions” (49.9%). For the With No Experience group, the response rates in order of the highest were as follows: “funding restrictions” (68.6%); “difficulty in creating a platform that would allow science communication activities” (64.0%).

For most of the items, the response rates were higher for the With No Experience group than the With Experience group. However, there was no significant difference noted in the presence or absence of experience in science communication activities for the response of “no rewards” (With Experience 51.2%, With No Experience 49.5%).

2-7 Support (see Table 6 on pages 36-37, Fig. 17 on pages 38-40, Fig. 18 on page 41, and Fig. 19 on page 42)

Regarding the support for promoting science communication activities, irrespective of the presence or absence of experience in these activities, the high response rates were as follows: “human support system” (With Experience 84.2%, With No Experience 87.2%); “subsidies for necessary expenses” (With Experience 83.1%, With No Experience 85.8%); “providing places and opportunities for practice” (With Experience 67.7%, With No Experience 77.7%).

Continuing on from this, in the With Experience group the high response rates were as follows: “direct evaluation from the visitors” (61.3%); “evaluated on results as per for a thesis” (59.1%). For the With No Experience group, the high response rates were as follows: “database, books and manuals, etc., with examples of activities” (64.5%); “holding joint events and study workshops, etc., where results and know-how from science communication activities are presented and shared” (64.4%); “evaluated on results as per for a thesis” (63.9%).

2-8 Support System (Departments/Staff) (see Figs. 20-21 on page 43, Fig. 22 on page 44, Fig. 23 on page 45 and Fig. 24 on page 46)

The ratio of persons who responded that there is a support system (departments/staff) for science communication activities was 42.3%, while the ratio of those who responded that there is no such support system was 57.7%. For those in the former group, the response rate for who the specific providers was highest for "students" (84.5%), followed by "staff from a special department for science communication" (76.2%).

The typical contents of the support provided are as follows: "work related to carrying out the activities" (72.9%); "setting up and running the activities on the day" (60.1%); "negotiating with external parties" (60.0%); "planning the activities" (57.0%).

The highest response for the funding sources of science communication activities was "universities and research institutes" (65.9%).

2-9 Preferred Training (see Table 7 on pages 47-49, Fig. 25 on page 50, Fig. 26 on page 51 and Fig. 27 on pages 52-56)

For the With Experience group, the response rates did not exceed 50% for any of the items. In contrast, in the With No Experience group, the response rates for all six items were above 50%, as follows: "open lectures, lecture presentations, symposiums and seminars for general public" (65.7%); "interactive science cafes and workshops" (56.5%); "special classes at elementary, junior and senior high schools" (53.2%); "work with science museums (52.2%); "writing books and developing software for the general public" (51.7%); "opening research facilities to the public, open campus" (51.4%).

2-10 Impact of the 4th Science and Technology Basic Plan on Scientist Involvement in Science Communication Activities (see Table 8 and Fig. 28 on page 57, Tables 9-10 on page 58, Figs. 29-30 on page 59, Table 11 and Fig. 31 on page 60)

The ratio of persons who responded that they "know of" or "somewhat know of" the 4th Science and Technology Basic Plan that states, "researchers who have received a certain amount or more of national research funds are required to actively communicate with the public on the content and results of their research activities" was 45.6%, while the ratio of those who responded that they "don't know of" or "don't really know of" the Basic Plan was 49.3%. Also, the greater the amount of annual research grants received by individuals, the higher the response was for "know of" or "somewhat know of" regarding the Basic Plan.

The ratio of persons who responded that they "agree" or "somewhat agree" the Basic Plan was 70.9%, which greatly exceeded the 10.8% of persons who responded "disagree" or "somewhat disagree" regarding the Basic Plan.

Regarding the question of whether the Basic Plan had resulted in carrying out more science communication activities than previously, the ratio of persons who responded "neither agree nor disagree" was 65.6%, which was greater than half the respondents.

Meanwhile, the ratio of persons who responded that scientists voluntarily carrying out science communication activities "had become the norm" or "had somewhat become the norm" was only 28.1%.

3. Discussion

3-1 Current State

The ratio of scientists with experience in science communication activities exceeded 60% (64.4%). Also, the ratio of those who "agree" or "somewhat agree" the 4th Science and Technology Basic Plan that states, "researchers who have received a certain amount or more of national research funds are required to actively communicate with the public on the content and results of their research activities" was 70.9%. Thus, science communication activities can be regarded as a general activity of scientists.

The survey results also revealed that a wide range of science communication activities are carried out, from typical activities to promote understanding such as "open lectures, lecture presentations, symposiums and seminars for the general public" (77.4%) to interactive activities including "collaborative surveys and research with citizens" (8.9%).

Conversely, the ratio of persons who responded that scientists voluntarily carrying out science communication activities "had become the norm" or "had somewhat become the norm" was only 28.1%. This result indicated that science communication activities have not become the norm as a voluntary activity of scientists.

3-2 Objectives

Regarding the objectives of carrying out science communication activities, irrespective of the presence or absence of experience in these activities, the following response rates were all more than 80%: "fulfill my original duty as a scientist to publish in society the background and results of my research" (With Experience 89.0%, With No Experience 90.1%); "stimulate interest in science, technology and academia" (With Experience 86.8%, With No Experience 84.1%); "use my abilities to help solve social issues as a scientist" (With Experience 82.0%, With No Experience 82.0%). These results suggest that science communication activities are recognized as a social responsibility of scientists.

Meanwhile, the response rate for "enhance my own multifaceted understanding of my research field" was over 60% (With Experience 67.3%, With No Experience 70.0%). This result indicates that scientists view science communication activities as a way of gaining a different perspective on their own research activities, so as to deepen their understanding thereof. Thus, science communication activities can be regarded as a way for scientists to gain an overview of their own research field as well as acquire different perspectives from experts in other fields and the general public, which subsequently leads to a multifaceted understanding.

3-3 Achievements

Regarding the achievements made by the With Experience group in carrying out science communication activities, the response rates in order of the highest were as follows: "communicating my message" (86.1%); "understanding what the other persons wanted to say" (69.2%); "sharing ideas and thoughts" (67.5%); "acquiring new knowledge and realizations" (67.5%); "contributing to solving social issues" (35.6%). These achievements can be regarded as also coinciding with the current state of science communication activities, which cover a wide range from activities intended to promote understanding to highly interactive citizen participation-based activities.

Also, the response rate was notably higher in the With No Experience group than in the With Experience group for the following: “contributing to solving social issues” (With Experience 35.6%, With No Experience 68.7%).

3-4 Barriers

The survey results revealed that the major barriers to carrying out science communication activities are as follows: “lack of time” (With Experience 82.9%, With No Experience 86.2%); “too much paperwork” (With Experience 74.5%, With No Experience 85.8%); “no rewards” (With Experience 51.2%, With No Experience 49.5%); “funding restrictions” (With Experience 49.9%, With No Experience 68.6%); “difficulty in creating a platform that would allow science communication activities” (With Experience 42.2%, With No Experience 64.0%).

Thus, the removal of these barriers is expected to promote scientist involvement in science communication activities.

3-5 Support

Regarding the support for promoting science communication activities, the results revealed the following as actions required in response to the items cited as barriers: “human support system” (With Experience 84.2%, With No Experience 87.2%); “subsidies for necessary expenses” (With Experience 83.1%, With No Experience 85.8%); “providing places and opportunities for practice” (With Experience 67.7%, With No Experience 77.7%); “evaluated on results as per for a thesis” (With Experience 59.1%, With No Experience 63.9%).

Furthermore, in the With Experience group there was a high response rate for “direct evaluation from the visitors” (With Experience 61.3%, With No Experience 55.3%), while in the With No Experience group the high response rates were as follows: “database, books and manuals, etc., with examples of activities” (With Experience 54.1%, With No Experience 64.5%); “holding joint events and study workshops, etc., where results and know-how from science communication activities are presented and shared” (With Experience 51.3%, With No Experience 64.4%). These results show the need for considering support policies in accordance with experience in science communication activities.

3-5-1 Human Support System

The results revealed that about half the organizations (51.2%) with which the With Experience group is affiliated have a support system (departments/staff) for science communication activities, while there are fewer organizations (23.6%) of the With No Experience group in which such a system exists.

Thus, a diverse range of support is required, such as building an appropriate human support system with staff from a special department for science communication, and providing assistance for the following: “work related to carrying out the activities” (72.9%); “setting up and running the activities on the day” (60.1%); “negotiating with external parties” (60.0%); “planning the activities” (57.0%).

3-5-2 Subsidies for Necessary Expenses

In the case of a support system, the highest response for the funding sources of science communication

activities was “universities and research institutes” (65.9%). Thus, in order to remove the barrier of “funding restrictions,” a wider variety of funding for science communication activities needs to be secured, as follows: “competitive funds (part of research expenses)” (23.7%); “corporate donations” (10.1%); “from participants” (14.5%).

3-5-3 Providing places and opportunities for practice

The survey results indicate that in addition to planning activities carried out by staff from a special department for science communication, mechanisms need to be built so as to provide and introduce information on opportunities for practicing these activities, such as developing events and exhibitions with science museums, holding science festivals in collaboration with local governments and planning and participating in citizen classes, and special classes and providing research guidance, etc., at elementary, junior and senior high schools.

3-5-4 No Rewards

The item “no rewards” (With Experience 51.2%, With No Experience 49.5%) was the only one within the barriers in which there were no significant differences based on experience in activities, which suggests that this is a general trend among scientists. Thus, in order to make it “the norm” to have scientists voluntarily carrying out science communication activities, it is essential to establish mechanisms (other than a thesis index) for evaluating these activities as results.

3-6 Training

The survey results showed that over 50% of the persons in the With No Experience group would prefer training on the following items: “open lectures, lecture presentations, symposiums and seminars for the general public” (65.7%); “interactive science cafes and workshops” (56.5%); “special classes at elementary, junior and senior high schools” (53.2%); “work with science museums” (52.2%); “writing books and developing software for the general public” (51.7%); “opening research facilities to the public, open campus” (51.4%).

Conversely, in the With Experience group there were no items with a response rate that exceeded 50%. A notable difference between the two groups was the ranking of an item on the need for training to “acquire knowledge on social issues, systems and laws, etc.” (46.2%), which placed eighth in the With No Experience group compared to second in the With Experience group.

From these results, the development and implementation of needs-based training is required such as general training on typical science communication activities for the With No Experience group, and a more diverse range of training according to the content of and awareness of issues in science communication activities for the With Experience group.

3-7 Summary

This survey revealed that although scientist involvement in science communication activities has become common, voluntarily carrying out these activities is not yet the norm.

This can be attributed to the following barriers as background factors: “lack of time” (With Experience

82.9%, With No Experience 86.2%); “too much paperwork” (With Experience 74.5%, With No Experience 85.8%); “no rewards” (With Experience 51.2%, With No Experience 49.5%); “funding restrictions” (With Experience 49.9%, With No Experience 68.6%); “difficulty in creating a platform that would allow science communication activities” (With Experience 42.2%, With No Experience 64.0%).

Thus, devising appropriate measures such as alleviating the administrative burden on scientists and evaluating science communication activities as results, etc., will enable the voluntary carrying out of these activities by scientists to become the norm in society.

4. Acknowledgements

We express our sincere thanks to all of the scientists who cooperated with this survey.

5. Investigation Implementation System

This survey was conducted as part of the JST Center for Science Communication research on issues, focusing on “Practical Research on the Science communication Activities of Scientists in Universities and Research Institutes.”

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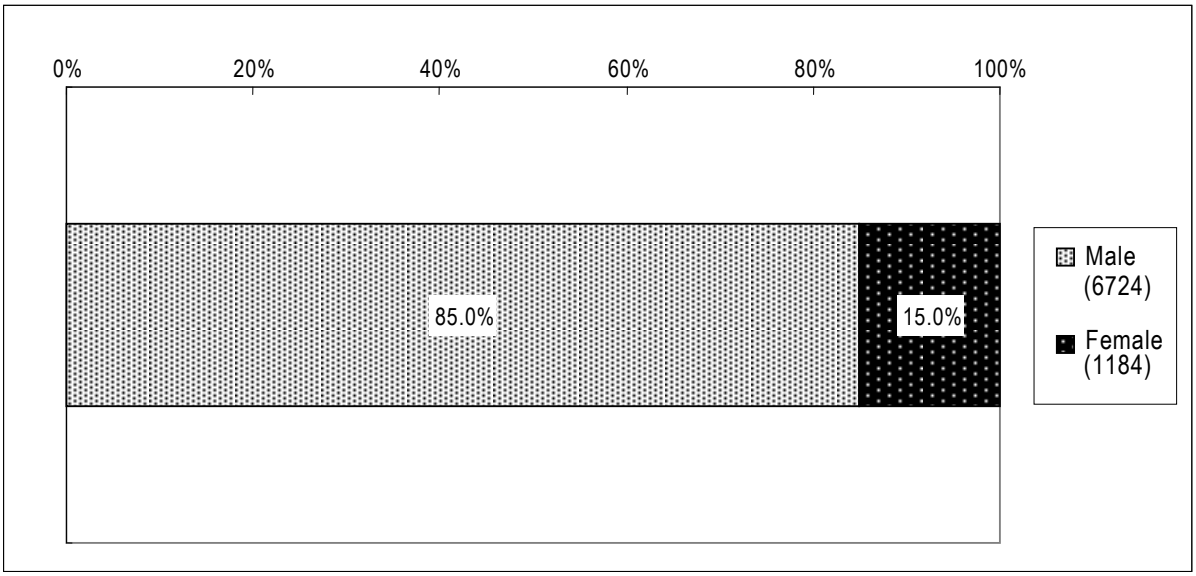
II. Survey Results

1. About the Respondents

The following graph displays the attributes of the survey respondents (N = 7,908).

○ Gender

Fig. 1 Gender Ratio of Respondents

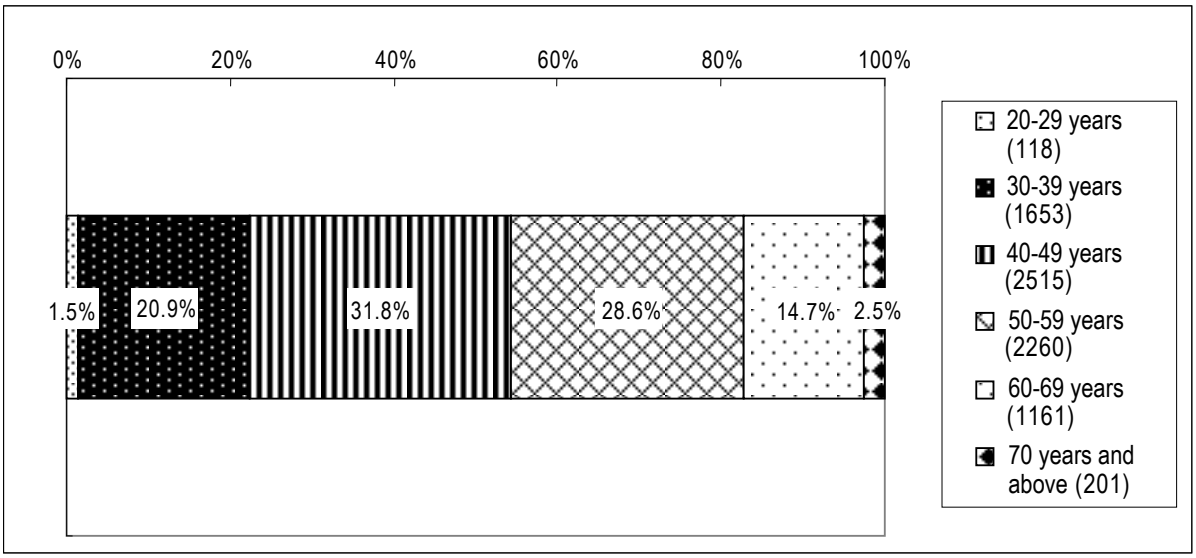


( ): Frequency

N = 7,908

○ Age

Fig. 2 Ratio by Age

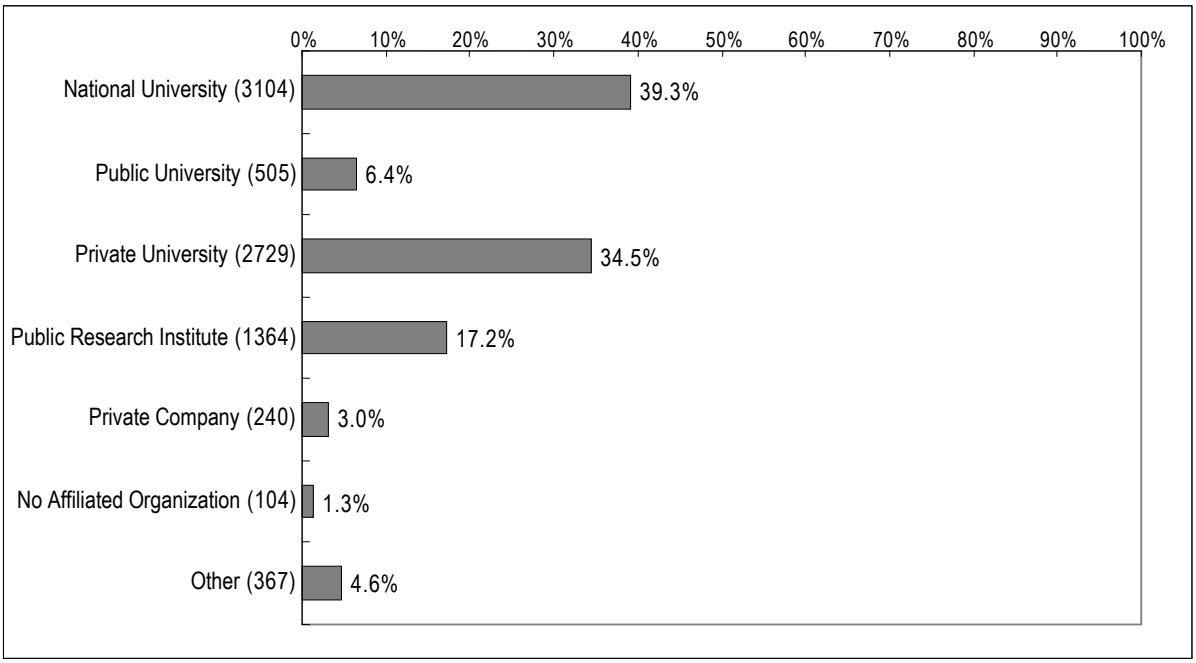


( ): Frequency

N = 7,908

○ Type of Affiliated Organizations (Multiple Responses)

Fig. 3 Affiliated Organizations (Multiple Responses)

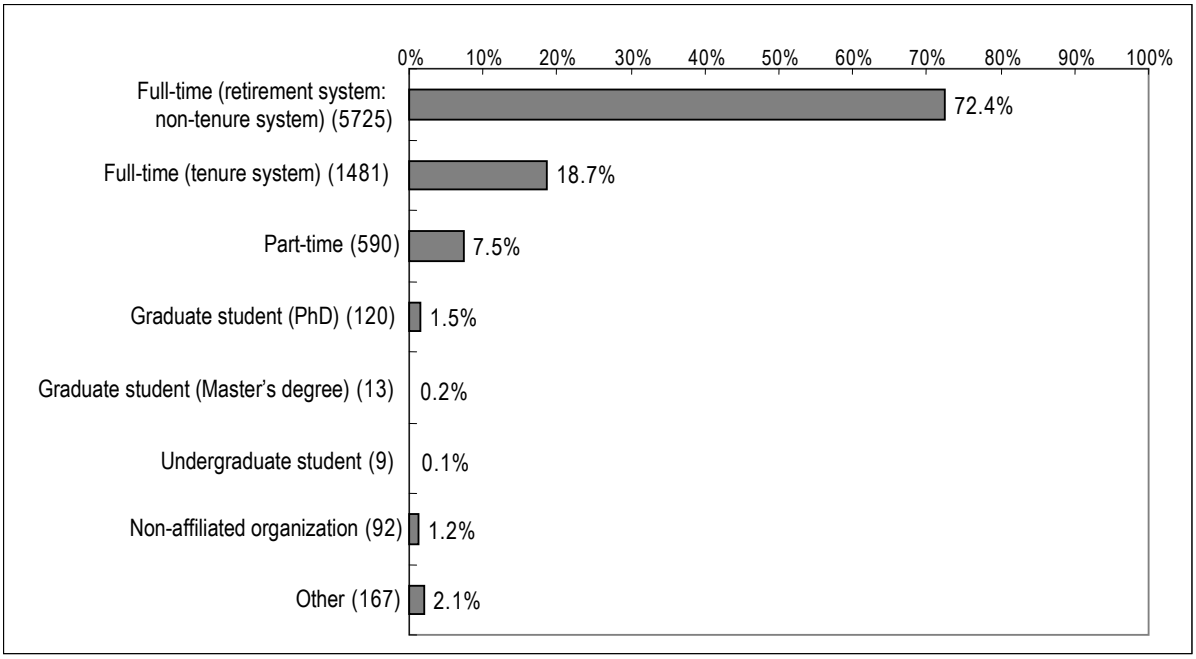


( ): Frequency

N = 7,908

○ Employment Pattern (Multiple Responses)

Fig. 4 Employment Pattern (Multiple Responses)

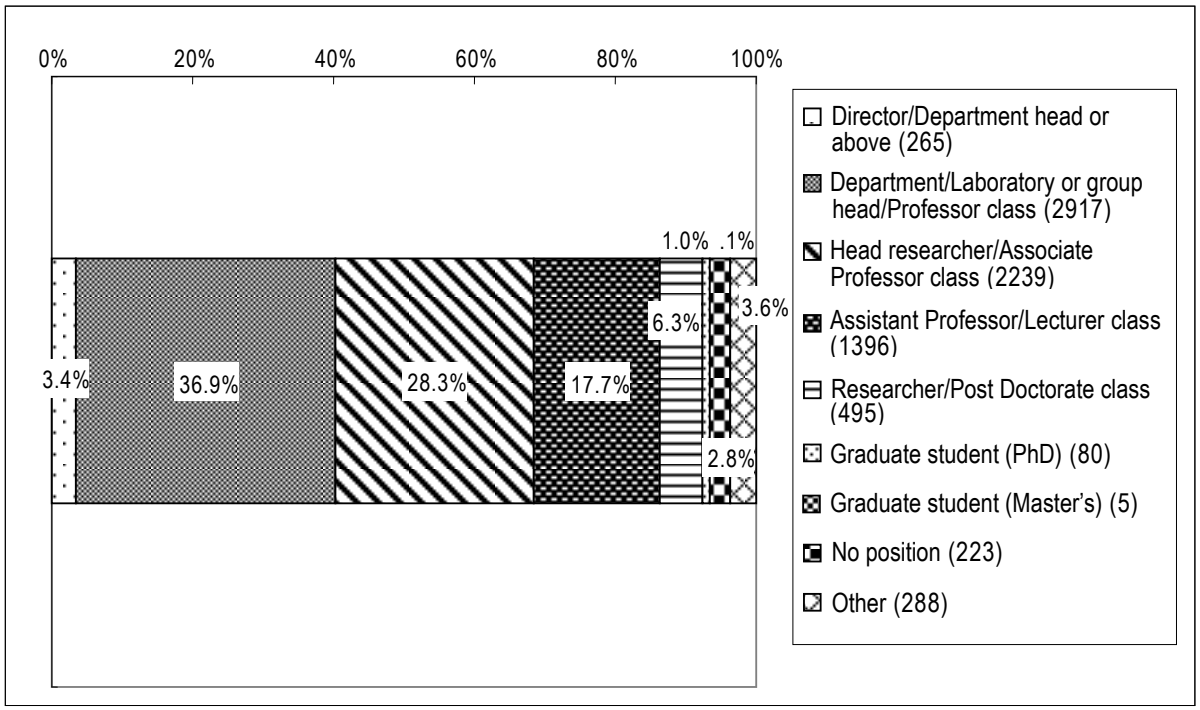


( ): Frequency

N = 7,908

○ Position

Fig. 5 Position

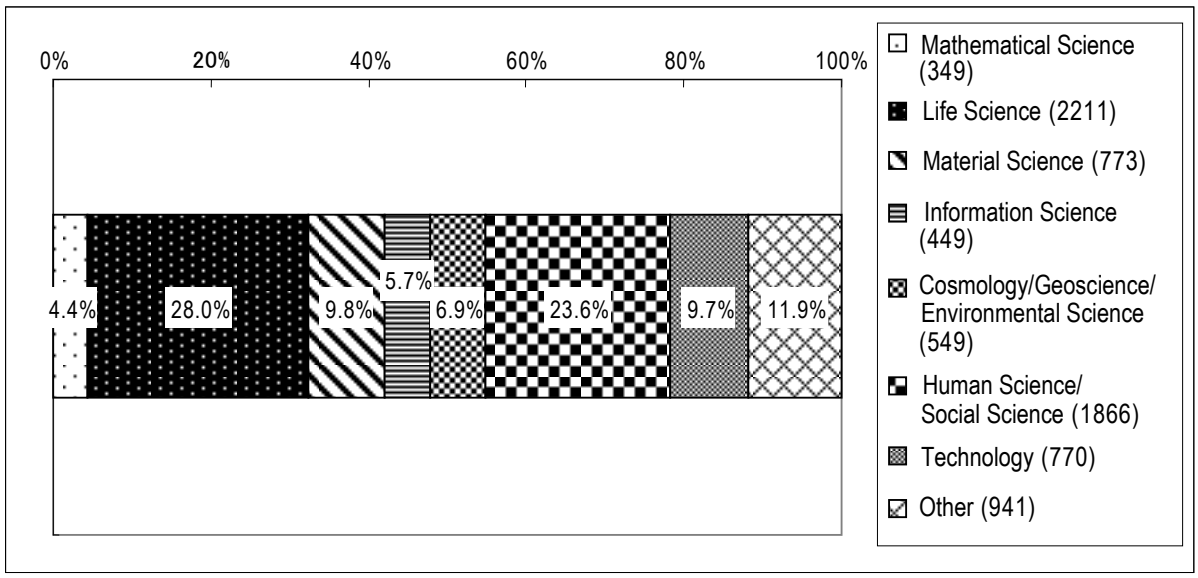


( ): Frequency

N = 7,908

○ Specialty Fields

Fig. 6 Specialty Fields

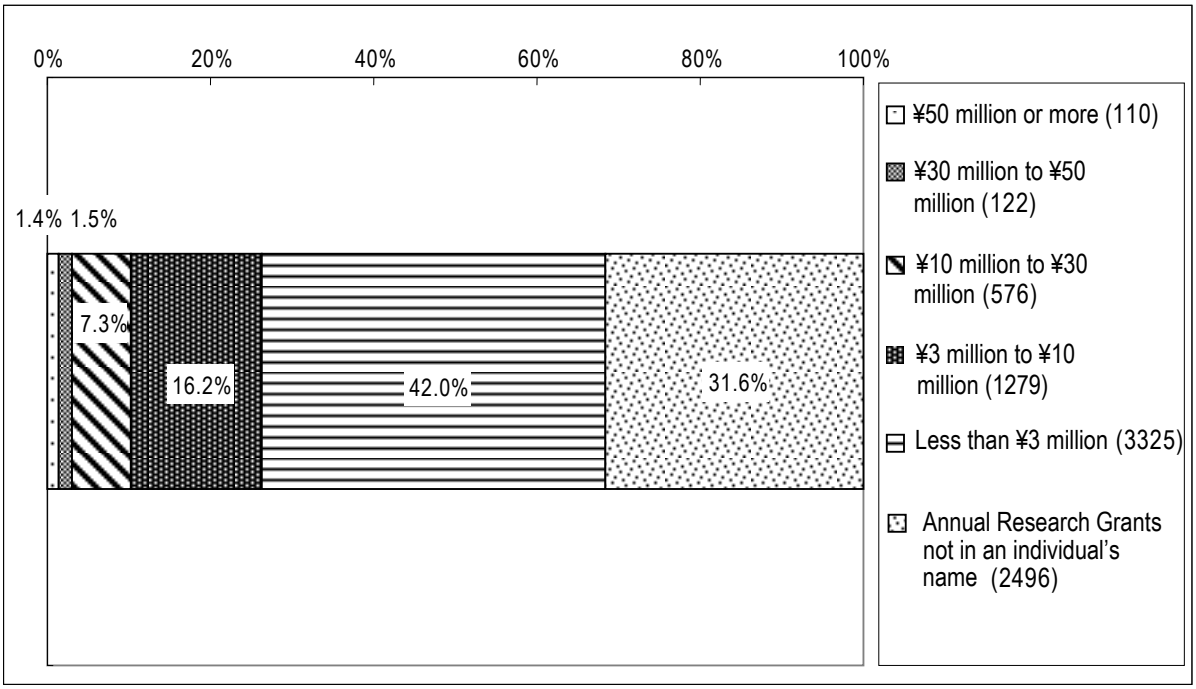


( ): Frequency

N = 7,908

○ Annual Research Grants to Individuals

Fig. 7 Annual Research Grants to Individuals



( ): Frequency

N = 7,908

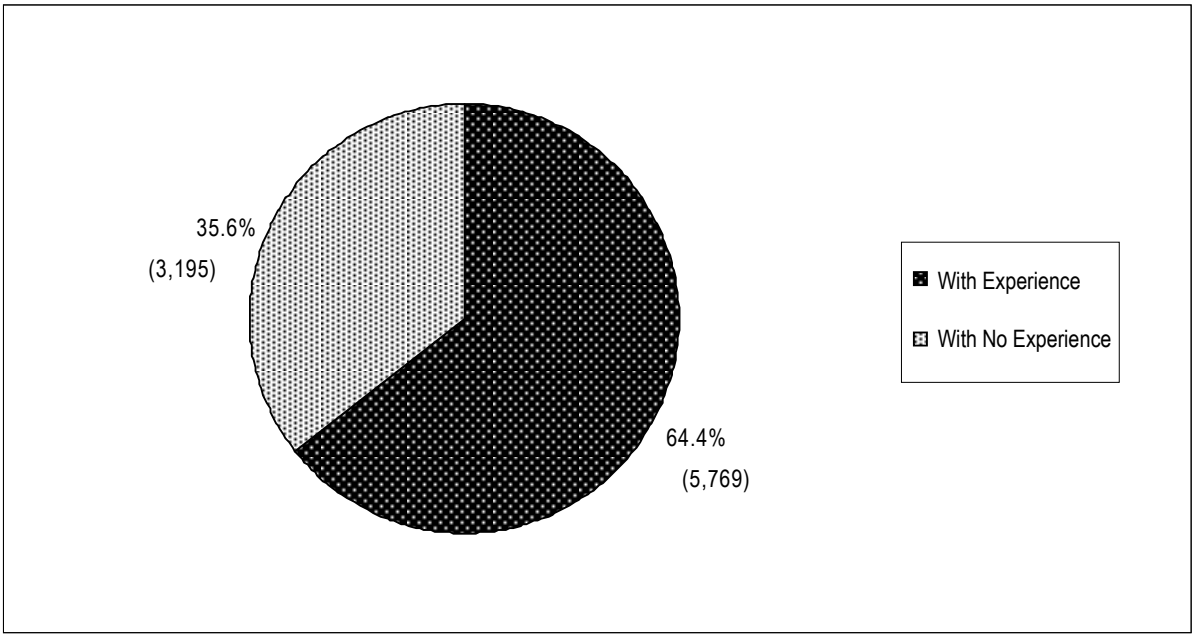
2. Results

This survey is composed of the following sections: State of Science Communication Activities (2-1); Barriers in Carrying Out Science Communication Activities (2-2); Support for Promoting Science Communication Activities (2-3); Impact of Government Policies on Scientist Involvement in Science Communication Activities (2-4). The results are listed in this order.

2-1 State of Science Communication Activities

The results of the question "So far, have you ever carried out science communication activities targeting non-scientists[2]?" are as follows (including respondents who withdrew from the survey midway): yes 64.4% (5,769 persons); no 35.6% (3,195 persons).

Fig. 8 Experience in Science Communication Activities (Number of Responses: 8,964)



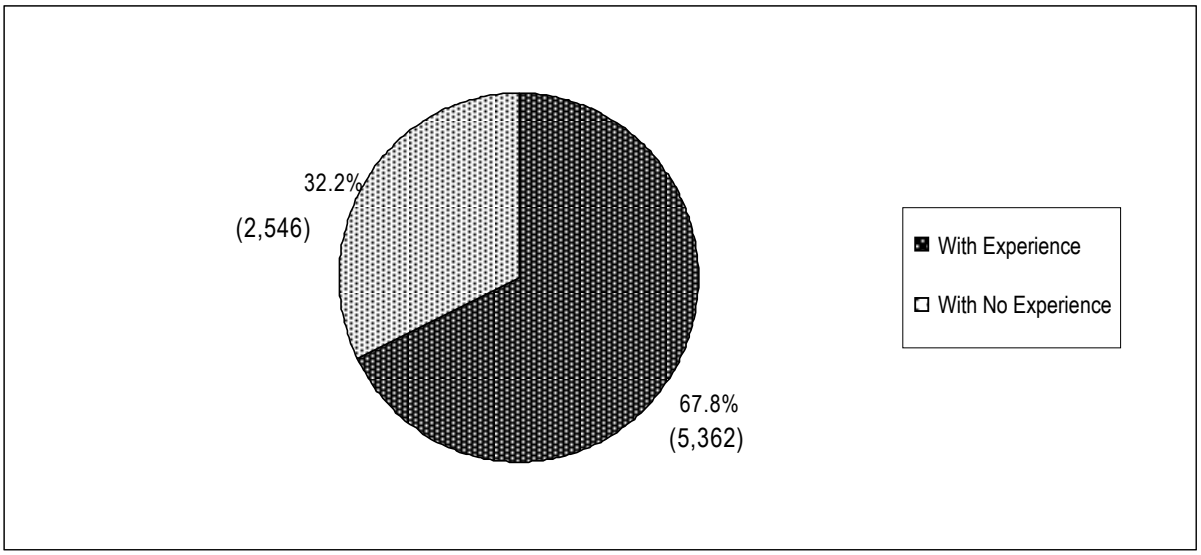
( ): Frequency

N = 8,964

[2] Academic conference presentations and thesis submissions for experts are not included, even as an open access source.

The results for respondents who completed the survey from start to finish are as follows: yes 67.8% (5,362 persons); no 32.2% (2,546 persons).

Fig. 9 Experience in Science Communication Activities (Number of Valid Responses: 7,908)



( ): Frequency

N = 7,908

The results also indicated a positive correlation between the amount of annual research grants received by individuals and the tendency to carry out Science communication activities (i.e., the greater the amount, the higher the tendency).

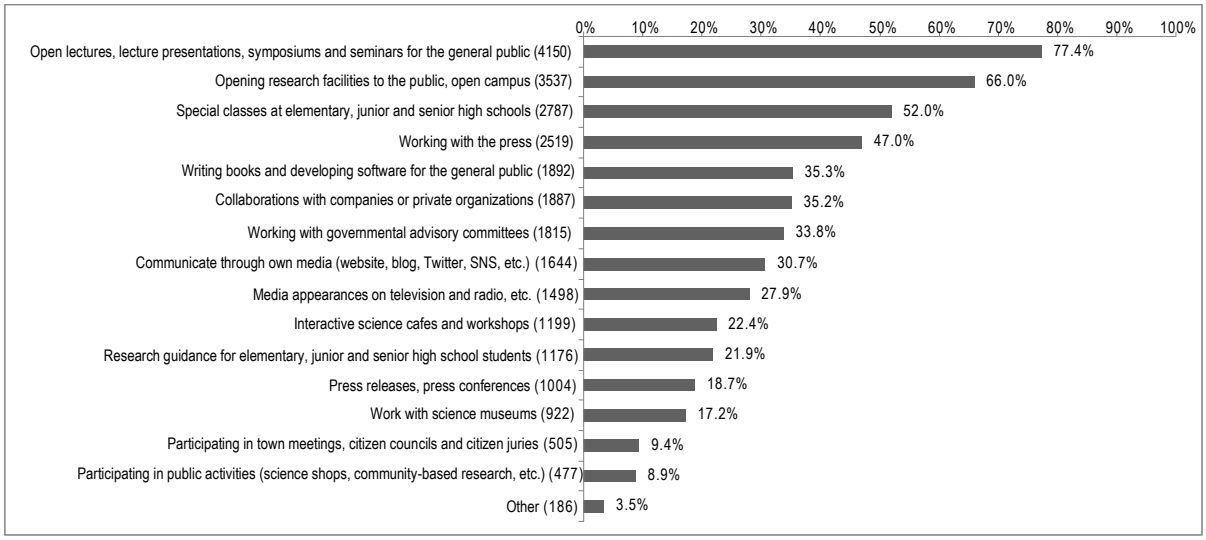
Table 1 Experience in Science Communication Activities by Annual Research Grants to Individuals

Annual Research Grants in an individual's name		With Experience	With No Experience
¥50 million or more	Frequency	102	8
	Percent (%)	92.7%	7.3%
¥30 million to ¥50 million	Frequency	108	14
	Percent (%)	88.5%	11.5%
¥10 million to ¥30 million	Frequency	483	93
	Percent (%)	83.9%	16.1%
¥3 million to ¥10 million	Frequency	942	337
	Percent (%)	73.7%	26.3%
Less than ¥3 million	Frequency	2224	1101
	Percent (%)	66.9%	33.1%
Annual Research Grants not in an individual's name	Frequency	1503	993
	Percent (%)	60.2%	39.8%

N = 7,908

The following graph displays the specific content of science communication activities of the With Experience group. (Multiple Responses)

Fig. 10 Specific Content of Science Communication Activities (Multiple Responses)



( ): Frequency

N = 5,362

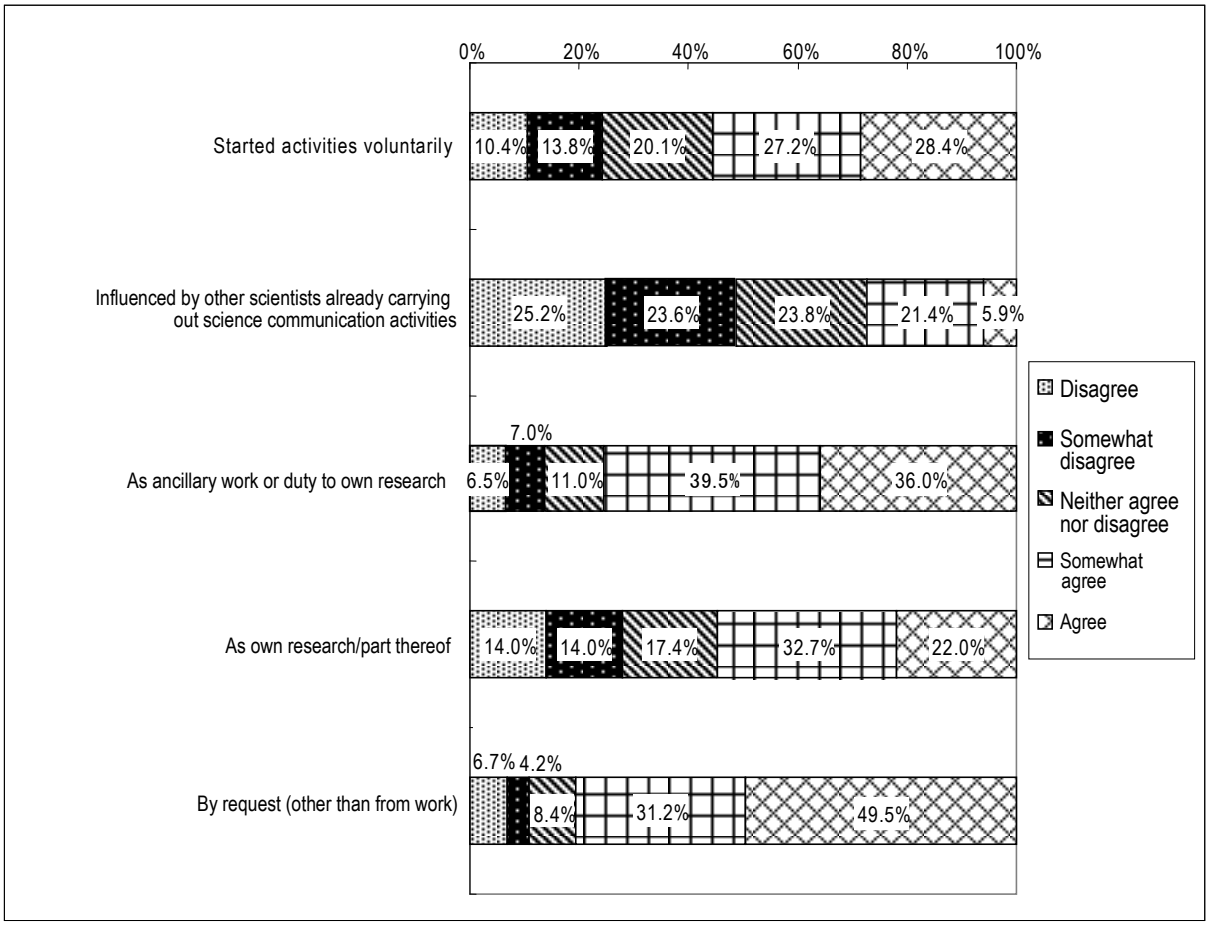
The following table displays the impetus for science communication activities of the With Experience group.

Table 2 Impetus for Science Communication Activities

Items	Frequency /Percent (%)	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Started activities voluntarily	Frequency	559	740	1080	1461	1522
	Percent (%)	10.4%	13.8%	20.1%	27.2%	28.4%
Influenced by other scientists already carrying out science communication activities	Frequency	1351	1268	1278	1149	316
	Percent (%)	25.2%	23.6%	23.8%	21.4%	5.9%
As ancillary work or duty to own research	Frequency	351	376	590	2116	1929
	Percent (%)	6.5%	7.0%	11.0%	39.5%	36.0%
As own research/part there of	Frequency	749	750	932	1753	1178
	Percent (%)	14.0%	14.0%	17.4%	32.7%	22.0%
By request (other than from work)	Frequency	359	224	449	1675	2655
	Percent (%)	6.7%	4.2%	8.4%	31.2%	49.5%

N = 5,362

Fig. 11 Impetus for Science Communication Activities



N = 5,362

The following table displays the objectives of science communication activities of the With Experience group and the With No Experience group. For the With No Experience group, we asked what the objective would be if they were to carry out science communication activities.

Table 3 Objectives of Science Communication Activities

(By Experience in Science Communication Activities)

Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Fulfill my original duty as a scientist to publish in society the background and results of my research	With Experience N=5,362	Frequency	74	182	332	1930	2844
		Percent (%)	1.4%	3.4%	6.2%	36.0%	53.0%
	With No Experience N=2,546	Frequency	37	64	150	917	1378
		Percent (%)	1.5%	2.5%	5.9%	36.0%	54.1%
Use my abilities to help solve social issues as a scientist	With Experience N=5,362	Frequency	119	274	571	1967	2431
		Percent (%)	2.2%	5.1%	10.6%	36.7%	45.3%
	With No Experience N=2,546	Frequency	58	120	281	932	1155
		Percent (%)	2.3%	4.7%	11.0%	36.6%	45.4%
Fulfill my accountability to the providers of the acquired research funding, as a duty to my affiliated institution	With Experience N=5,362	Frequency	292	440	865	1952	1813
		Percent (%)	5.4%	8.2%	16.1%	36.4%	33.8%
	With No Experience N=2,546	Frequency	42	130	280	1053	1041
		Percent (%)	1.6%	5.1%	11.0%	41.4%	40.9%
Fulfill my accountability to taxpayers	With Experience N=5,362	Frequency	439	648	1182	1842	1251
		Percent (%)	8.2%	12.1%	22.0%	34.4%	23.3%
	With No Experience N=2,546	Frequency	106	249	541	979	671
		Percent (%)	4.2%	9.8%	21.2%	38.5%	26.4%
Stimulate interest in science, technology and academia	With Experience N=5,362	Frequency	86	147	475	2048	2606
		Percent (%)	1.6%	2.7%	8.9%	38.2%	48.6%
	With No Experience N=2,546	Frequency	22	84	297	1068	1075
		Percent (%)	0.9%	3.3%	11.7%	41.9%	42.2%
Raise the knowledge level of non-experts	With Experience N=5,362	Frequency	209	529	1253	2064	1307
		Percent (%)	3.9%	9.9%	23.4%	38.5%	24.4%
	With No Experience N=2,546	Frequency	119	321	755	922	429
		Percent (%)	4.7%	12.6%	29.7%	36.2%	16.8%
Prevent children from losing interest in science	With Experience N=5,362	Frequency	447	627	1419	1637	1232
		Percent (%)	8.3%	11.7%	26.5%	30.5%	23.0%
	With No Experience N=2,546	Frequency	128	315	746	912	445
		Percent (%)	5.0%	12.4%	29.3%	35.8%	17.5%
Experience in science communication activities	With Experience N=5,362	Frequency	273	481	999	2155	1454
		Percent (%)	5.1%	9.0%	18.6%	40.2%	27.1%
	With No Experience N=2,546	Frequency	76	178	509	1115	668
		Percent (%)	3.0%	7.0%	20.0%	43.8%	26.2%

(Con't)

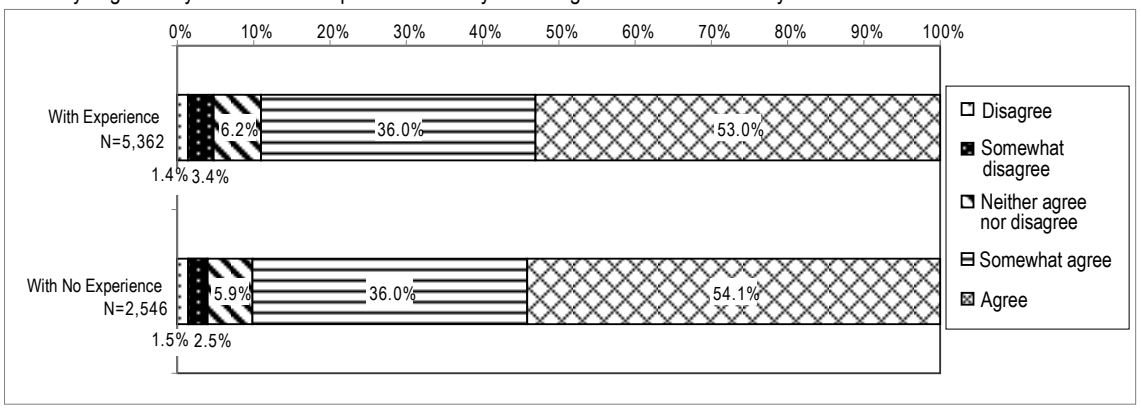
Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Build networks with a range of people	With Experience N=5,362	Frequency	255	512	1130	2085	1380
		Percent (%)	4.8%	9.5%	21.1%	38.9%	25.7%
	With No Experience N=2,546	Frequency	81	201	556	1099	609
		Percent (%)	3.2%	7.9%	21.8%	43.2%	23.9%
Practice and apply research findings in society	With Experience N=5,362	Frequency	237	464	933	2034	1694
		Percent (%)	4.4%	8.7%	17.4%	37.9%	31.6%
	With No Experience N=2,546	Frequency	64	142	396	1119	825
		Percent (%)	2.5%	5.6%	15.6%	44.0%	32.4%
Facilitate the process of acquiring research funds	With Experience N=5,362	Frequency	1273	1236	1667	883	303
		Percent (%)	23.7%	23.1%	31.1%	16.5%	5.7%
	With No Experience N=2,546	Frequency	273	461	948	642	222
		Percent (%)	10.7%	18.1%	37.2%	25.2%	8.7%
Get students and young scientists interested in my own research field	With Experience N=5,362	Frequency	437	681	1285	1949	1010
		Percent (%)	8.1%	12.7%	24.0%	36.3%	18.8%
	With No Experience N=2,546	Frequency	121	277	723	1011	414
		Percent (%)	4.8%	10.9%	28.4%	39.7%	16.3%
Know the trends and views in society	With Experience N=5,362	Frequency	434	702	1319	1979	928
		Percent (%)	8.1%	13.1%	24.6%	36.9%	17.3%
	With No Experience N=2,546	Frequency	101	252	655	1084	454
		Percent (%)	4.0%	9.9%	25.7%	42.6%	17.8%
Enjoy communicating with non-experts	With Experience N=5,362	Frequency	337	567	1353	1908	1197
		Percent (%)	6.3%	10.6%	25.2%	35.6%	22.3%
	With No Experience N=2,546	Frequency	174	348	863	820	341
		Percent (%)	6.8%	13.7%	33.9%	32.2%	13.4%
Raise one's own name recognition	With Experience N=5,362	Frequency	1775	1240	1496	685	166
		Percent (%)	33.1%	23.1%	27.9%	12.8%	3.1%
	With No Experience N=2,546	Frequency	642	629	860	330	85
		Percent (%)	25.2%	24.7%	33.8%	13.0%	3.3%

N = 7,908

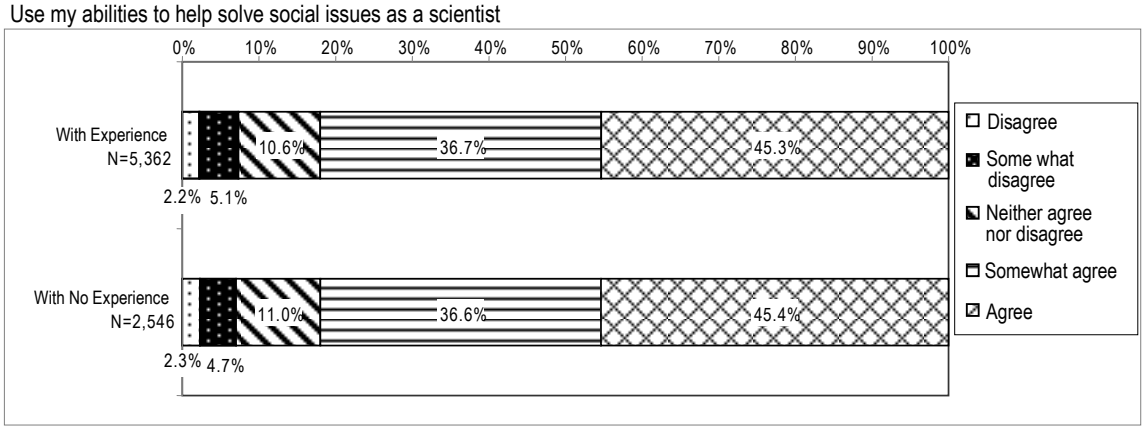
Fig. 12 Objectives of Science Communication Activities

(By Experience in Science Communication Activities)

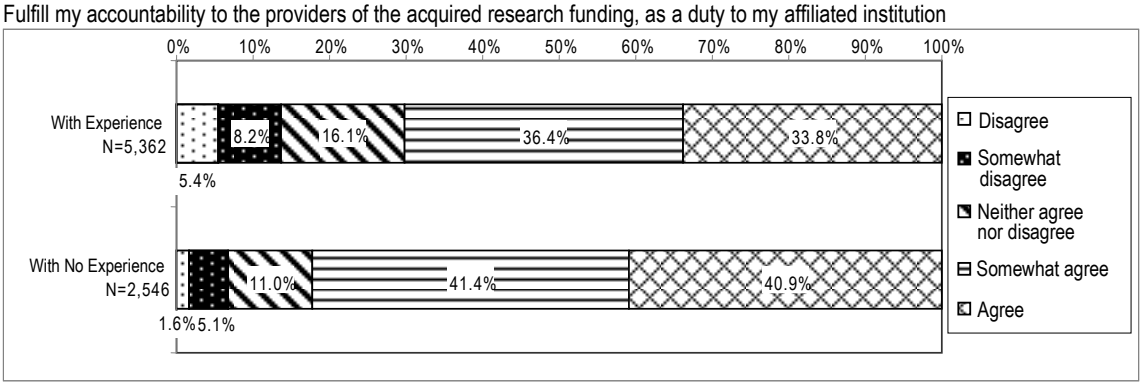
Fulfill my original duty as a scientist to publish in society the background and results of my research



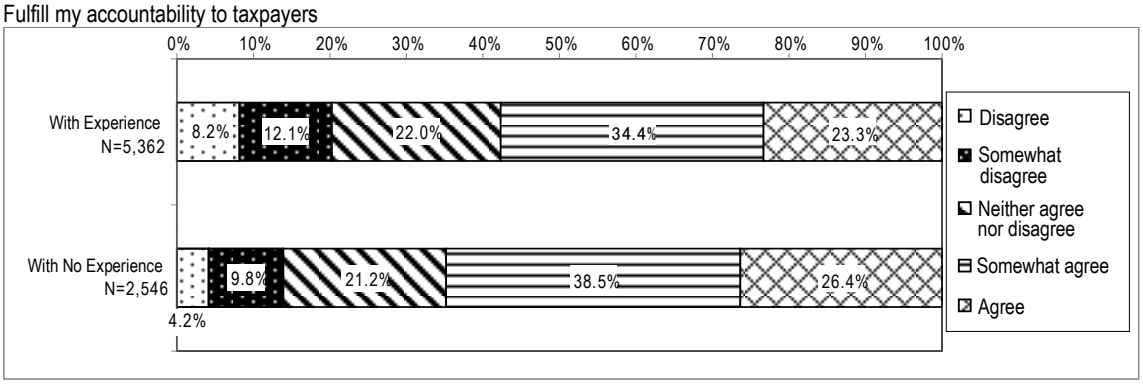
Use my abilities to help solve social issues as a scientist



Fulfill my accountability to the providers of the acquired research funding, as a duty to my affiliated institution

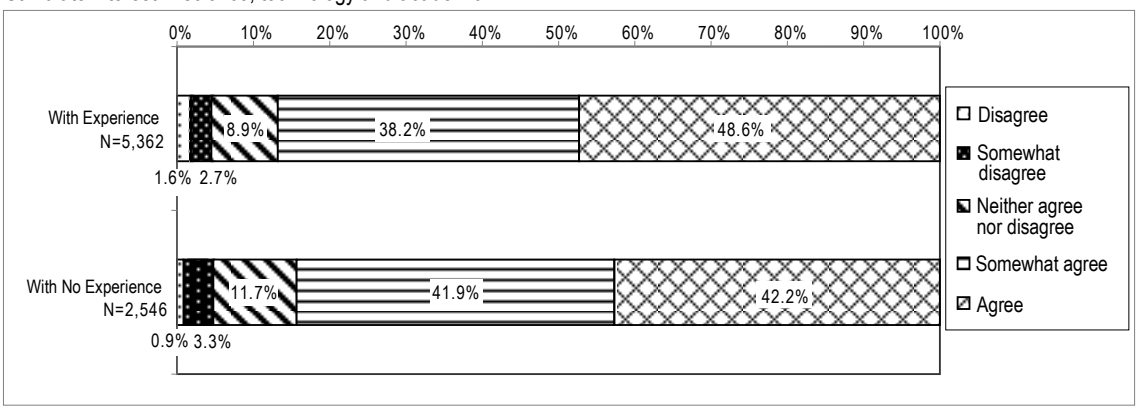


Fulfill my accountability to taxpayers

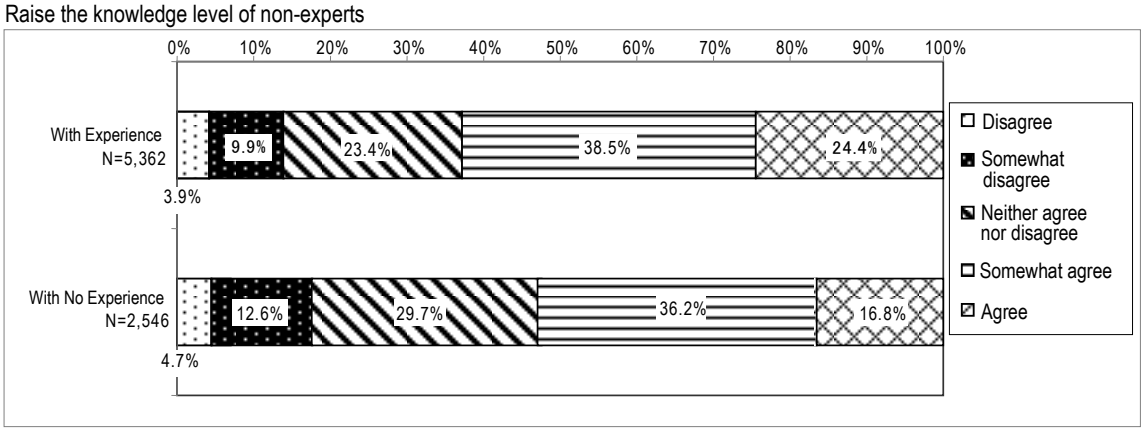


(Con't.)

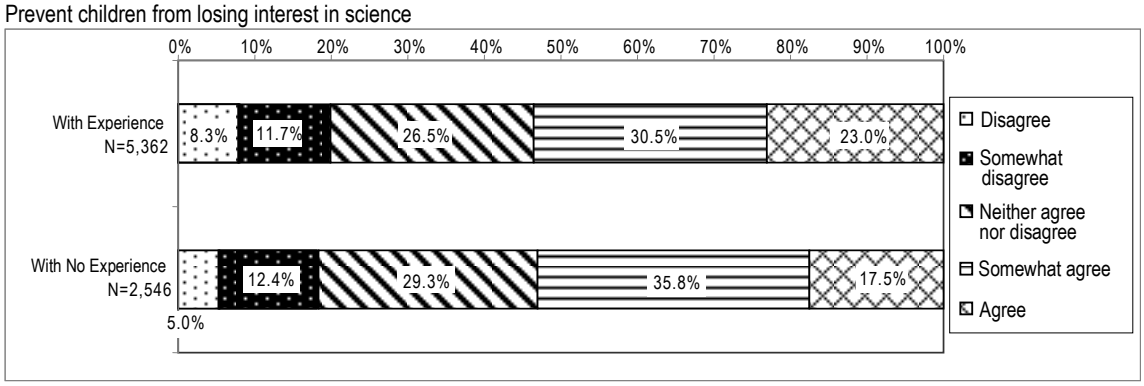
Stimulate interest in science, technology and academia



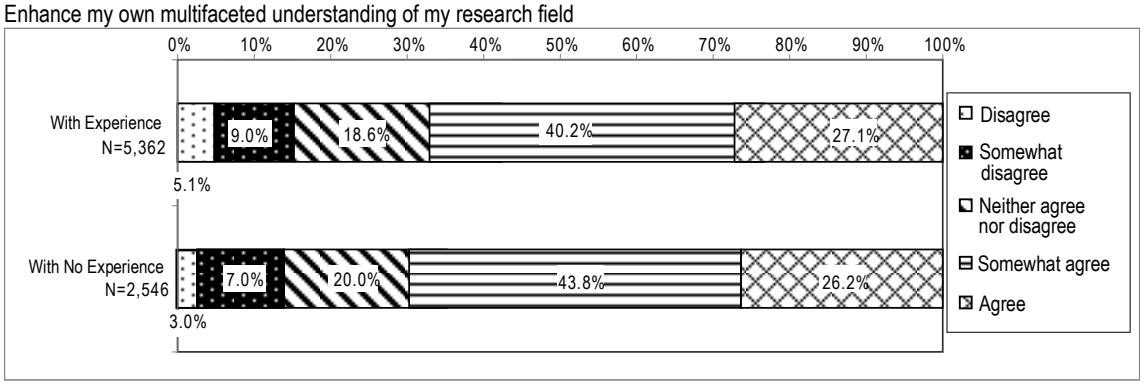
Raise the knowledge level of non-experts



Prevent children from losing interest in science

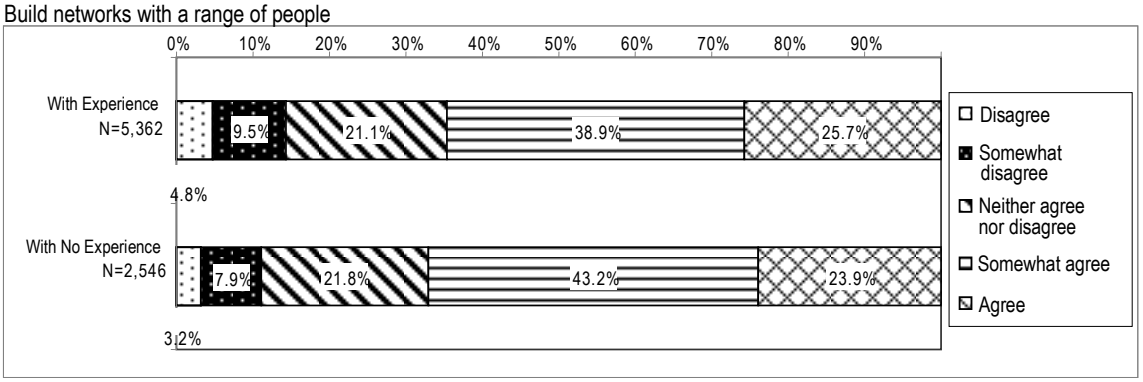


Enhance my own multifaceted understanding of my research field

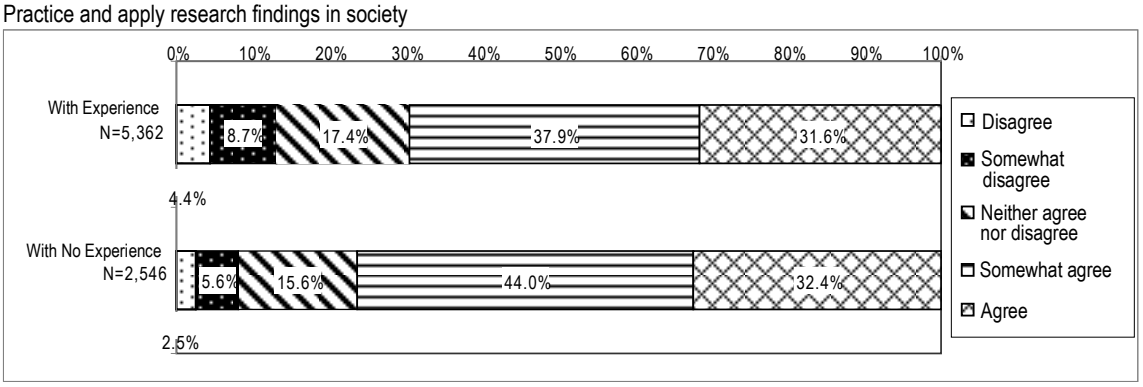


(Con't.)

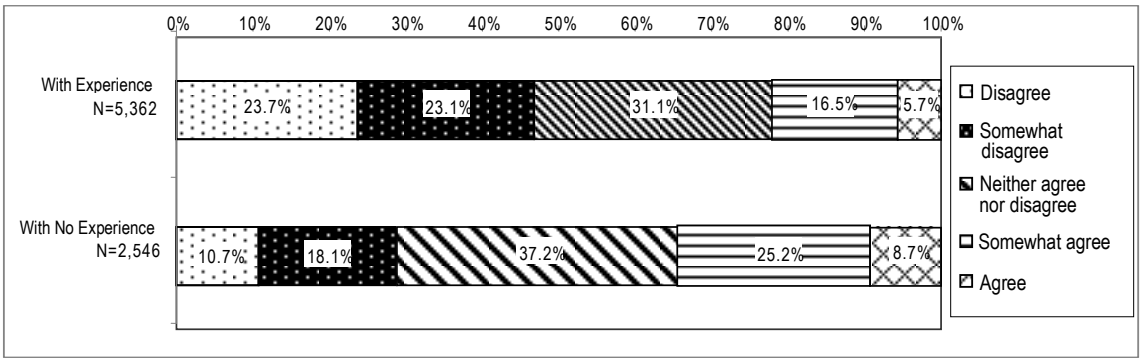
Build networks with a range of people



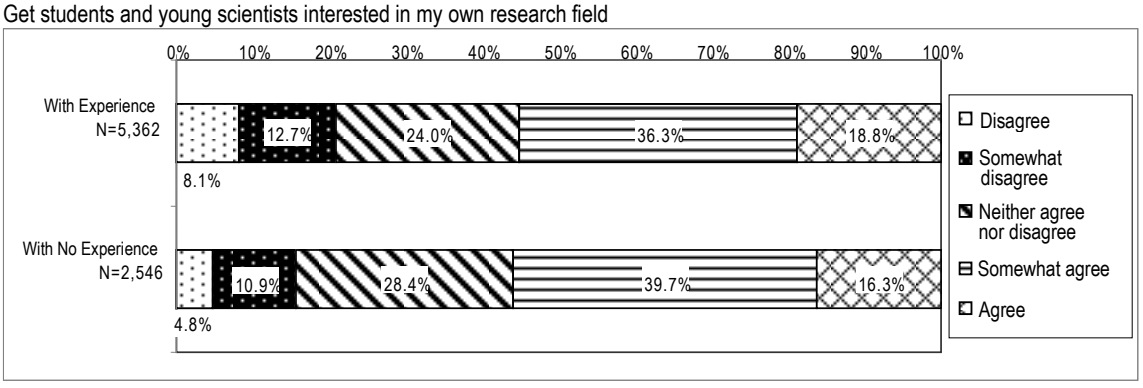
Practice and apply research findings in society



Facilitate the process of acquiring research funds

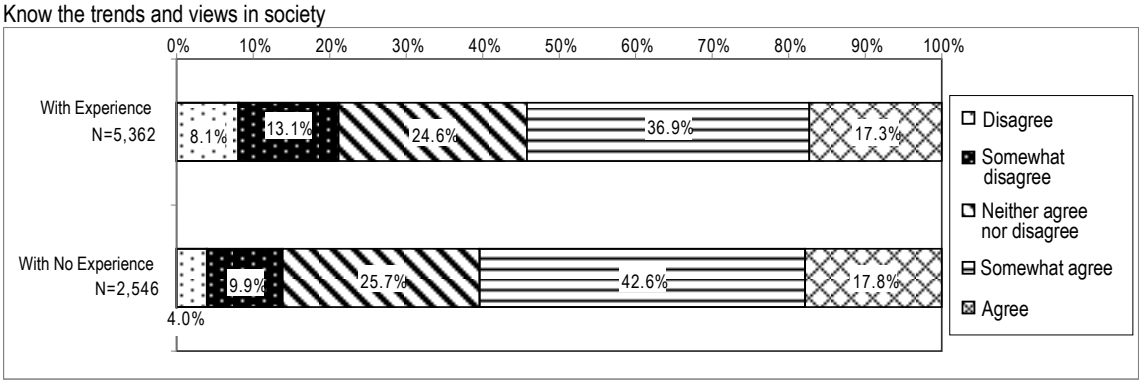


Get students and young scientists interested in my own research field

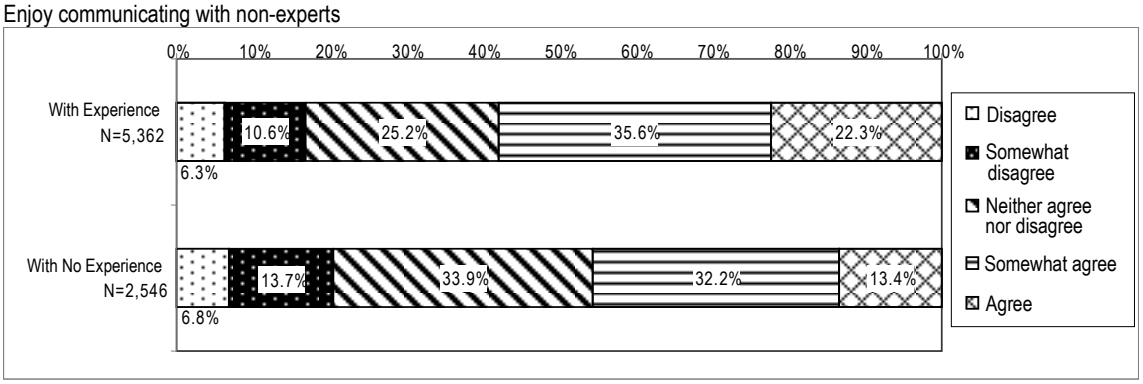


(Con't.)

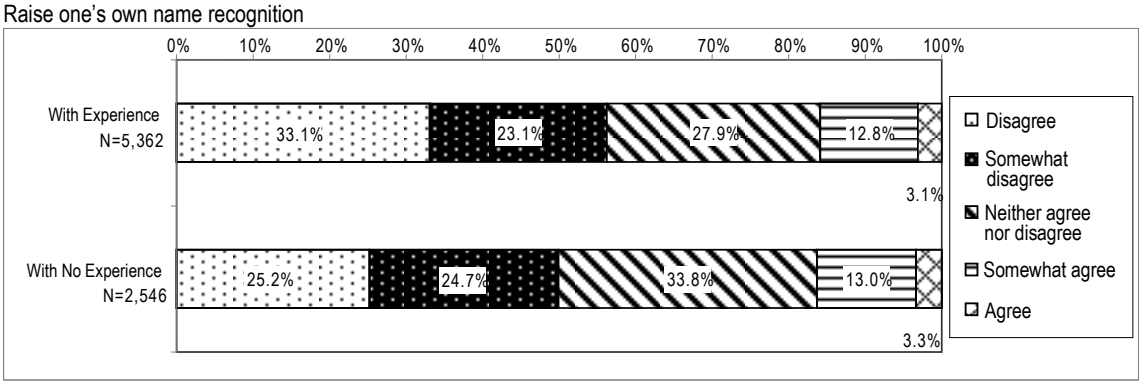
Know the trends and views in society



Enjoy communicating with non-experts



Raise one's own name recognition



The following table displays the achievements made by carrying out science communication activities of the With Experience group and the With No Experience group. For the With Experience group, we asked what they actually achieved by carrying out science communication activities, while for the With No Experience group, we asked what they would like to achieve by carrying out science communication activities.

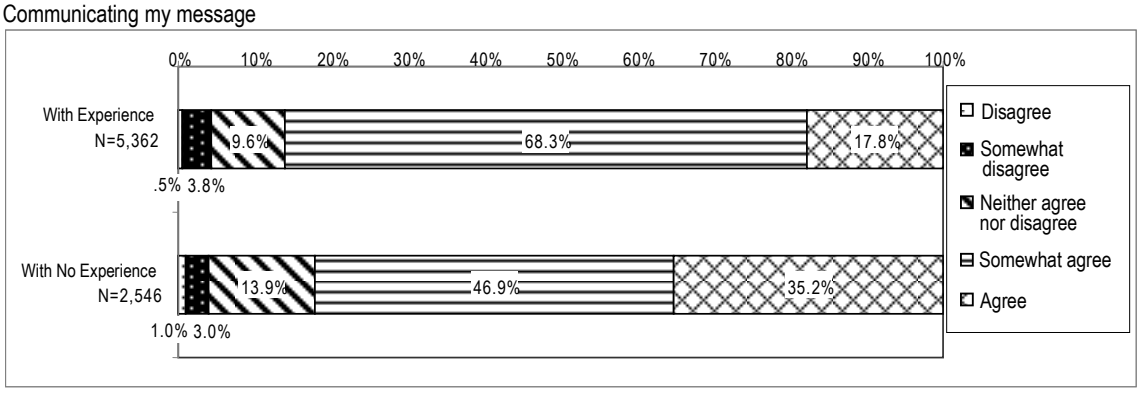
Table 4 Achievements of Science Communication Activities

Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Communicating my message	With Experience N=5,362	Frequency	28	204	515	3661	954
		Percent (%)	.5%	3.8%	9.6%	68.3%	17.8%
	With No Experience N=2,546	Frequency	25	76	354	1194	897
		Percent (%)	1.0%	3.0%	13.9%	46.9%	35.2%
Understanding what the other persons wanted to say	With Experience N=5,362	Frequency	64	306	1285	3093	614
		Percent (%)	1.2%	5.7%	24.0%	57.7%	11.5%
	With No Experience N=2,546	Frequency	23	80	495	1256	692
		Percent (%)	.9%	3.1%	19.4%	49.3%	27.2%
Sharing ideas and thoughts	With Experience N=5,362	Frequency	59	316	1366	2898	723
		Percent (%)	1.1%	5.9%	25.5%	54.0%	13.5%
	With No Experience N=2,546	Frequency	37	93	575	1130	711
		Percent (%)	1.5%	3.7%	22.6%	44.4%	27.9%
Acquiring new knowledge and realizations	With Experience N=5,362	Frequency	168	492	1084	2341	1277
		Percent (%)	3.1%	9.2%	20.2%	43.7%	23.8%
	With No Experience N=2,546	Frequency	26	62	315	1055	1088
		Percent (%)	1.0%	2.4%	12.4%	41.4%	42.7%
Contributing to solving social issues	With Experience N=5,362	Frequency	471	991	1990	1520	390
		Percent (%)	8.8%	18.5%	37.1%	28.3%	7.3%
	With No Experience N=2,546	Frequency	59	151	587	960	789
		Percent (%)	2.3%	5.9%	23.1%	37.7%	31.0%

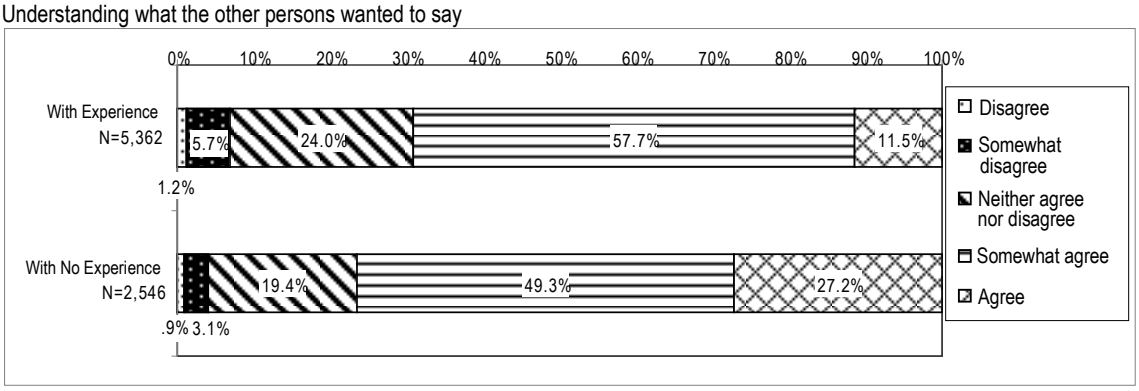
N = 7,908

Fig. 13 Achievements of Science Communication Activities

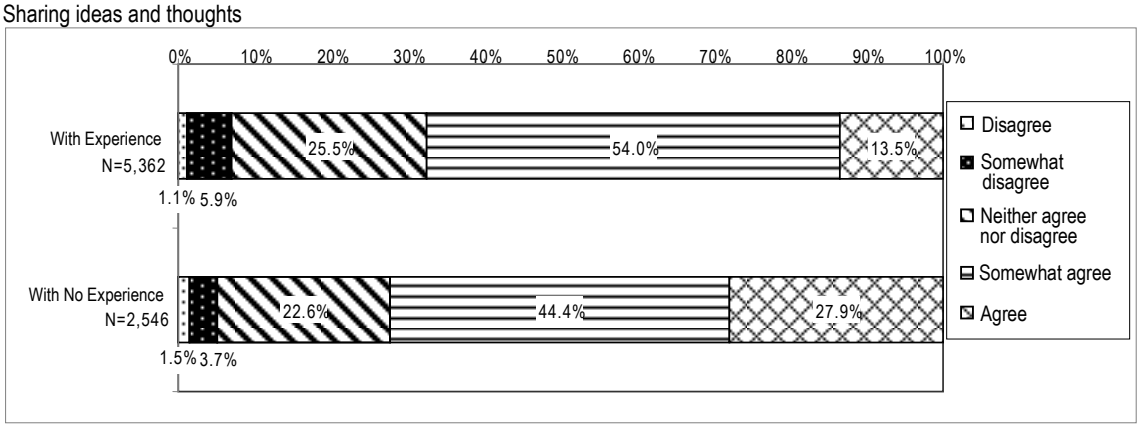
Communicating my message



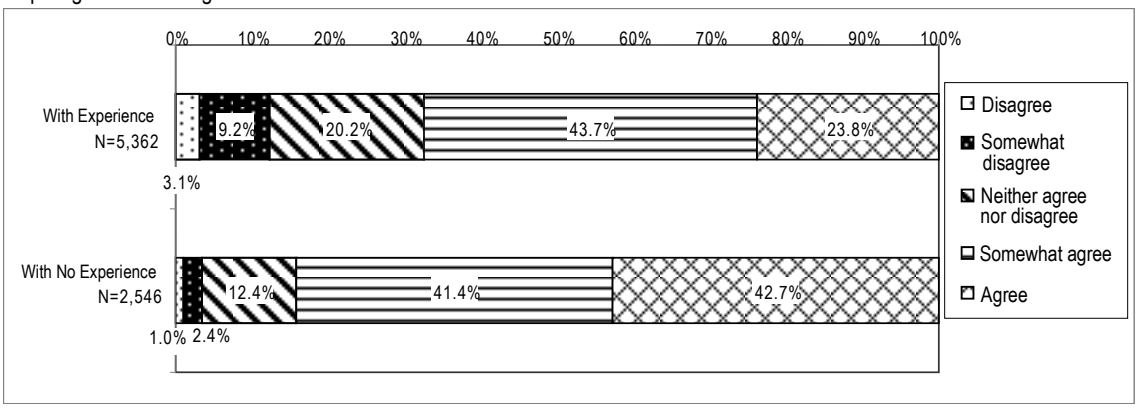
Understanding what the other persons wanted to say



Sharing ideas and thoughts

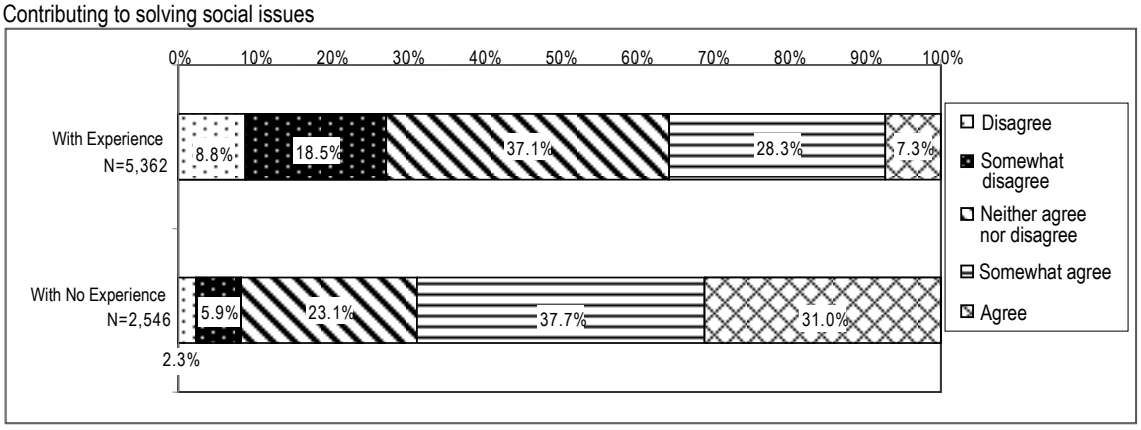


Acquiring new knowledge and realizations



(Con't.)

Contributing to solving social issues



2-2 Barriers in Carrying Out Science Communication Activities

The following table displays the items listed as barriers in carrying out science communication activities.

Table 5 Barriers in Carrying Out Science Communication Activities

Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Lack of time	With Experience N=5,362	Frequency	105	370	444	2105	2338
		Percent (%)	2.0%	6.9%	8.3%	39.3%	43.6%
	With No Experience N=2,546	Frequency	34	105	211	938	1258
		Percent (%)	1.3%	4.1%	8.3%	36.8%	49.4%
Too much paperwork	With Experience N=5,362	Frequency	114	474	778	2022	1974
		Percent (%)	2.1%	8.8%	14.5%	37.7%	36.8%
	With No Experience N=2,546	Frequency	27	68	267	927	1257
		Percent (%)	1.1%	2.7%	10.5%	36.4%	49.4%
Lack of understanding and cooperation from others	With Experience N=5,362	Frequency	513	1466	1728	1170	485
		Percent (%)	9.6%	27.3%	32.2%	21.8%	9.0%
	With No Experience N=2,546	Frequency	110	398	914	747	377
		Percent (%)	4.3%	15.6%	35.9%	29.3%	14.8%
No rewards	With Experience N=5,362	Frequency	353	1031	1234	1472	1272
		Percent (%)	6.6%	19.2%	23.0%	27.5%	23.7%
	With No Experience N=2,546	Frequency	129	397	762	727	531
		Percent (%)	5.1%	15.6%	29.9%	28.6%	20.9%
Funding restrictions	With Experience N=5,362	Frequency	374	910	1402	1575	1101
		Percent (%)	7.0%	17.0%	26.1%	29.4%	20.5%
	With No Experience N=2,546	Frequency	57	188	554	989	758
		Percent (%)	2.2%	7.4%	21.8%	38.8%	29.8%
Difficulty in easily explaining and communicating about one's work	With Experience N=5,362	Frequency	974	1592	940	1392	464
		Percent (%)	18.2%	29.7%	17.5%	26.0%	8.7%
	With No Experience N=2,546	Frequency	294	619	612	746	275
		Percent (%)	11.5%	24.3%	24.0%	29.3%	10.8%
Difficulty in creating a platform that would allow outreach activities	With Experience N=5,362	Frequency	454	1164	1480	1763	501
		Percent (%)	8.5%	21.7%	27.6%	32.9%	9.3%
	With No Experience N=2,546	Frequency	85	255	577	1112	517
		Percent (%)	3.3%	10.0%	22.7%	43.7%	20.3%
Public indifference	With Experience N=5,362	Frequency	732	1494	1770	1085	281
		Percent (%)	13.7%	27.9%	33.0%	20.2%	5.2%
	With No Experience N=2,546	Frequency	140	384	951	767	304
		Percent (%)	5.5%	15.1%	37.4%	30.1%	11.9%

(Con't.)

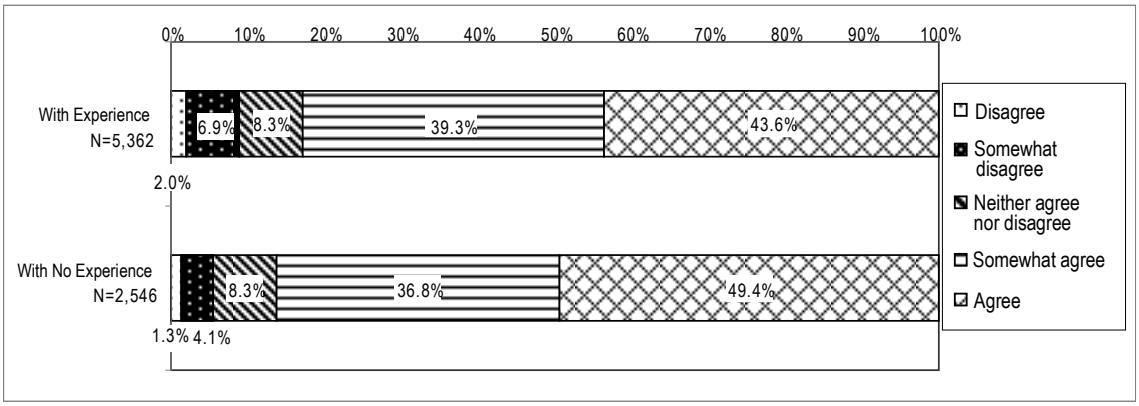
Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Lack of knowledge of the public	With Experience N=5,362	Frequency	965	1694	1710	784	209
		Percent (%)	18.0%	31.6%	31.9%	14.6%	3.9%
	With No Experience N=2,546	Frequency	249	558	1008	548	183
		Percent (%)	9.8%	21.9%	39.6%	21.5%	7.2%
Different views and values with the public	With Experience N=5,362	Frequency	841	1540	1792	953	236
		Percent (%)	15.7%	28.7%	33.4%	17.8%	4.4%
	With No Experience N=2,546	Frequency	209	525	985	634	193
		Percent (%)	8.2%	20.6%	38.7%	24.9%	7.6%
Gap between oneself and the professional image required by the public	With Experience N=5,362	Frequency	774	1461	1676	1154	297
		Percent (%)	14.4%	27.2%	31.3%	21.5%	5.5%
	With No Experience N=2,546	Frequency	198	443	909	750	246
		Percent (%)	7.8%	17.4%	35.7%	29.5%	9.7%
Nothing to gain	With Experience N=5,362	Frequency	2204	1820	1015	260	63
		Percent (%)	41.1%	33.9%	18.9%	4.8%	1.2%
	With No Experience N=2,546	Frequency	641	795	819	219	72
		Percent (%)	25.2%	31.2%	32.2%	8.6%	2.8%
No interest in science communication activities	With Experience N=5,362	Frequency	2619	1595	906	189	53
		Percent (%)	48.8%	29.7%	16.9%	3.5%	1.0%
	With No Experience N=2,546	Frequency	573	731	902	257	83
		Percent (%)	22.5%	28.7%	35.4%	10.1%	3.3%
Accountability adequately fulfilled by the thesis publication table	With Experience N=5,362	Frequency	2085	1621	1135	380	141
		Percent (%)	38.9%	30.2%	21.2%	7.1%	2.6%
	With No Experience N=2,546	Frequency	439	699	774	486	148
		Percent (%)	17.2%	27.5%	30.4%	19.1%	5.8%

N = 7,908

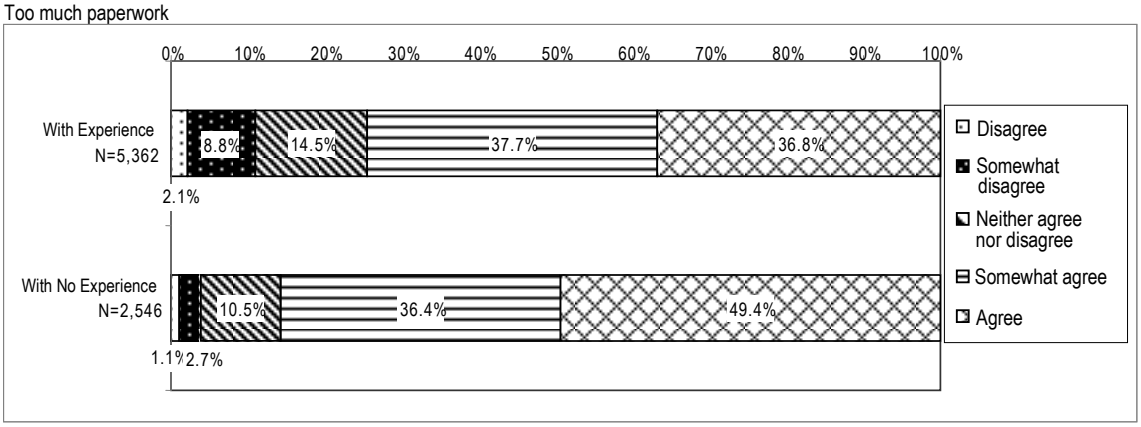
Fig. 14 Barriers in Carrying Out Science Communication Activities

(By Experience in Science Communication Activities)

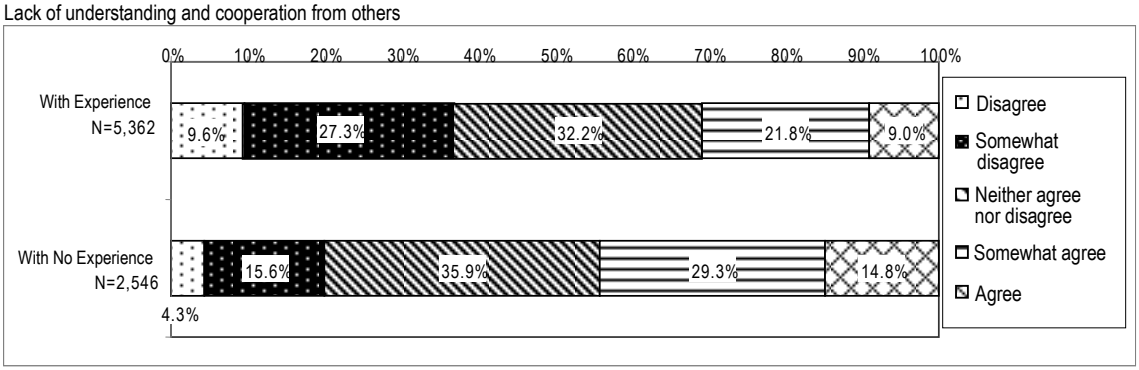
Lack of time



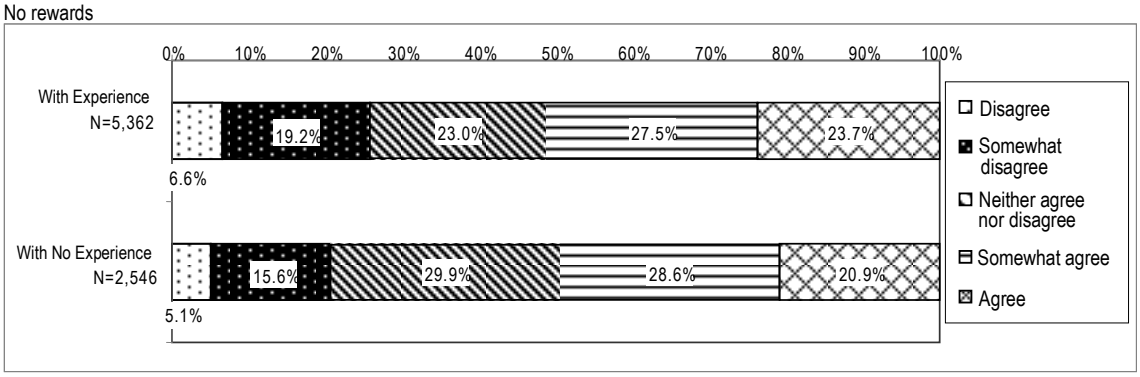
Too much paperwork



Lack of understanding and cooperation from others

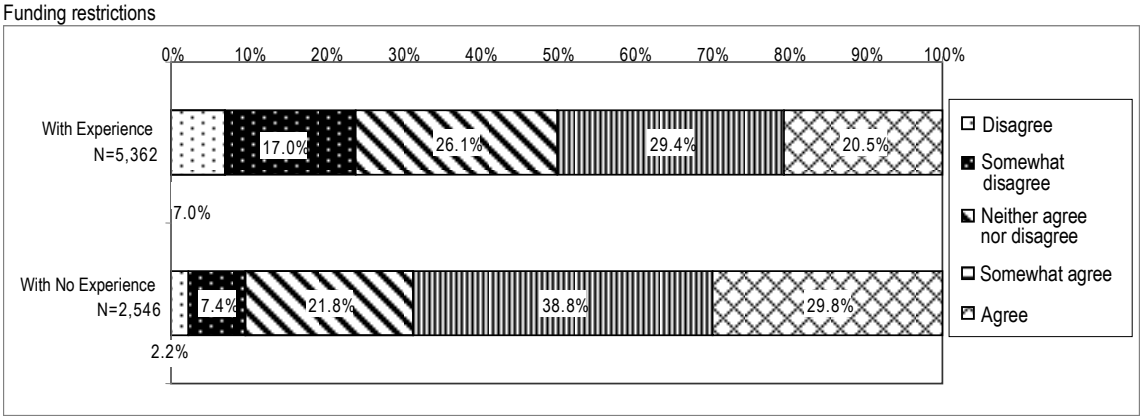


No rewards

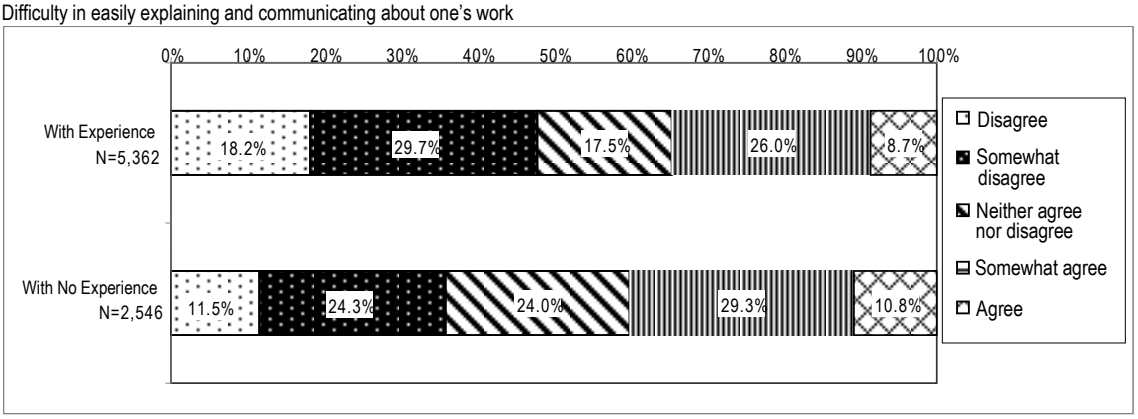


(Con't.)

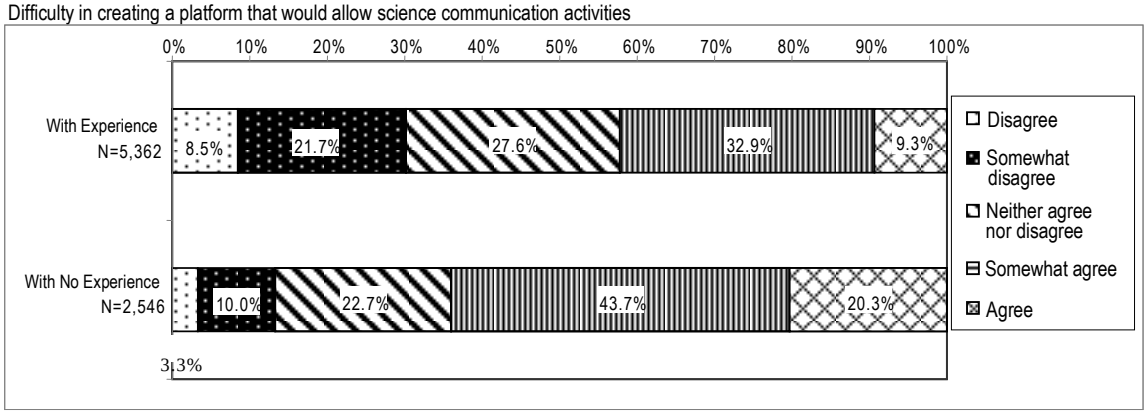
Funding restrictions



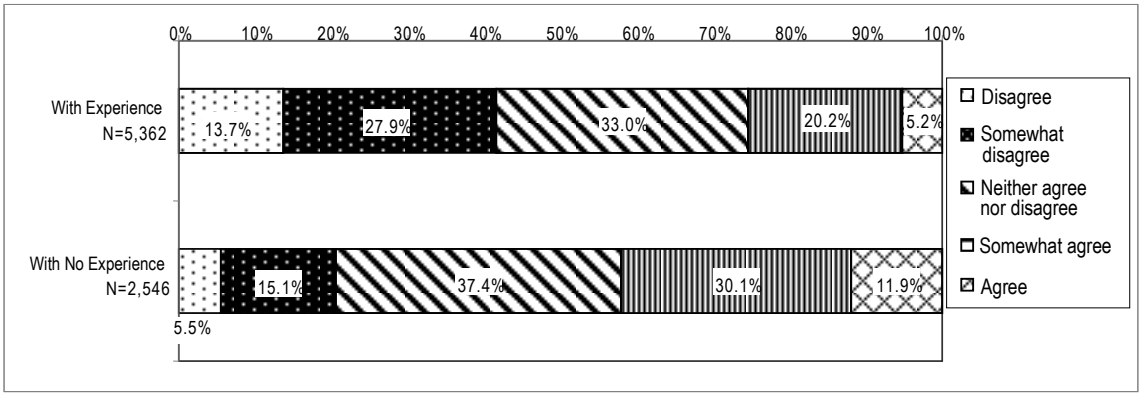
Difficulty in easily explaining and communicating about one's work



Difficulty in creating a platform that would allow science communication activities

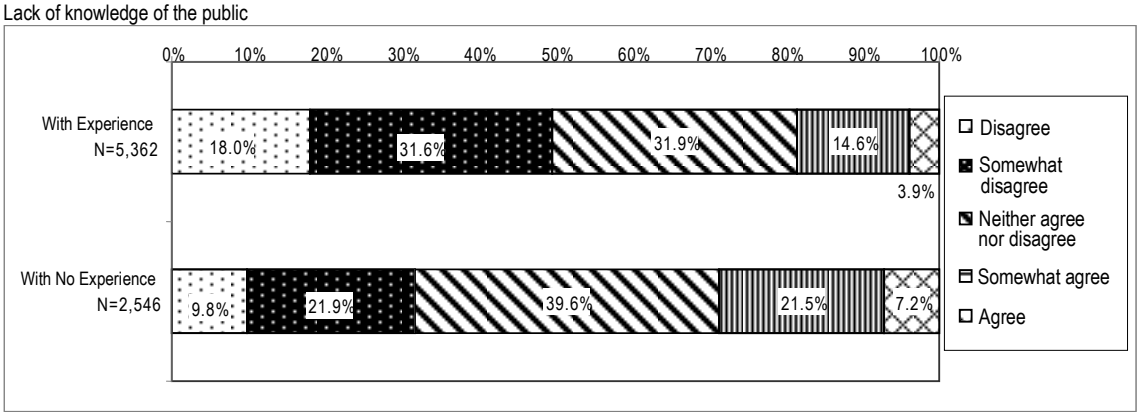


Public indifference

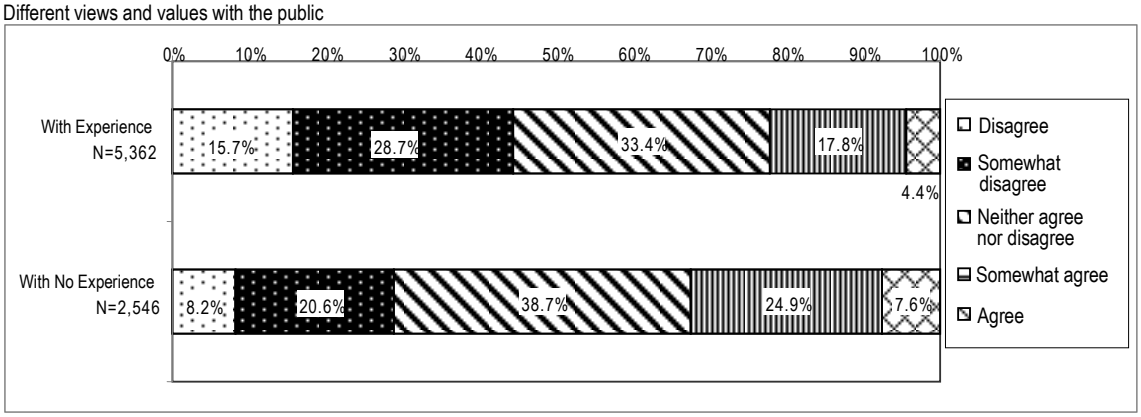


(Con't.)

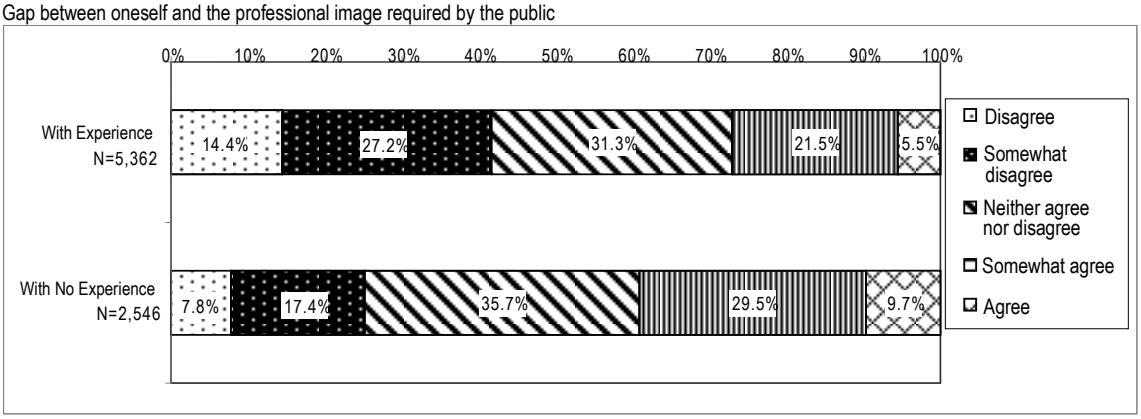
Lack of knowledge of the public



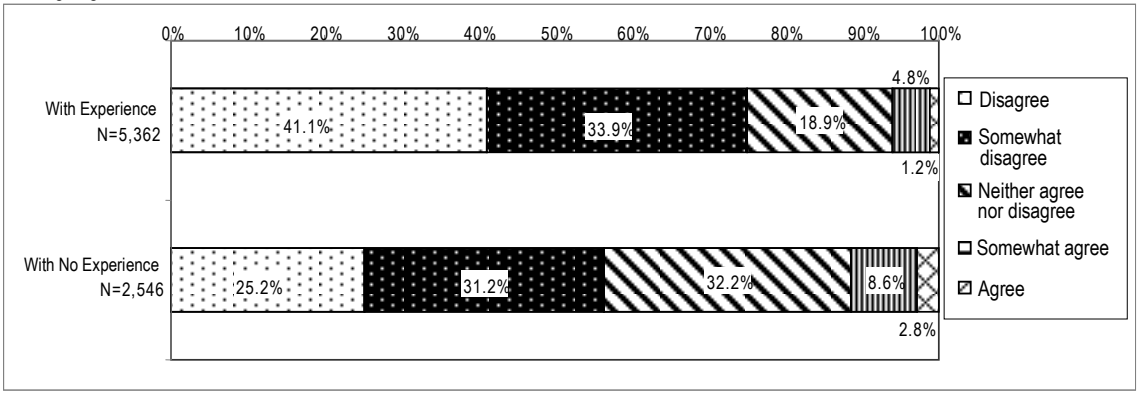
Different views and values with the public



Gap between oneself and the professional image required by the public

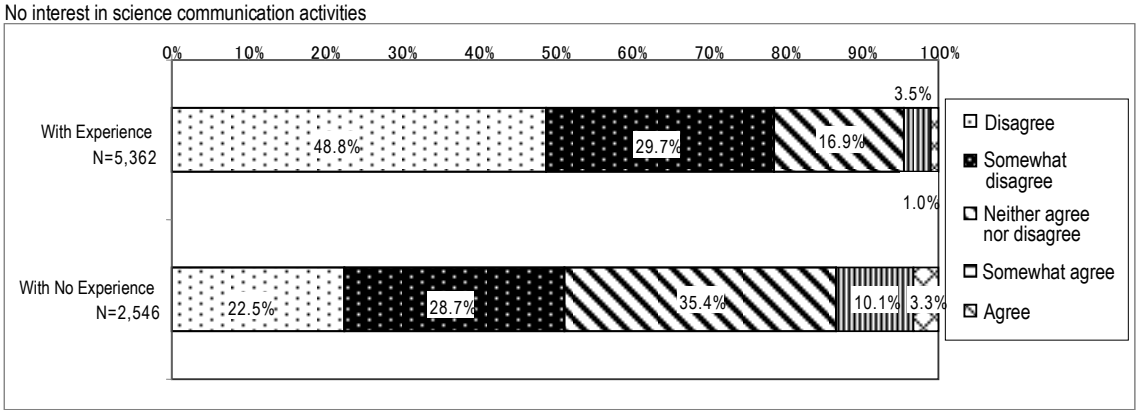


Nothing to gain



(Con't.)

No interest in science communication activities



Accountability adequately fulfilled by the thesis publication table

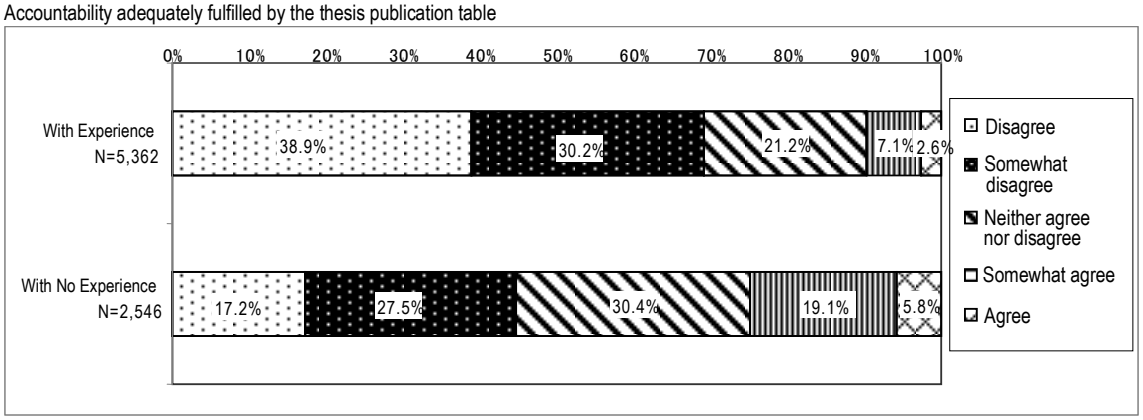
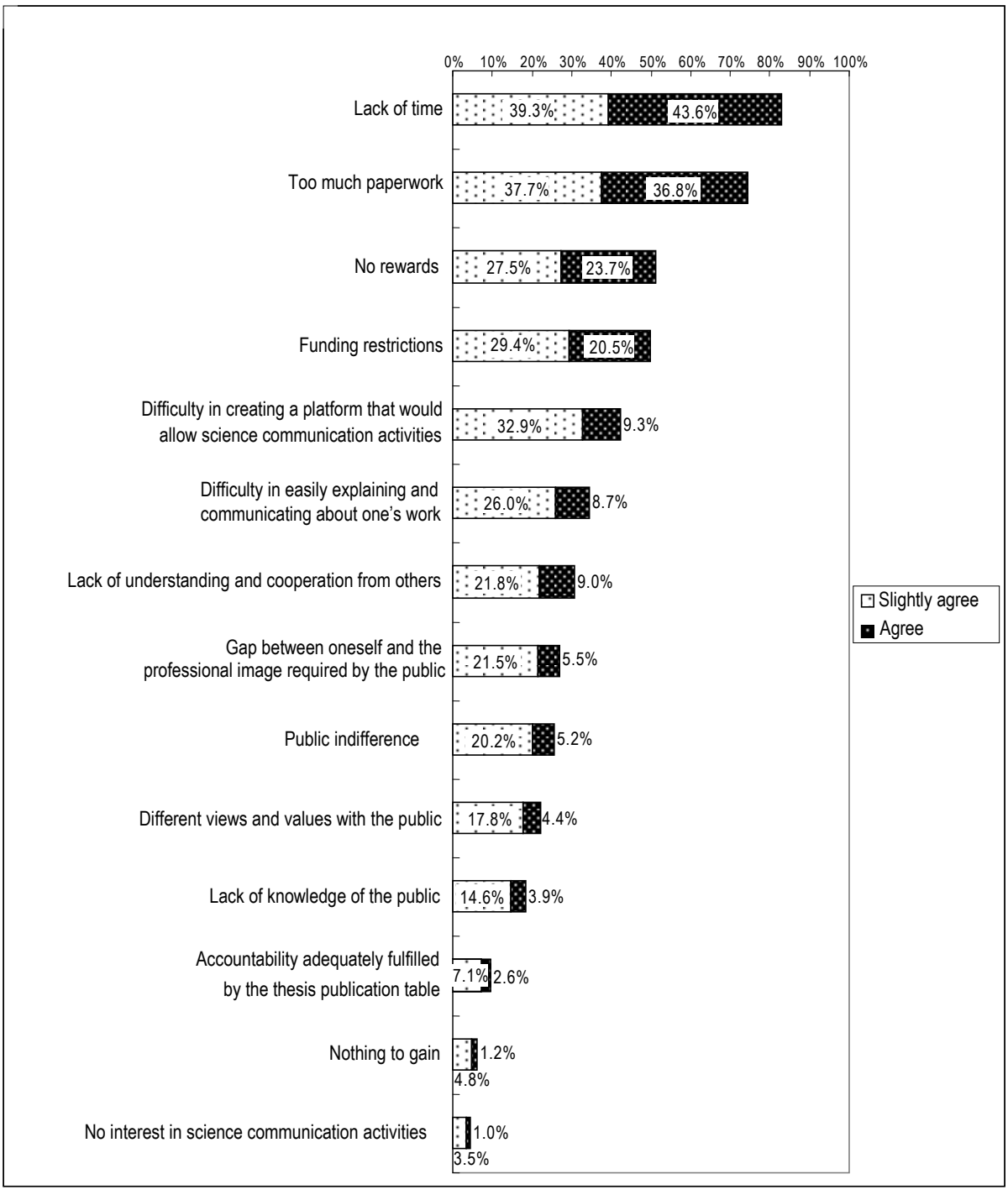
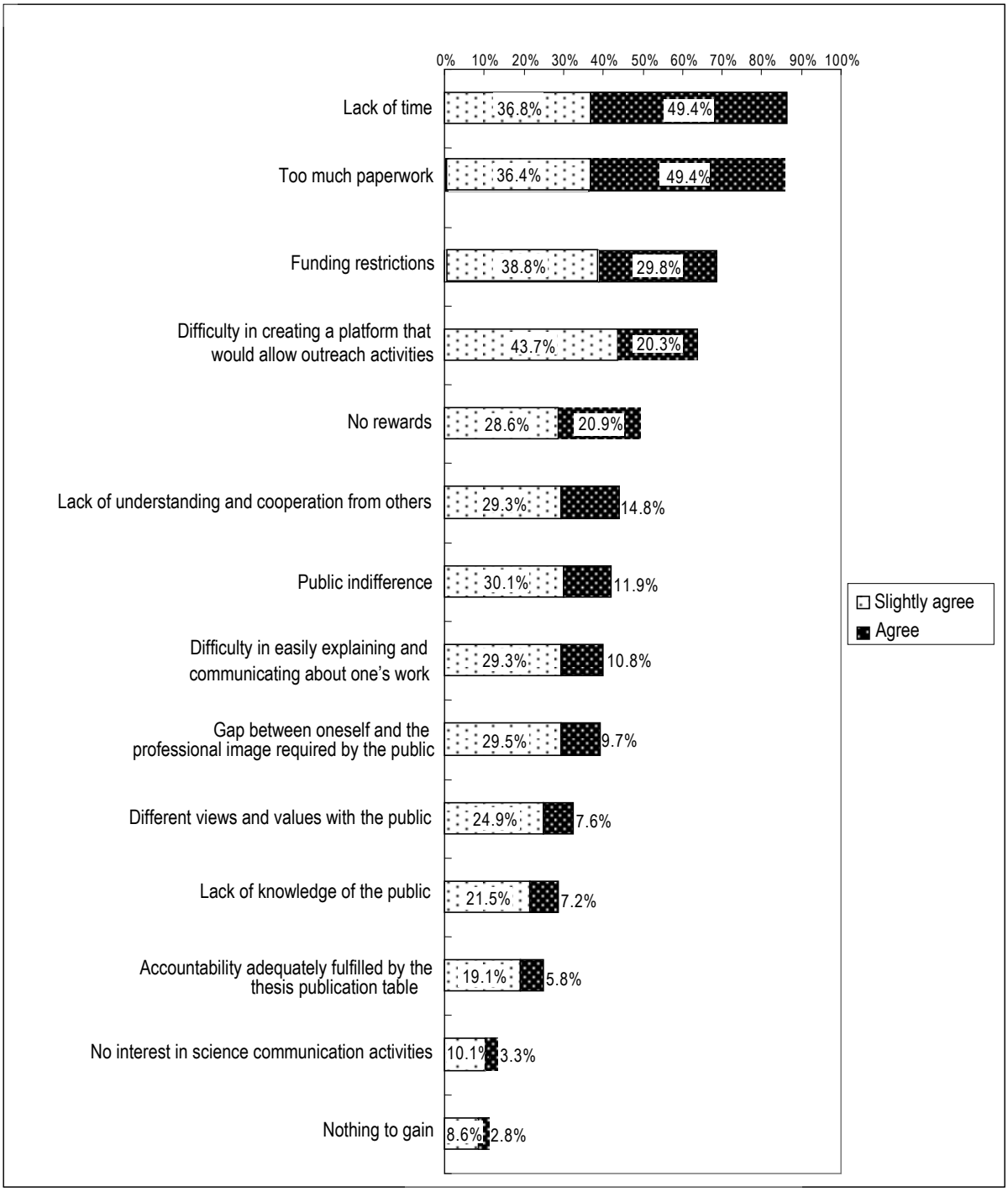


Fig. 15 Barriers in Carrying Out Science Communication Activities of the With Experience Group (Slightly agree, Agree)



N = 5,362

Fig. 16 Barriers in Carrying Out Science Communication Activities of the With Experience Group (Slightly agree, Agree)



N = 2,546

2-3 Support for Promoting Science Communication Activities

The following table displays the items listed as support for promoting science communication activities.

Table 6 Support for Promoting Science Communication Activities

(By Experience in Science Communication Activities)

Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Human support system	With Experience N=5,362	Frequency	61	253	537	2416	2095
		Percent (%)	1.1%	4.7%	10.0%	45.1%	39.1%
	With No Experience N=2,546	Frequency	26	60	240	1102	1118
		Percent (%)	1.0%	2.4%	9.4%	43.3%	43.9%
Incentive rewards from academic societies and organizations, etc.	With Experience N=5,362	Frequency	506	962	1523	1609	762
		Percent (%)	9.4%	17.9%	28.4%	30.0%	14.2%
	With No Experience N=2,546	Frequency	147	355	805	807	432
		Percent (%)	5.8%	13.9%	31.6%	31.7%	17.0%
Evaluation of results as per for a thesis	With Experience N=5,362	Frequency	368	716	1106	1933	1239
		Percent (%)	6.9%	13.4%	20.6%	36.0%	23.1%
	With No Experience N=2,546	Frequency	108	251	561	990	636
		Percent (%)	4.2%	9.9%	22.0%	38.9%	25.0%
Direct evaluation from the visitors	With Experience N=5,362	Frequency	166	488	1420	2318	970
		Percent (%)	3.1%	9.1%	26.5%	43.2%	18.1%
	With No Experience N=2,546	Frequency	82	218	838	1066	342
		Percent (%)	3.2%	8.6%	32.9%	41.9%	13.4%
Monetary remuneration of rewards, payment for writing and appearances	With Experience N=5,362	Frequency	455	961	1563	1679	704
		Percent (%)	8.5%	17.9%	29.1%	31.3%	13.1%
	With No Experience N=2,546	Frequency	133	371	848	810	384
		Percent (%)	5.2%	14.6%	33.3%	31.8%	15.1%
Subsidies for necessary expenses	With Experience N=5,362	Frequency	103	247	555	2605	1852
		Percent (%)	1.9%	4.6%	10.4%	48.6%	34.5%
	With No Experience N=2,546	Frequency	25	79	258	1262	922
		Percent (%)	1.0%	3.1%	10.1%	49.6%	36.2%

(Con't.)

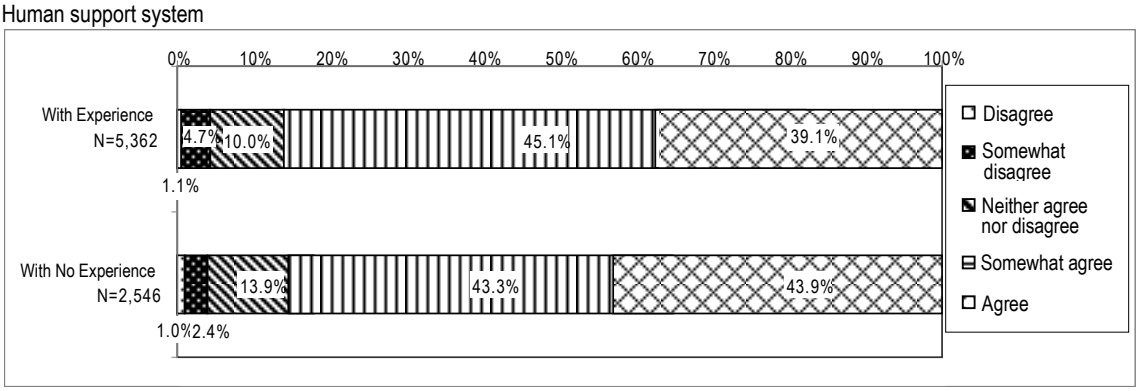
Items	Experience in science communication activities		Disagree	Somewha disagree	Neither agree nor disagree	Somewhat agree	Agree
Database, books and manuals etc., with examples of activities	With Experience N=5,362	Frequency	320	637	1502	2124	779
		Percent (%)	6.0%	11.9%	28.0%	39.6%	14.5%
	With No Experience N=2,546	Frequency	71	197	636	1166	476
		Percent (%)	2.8%	7.7%	25.0%	45.8%	18.7%
Skills training, lectures and courses useful for carrying out activities	With Experience N=5,362	Frequency	487	875	1594	1734	672
		Percent (%)	9.1%	16.3%	29.7%	32.3%	12.5%
	With No Experience N=2,546	Frequency	117	287	713	1014	415
		Percent (%)	4.6%	11.3%	28.0%	39.8%	16.3%
Providing places and opportunities for practice	With Experience N=2,546	Frequency	202	395	1136	2433	1196
		Percent (%)	3.8%	7.4%	21.2%	45.4%	22.3%
	With No Experience N=5,362	Frequency	33	93	441	1278	701
		Percent (%)	1.3%	3.7%	17.3%	50.2%	27.5%
Present findings and know-how from activities and share the information at events and study	With Experience N=5,362	Frequency	340	707	1562	2029	724
		Percent (%)	6.3%	13.2%	29.1%	37.8%	13.5%
	With No Experience N=2,546	Frequency	70	192	643	1159	482
		Percent (%)	2.7%	7.5%	25.3%	45.5%	18.9%

N = 7,908

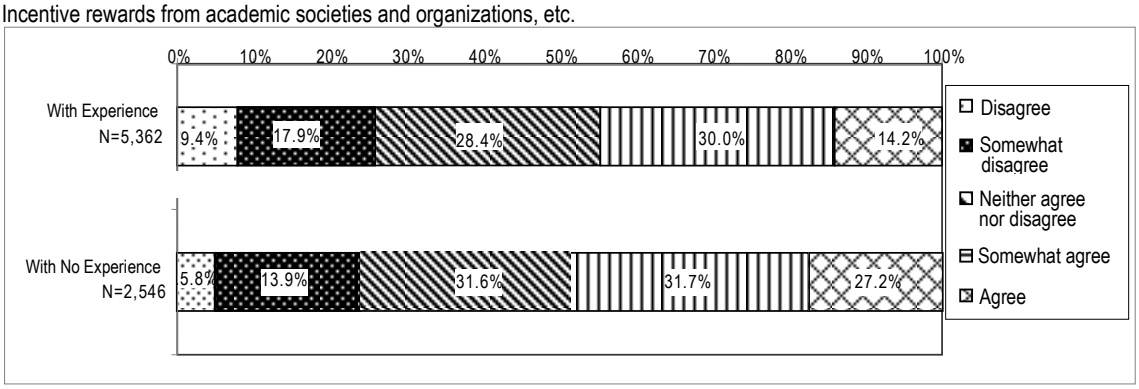
Fig. 17 Support for Promoting Science Communication Activities

(By Experience in Science Communication Activities)

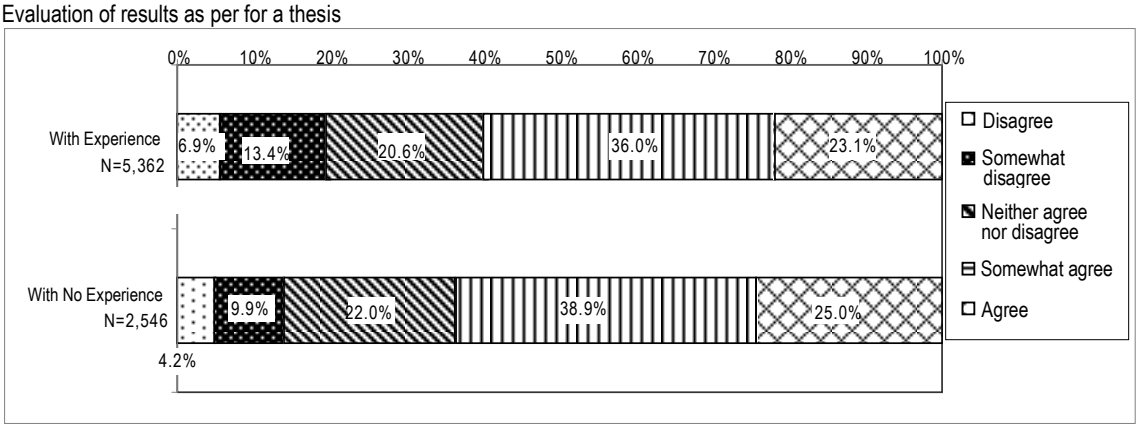
Human support system



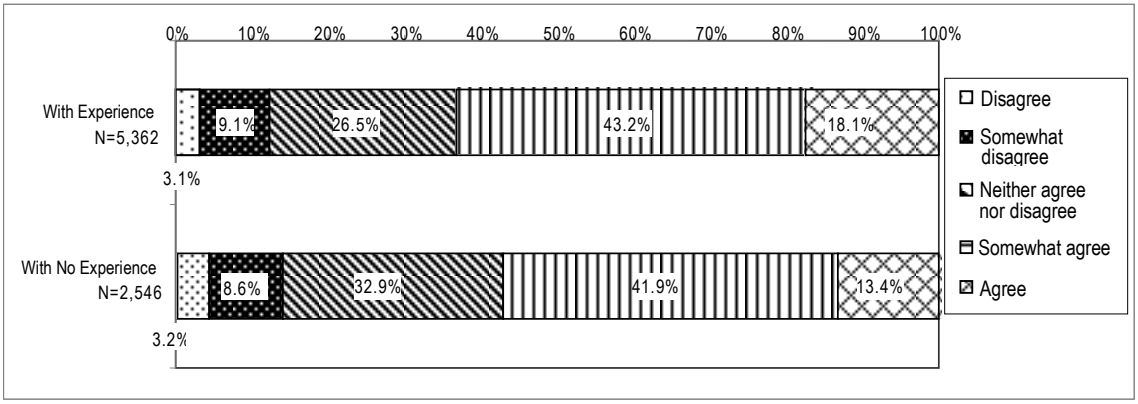
Incentive rewards from academic societies and organizations, etc.



Evaluation of results as per for a thesis

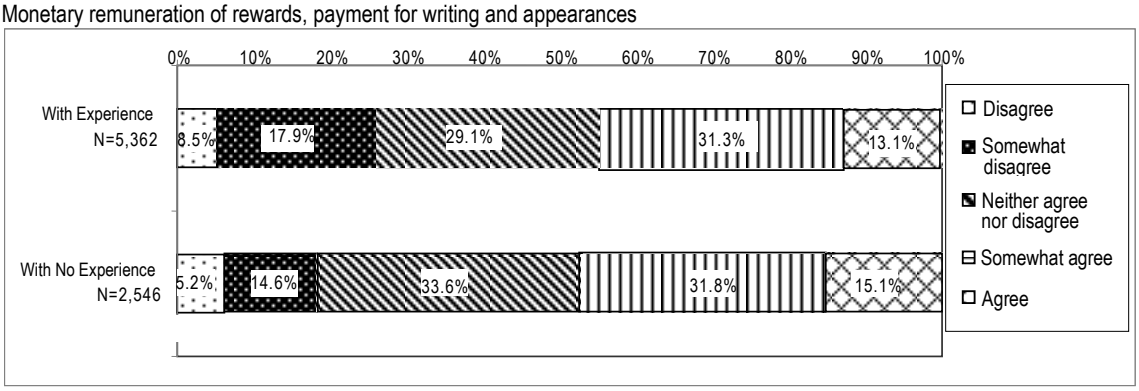


Direct evaluation from the visitors

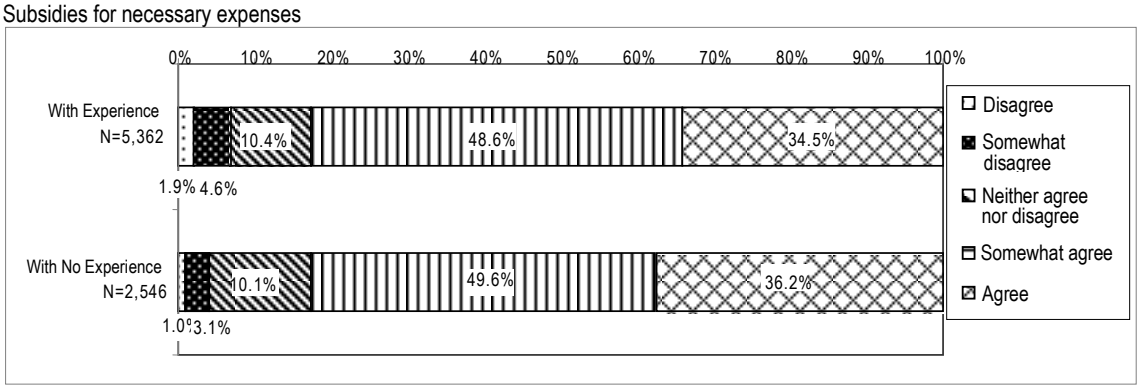


(Con't.)

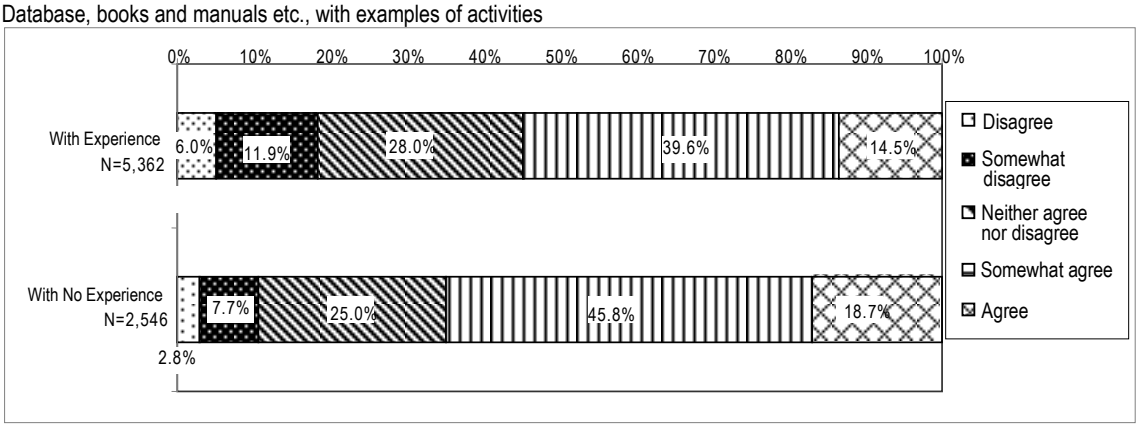
Monetary remuneration of rewards, payment for writing and appearances



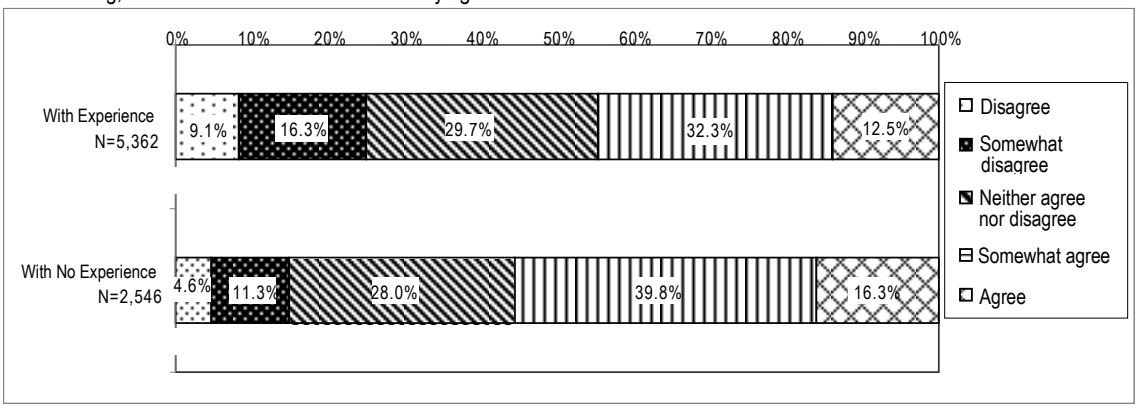
Subsidies for necessary expenses



Database, books and manuals etc., with examples of activities

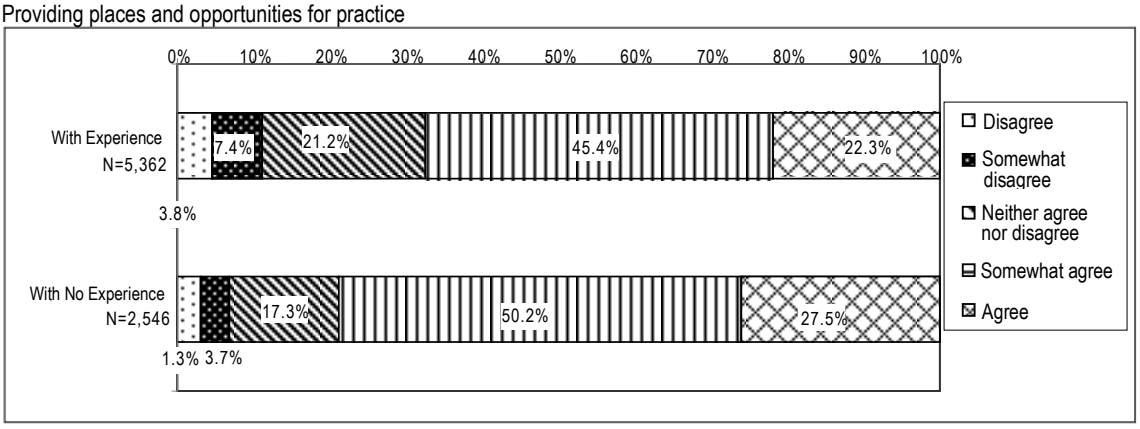


Skills training, lectures and courses useful for carrying out activities

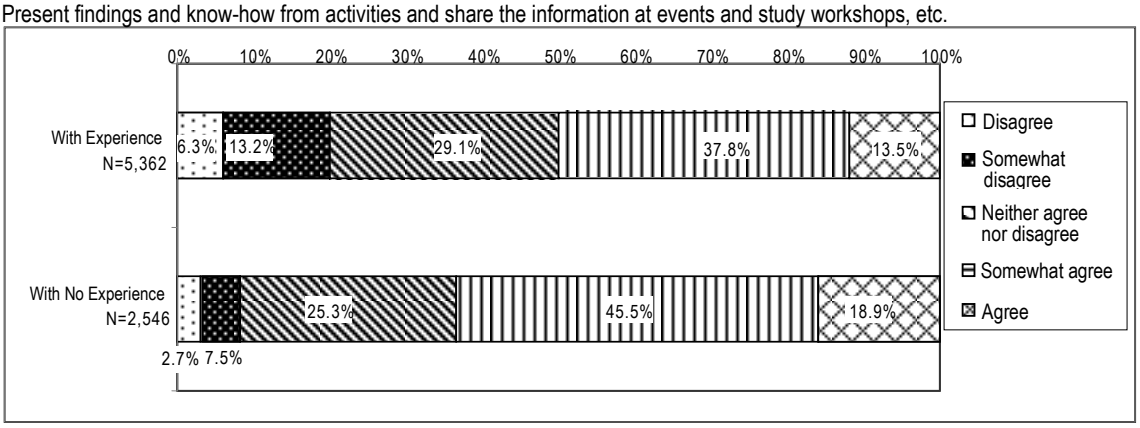


(Con't.)

Providing places and opportunities for practice

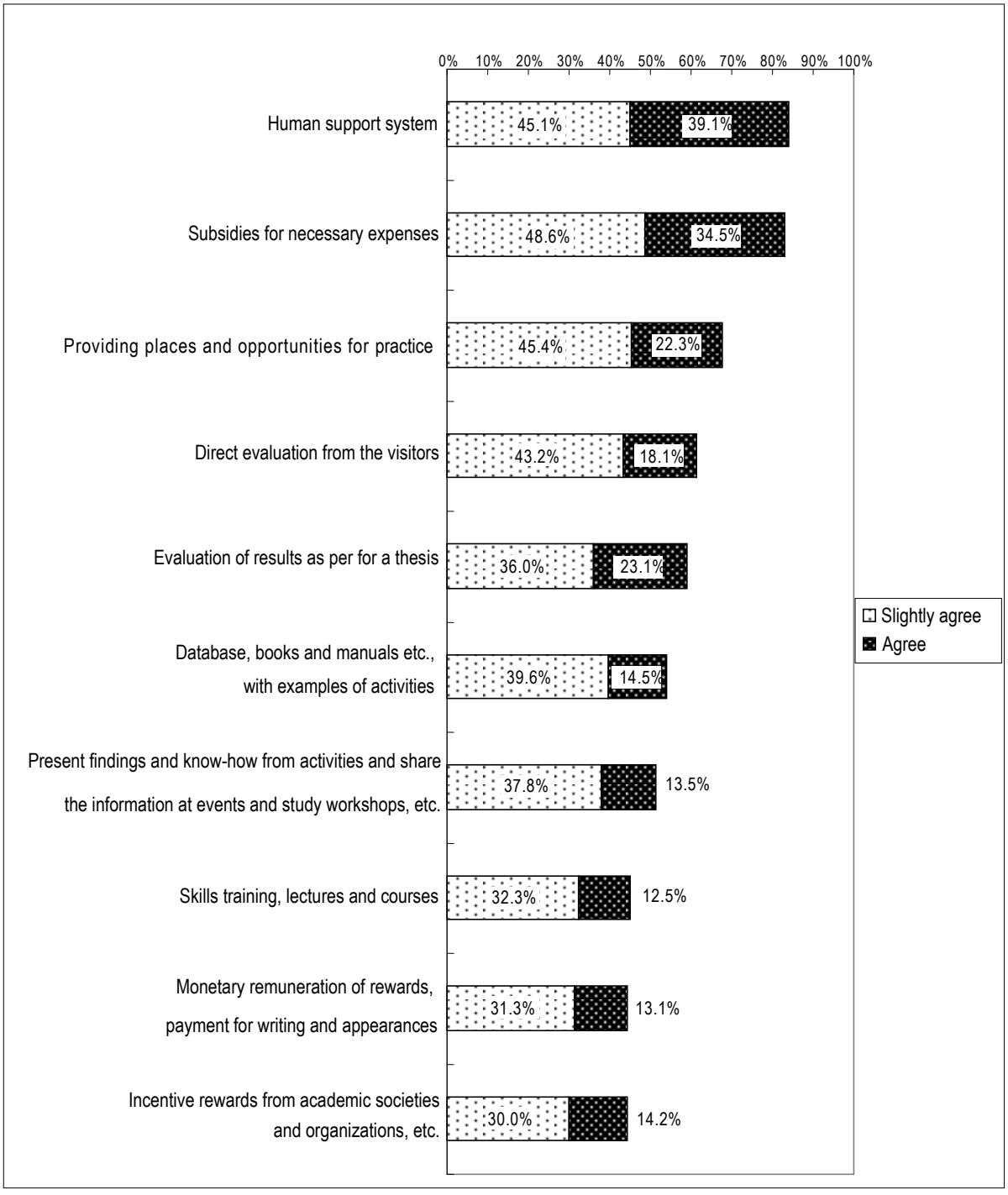


Present findings and know-how from activities and share the information at events and study workshops, etc.



The following graph displays the items listed by the With Experience group as required support for promoting science communication activities, in order from the highest response rate to the lowest.

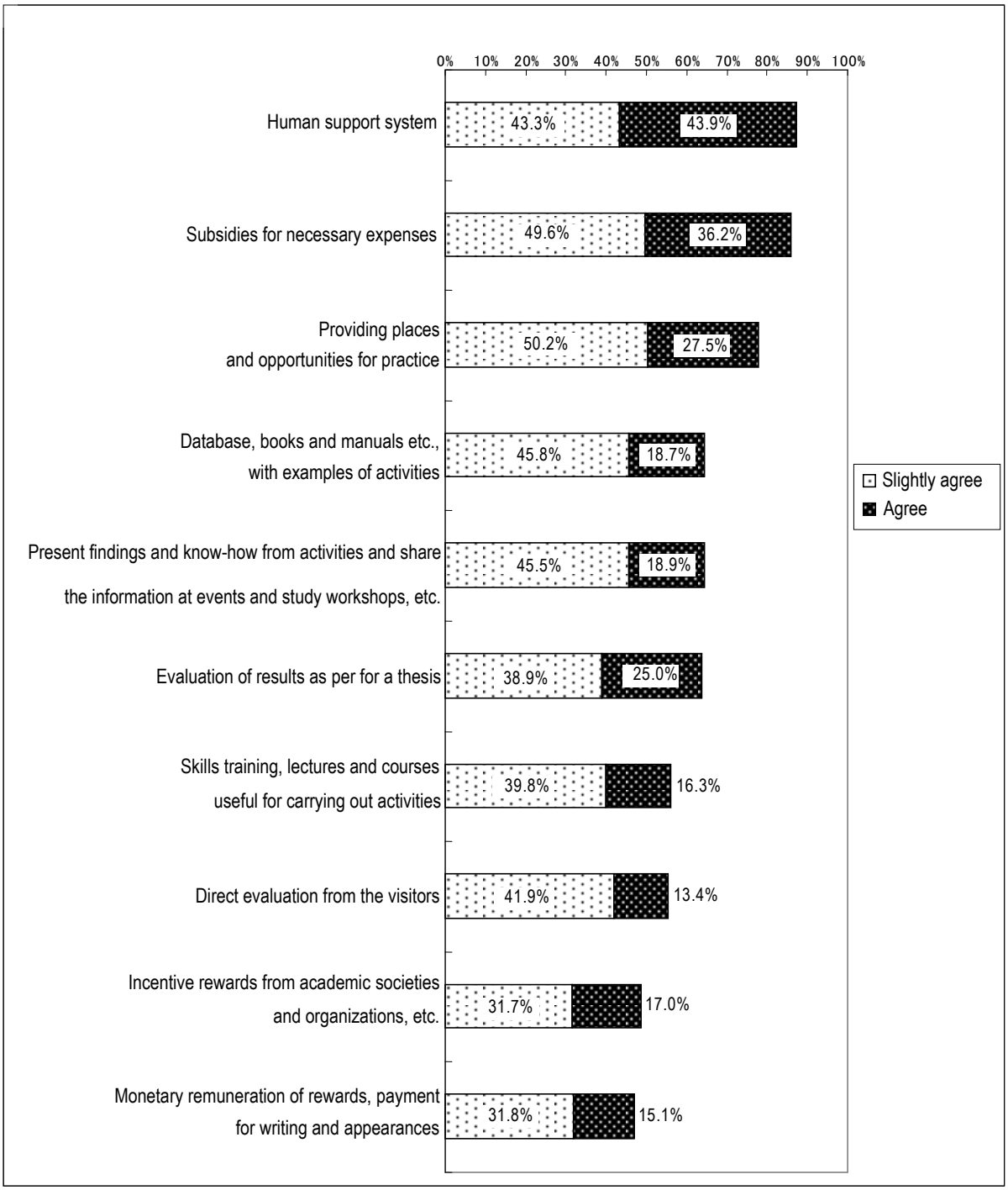
Fig. 18 Support for Promoting Science Communication Activities Required by the With Experience Group



N = 5,362

The following graph displays the items listed by the With No Experience group as required support for promoting science communication activities, in order from the highest response rate to the lowest.

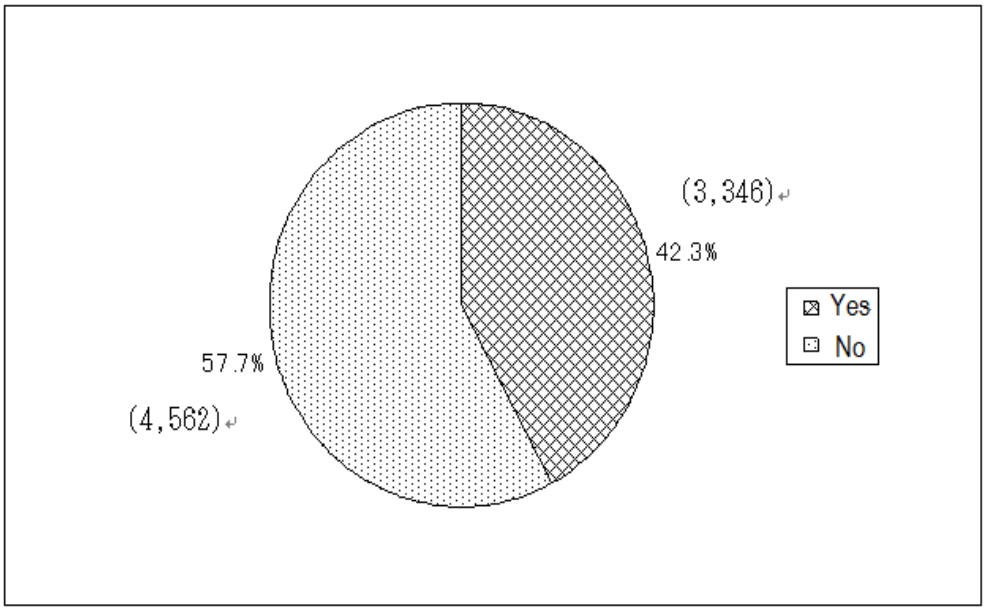
Fig. 19 Support for Promoting Science Communication Activities Required by the With No Experience Group



N = 2,546

The following graph shows the percentage of respondents that have or don't have a support system for science communication activities (specific departments and staff) in their affiliated organization.

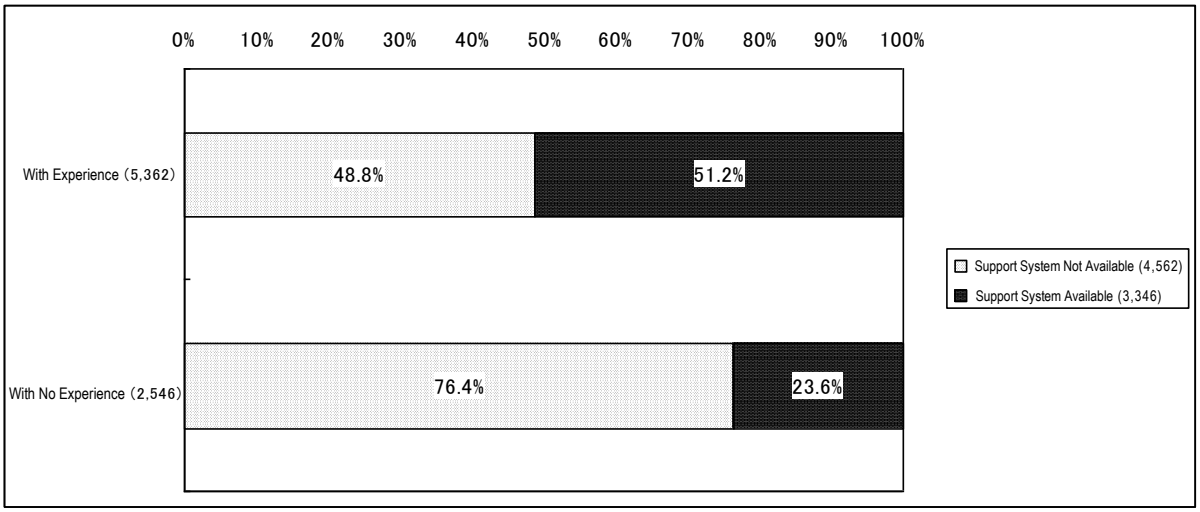
Fig. 20 Existence of Support System for Science Communication Activities



( ): Frequency

N = 7,908

Fig. 21 Cross Tabulation of Existence of Science Communication Activities and Existence of Support System for Science Communication Activities



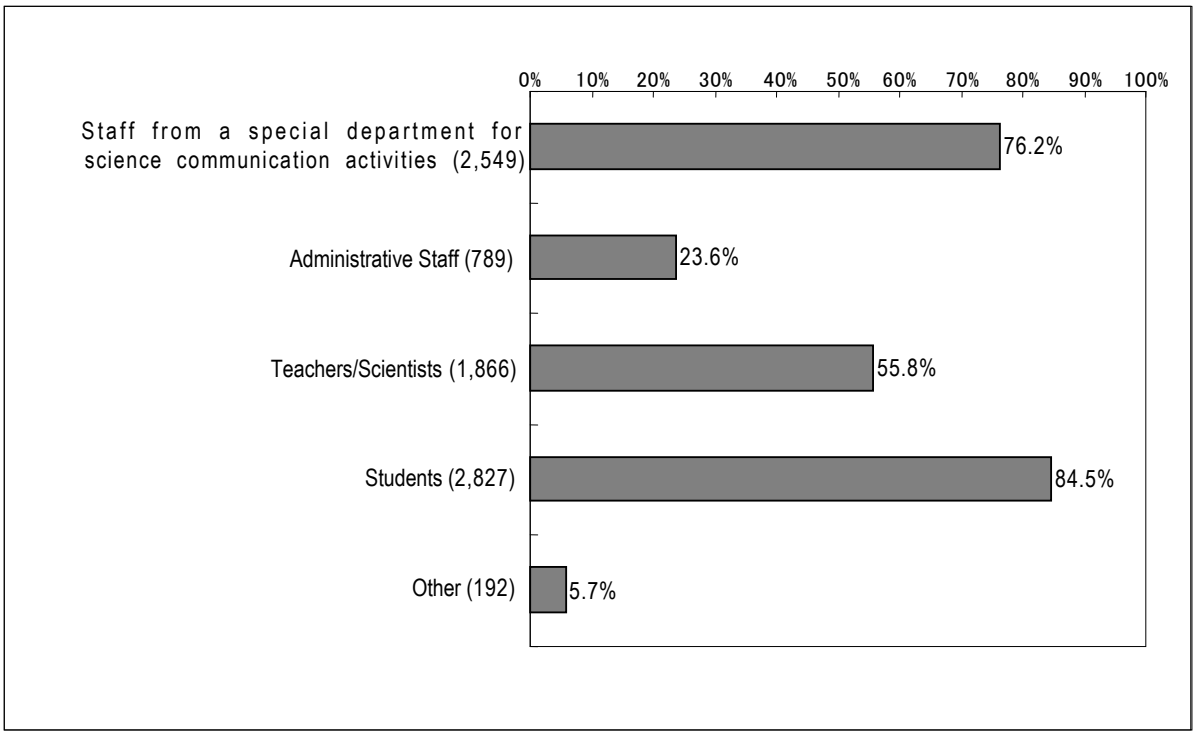
( ): Frequency

N = 7,908

The following graph shows the specific departments and staff for respondents that have a support system for science communication activities in their affiliated organization. (Multiple Responses)

Fig. 22 Specific Departments and Staff

(Support System for Science Communication Activities is Available)



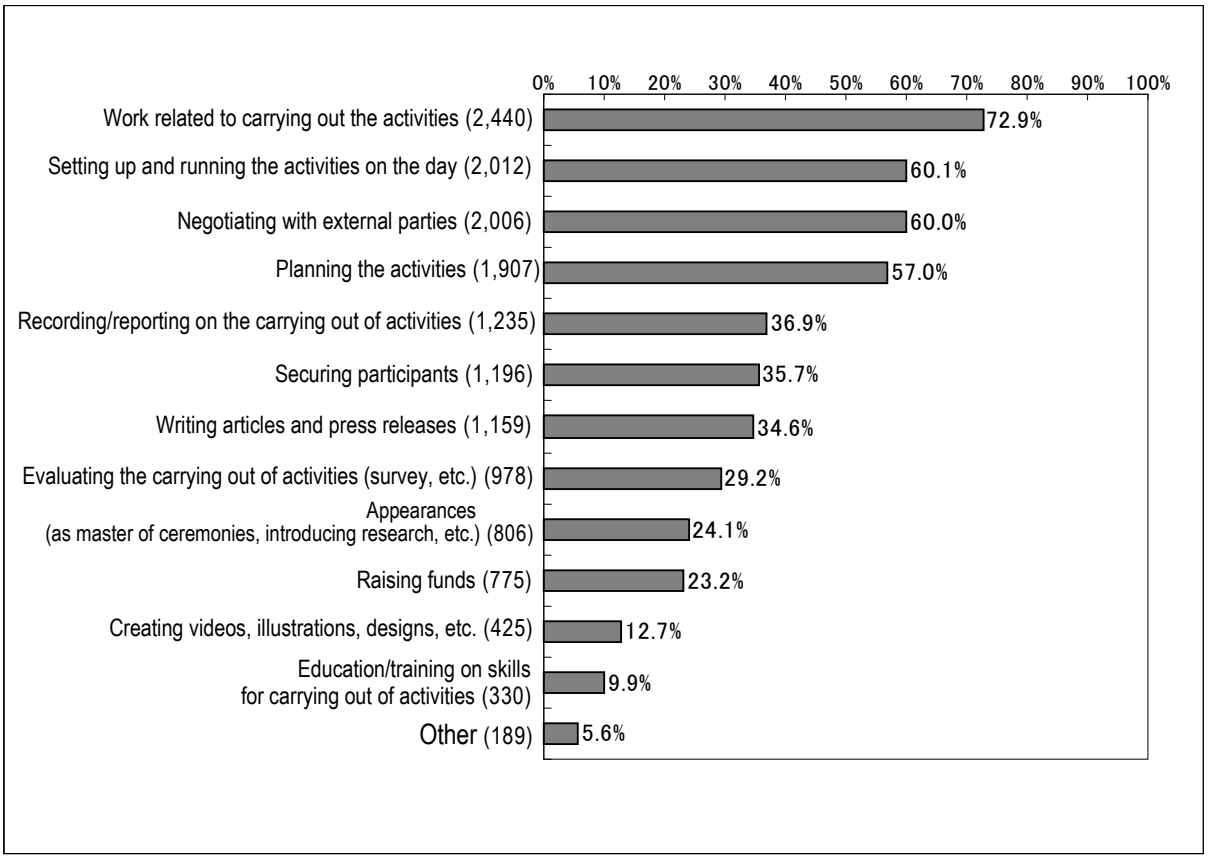
( ): Frequency

N = 3,346

The following graph shows the items listed as specific work carried out as a support system for science communication activities. (Multiple Responses)

Fig. 23 Specific Work of Support System for Science Communication Activities

(Support System for Science Communication Activities is Available)



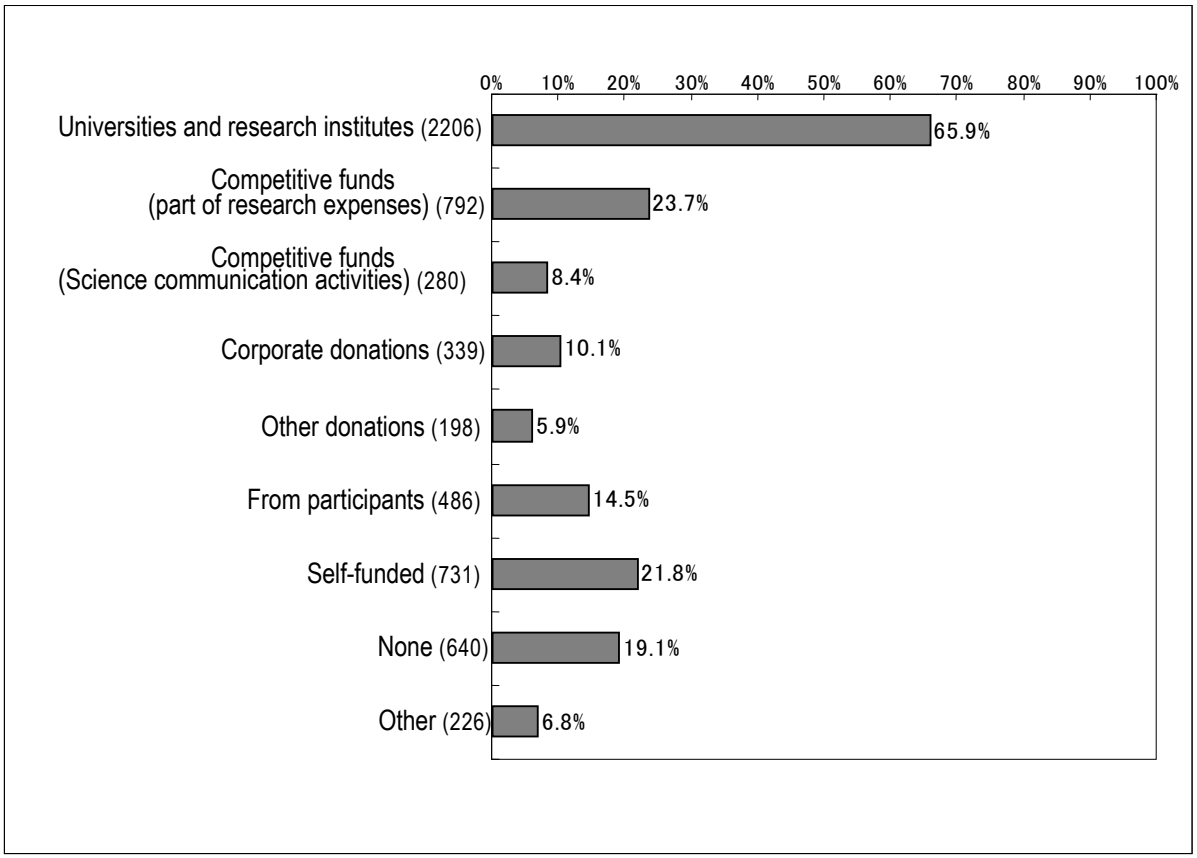
( ): Frequency

N = 3,346

The following graph shows the funding sources for activities when there is a support system for science communication activities available. (Multiple Responses)

Fig. 24 Funding Sources of Activities

(Support System for Science Communication Activities is Available)



( ): Frequency

N = 3,346

The following table shows the preferred training for science communication activities.

Table 7 Preferred Training (By Experience in Science Communication Activities)

Items	Experience in science communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	No Response
Special classes at elementary, junior and senior high schools	With Experience N=5,362	Frequency	836	1029	1272	1473	705	47
		Percent (%)	15.6%	19.2%	23.7%	27.5%	13.1%	.9%
	With No Experience N=2,546	Frequency	228	403	552	907	448	8
		Percent (%)	9.0%	15.8%	21.7%	35.6%	17.6%	.3%
Research guidance for Elementary, junior and senior high school students	With Experience N=5,362	Frequency	870	1103	1379	1338	610	62
		Percent (%)	16.2%	20.6%	25.7%	25.0%	11.4%	1.2%
	With No Experience N=2,546	Frequency	234	439	628	843	384	18
		Percent (%)	9.2%	17.2%	24.7%	33.1%	15.1%	.7%
Open lectures, lecturer presentations, symposiums and seminars for the general public	With Experience N=5,362	Frequency	721	743	1177	1829	846	46
		Percent (%)	13.4%	13.9%	22.0%	34.1%	15.8%	.9%
	With No Experience N=2,546	Frequency	138	219	506	1152	523	8
		Percent (%)	5.4%	8.6%	19.9%	45.2%	20.5%	.3%
Interactive, science cafes and workshops	With Experience N=5,362	Frequency	729	827	1421	1644	682	59
		Percent (%)	13.6%	15.4%	26.5%	30.7%	12.7%	1.1%
	With No Experience N=2,546	Frequency	160	263	674	1026	413	10
		Percent (%)	6.3%	10.3%	26.5%	40.3%	16.2%	.4%
Media appearances on television and radio, etc	With Experience N=5,362	Frequency	1082	1207	1681	939	392	61
		Percent (%)	20.2%	22.5%	31.4%	17.5%	7.3%	1.1%
	With No Experience N=2,546	Frequency	399	600	842	493	206	6
		Percent (%)	15.7%	23.6%	33.1%	19.4%	8.1%	.2%
Working with the press	With Experience N=5,362	Frequency	978	1063	1540	1244	488	49
		Percent (%)	18.2%	19.8%	28.7%	23.2%	9.1%	.9%
	With No Experience N=2,546	Frequency	321	496	786	677	261	5
		Percent (%)	12.6%	19.5%	30.9%	26.6%	10.3%	.2%
Press releases, press conferences	With Experience N=5,362	Frequency	975	1068	1645	1141	459	74
		Percent (%)	18.2%	19.9%	30.7%	21.3%	8.6%	1.4%
	With No Experience N=2,546	Frequency	324	500	871	606	231	14
		Percent (%)	12.7%	19.6%	34.2%	23.8%	9.1%	.5%

(Con't.)

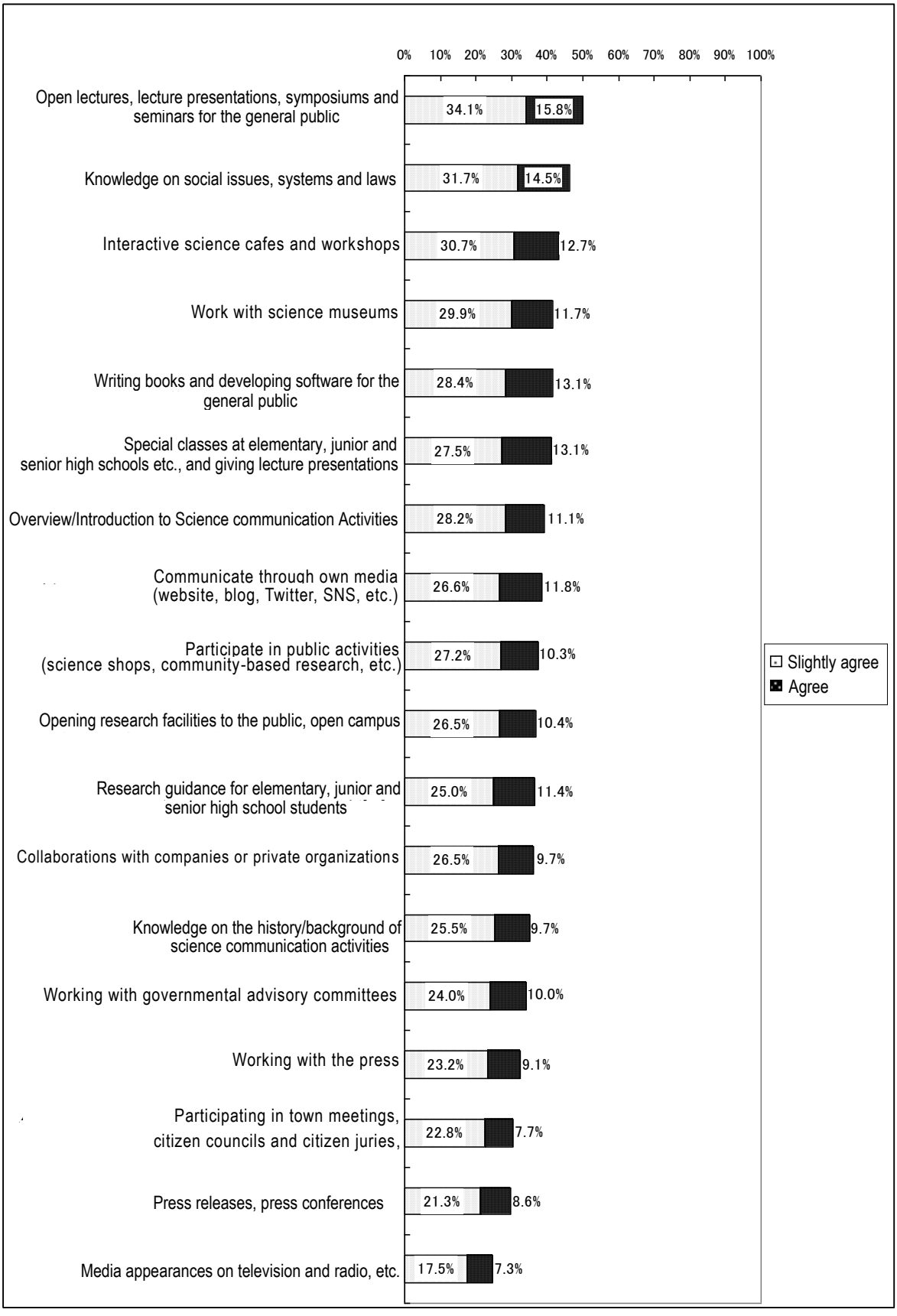
Items	Experience in science Communication activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	No Response
Opening research facilities to the public, open campus	With Experience N=5,362	Frequency	829	903	1589	1423	555	63
		Percent (%)	15.5%	16.8%	29.6%	26.5%	10.4%	1.2%
	No Experience N=2,546	Frequency	208	298	722	962	346	10
		Percent (%)	8.2%	11.7%	28.4%	37.8%	13.6%	.4%
Writing books and developing software for the general public	With Experience N=5,362	Frequency	779	827	1481	1522	701	52
		Percent (%)	14.5%	15.4%	27.6%	28.4%	13.1%	1.0%
	With No Experience N=2,546	Frequency	165	304	749	902	415	11
		Percent (%)	6.5%	11.9%	29.4%	35.4%	16.3%	.4%
Communicate through own media (website, blog, Twitter, SNS, etc.)	With Experience N=5,362	Frequency	888	881	1474	1426	634	59
		Percent (%)	16.6%	16.4%	27.5%	26.6%	11.8%	1.1%
	With No Experience N=2,546	Frequency	267	412	791	748	322	6
		Percent (%)	10.5%	16.2%	31.1%	29.4%	12.6%	.2%
Working with governmental advisory committees	With Experience N=5,362	Frequency	892	918	1677	1288	535	52
		Percent (%)	16.6%	17.1%	31.3%	24.0%	10.0%	1.0%
	With No Experience N=2,546	Frequency	240	374	845	789	290	8
		Percent (%)	9.4%	14.7%	33.2%	31.0%	11.4%	.3%
Participating in town meetings, citizen councils and citizen juries	With Experience N=5,362	Frequency	885	973	1819	1220	411	54
		Percent (%)	16.5%	18.1%	33.9%	22.8%	7.7%	1.0%
	With No Experience N=2,546	Frequency	243	387	876	800	229	11
		Percent (%)	9.5%	15.2%	34.4%	31.4%	9.0%	.4%
Collaborations with companies or private organizations	With Experience N=5,362	Frequency	821	884	1656	1422	522	57
		Percent (%)	15.3%	16.5%	30.9%	26.5%	9.7%	1.1%
	With No Experience N=2,546	Frequency	199	284	781	951	319	12
		Percent (%)	7.8%	11.2%	30.7%	37.4%	12.5%	.5%
Work with science museums	With Experience N=5,362	Frequency	722	741	1600	1605	630	64
		Percent (%)	13.5%	13.8%	29.8%	29.9%	11.7%	1.2%
	With No Experience N=2,546	Frequency	176	242	788	955	373	12
		Percent (%)	6.9%	9.5%	31.0%	37.5%	14.7%	.5%

(Con't.)

Items	Experience in Science Outreach Activities		Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	No Response
Participate in public activities (science shops, community-based research, etc.)	With Experience N=5,362	Frequency	759	833	1693	1458	553	66
		Percent (%)	14.2%	15.5%	31.6%	27.2%	10.3%	1.2%
	With No Experience N=2,546	Frequency	197	322	828	882	303	14
		Percent (%)	7.7%	12.6%	32.5%	34.6%	11.9%	.5%
Overview/ Introduction to Science Outreach	With Experience N=5,362	Frequency	798	793	1610	1513	594	54
		Percent (%)	14.9%	14.8%	30.0%	28.2%	11.1%	1.0%
	With No Experience N=2,546	Frequency	193	314	843	875	310	11
		Percent (%)	7.6%	12.3%	33.1%	34.4%	12.2%	.4%
Knowledge on the history/ background of Science Outreach Activities	With Experience N=5,362	Frequency	839	886	1677	1365	518	77
		Percent (%)	15.6%	16.5%	31.3%	25.5%	9.7%	1.4%
	With No Experience N=2,546	Frequency	217	357	897	798	264	13
		Percent (%)	8.5%	14.0%	35.2%	31.3%	10.4%	.5%
Knowledge on social issues, systems and laws	With Experience N=5,362	Frequency	640	694	1485	1700	780	63
		Percent (%)	11.9%	12.9%	27.7%	31.7%	14.5%	1.2%
	With No Experience N=2,546	Frequency	165	304	824	902	333	18
		Percent (%)	6.5%	11.9%	32.4%	35.4%	13.1%	.7%

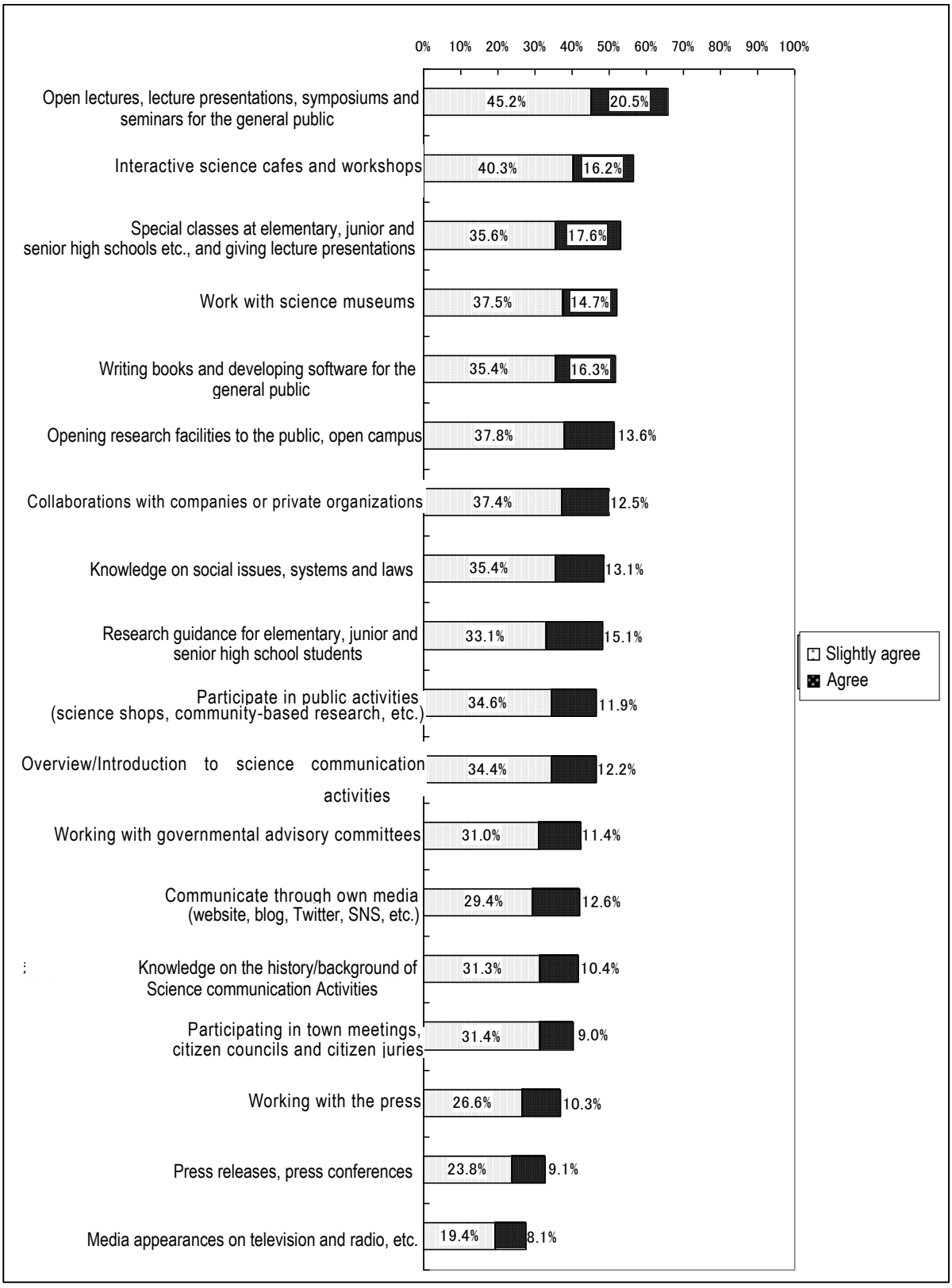
N = 7,908

Fig. 25 Preferred Training for Science Communication Activities of the With Experience Group



N = 5,362

Fig. 26 Preferred Training for Science Communication Activities of the With No Experience Group

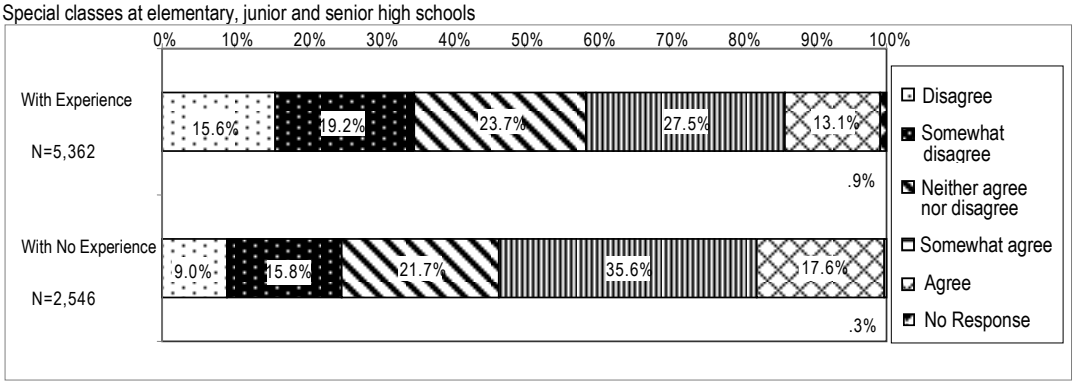


N = 2,546

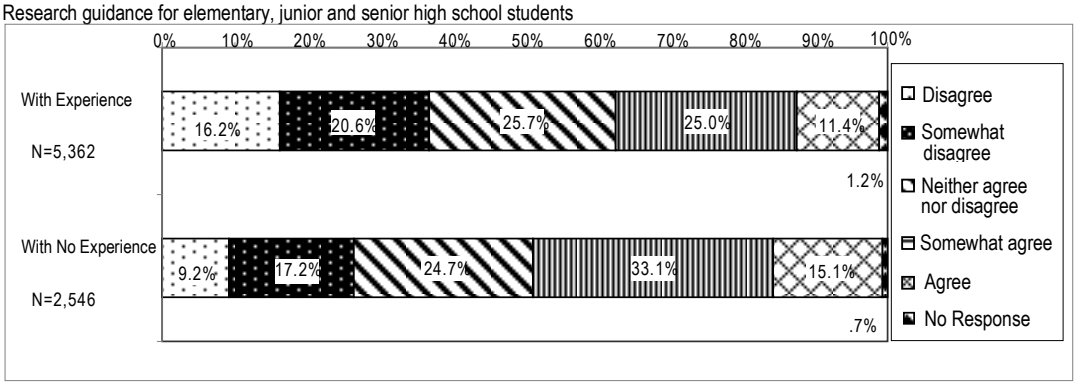
Fig. 27 Preferred Training

(By Experience in Science Communication Activities)

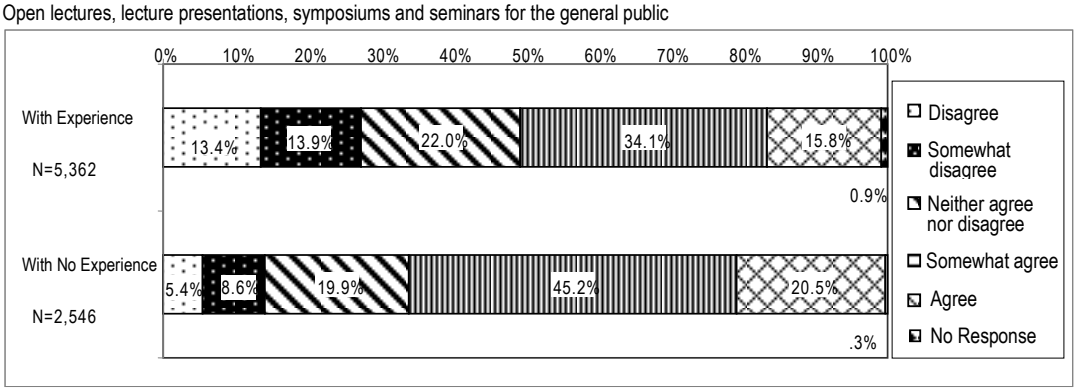
Special classes at elementary, junior and senior high schools



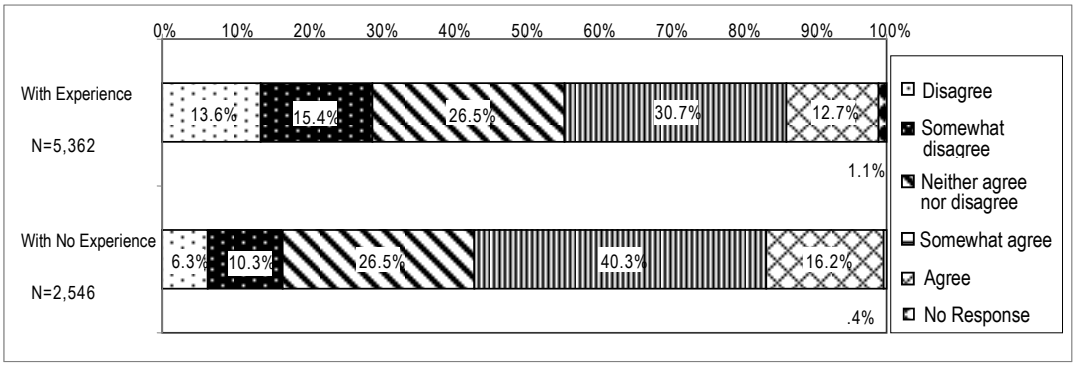
Research guidance for elementary, junior and senior high school students



Open lectures, lecture presentations, symposiums and seminars for the general public

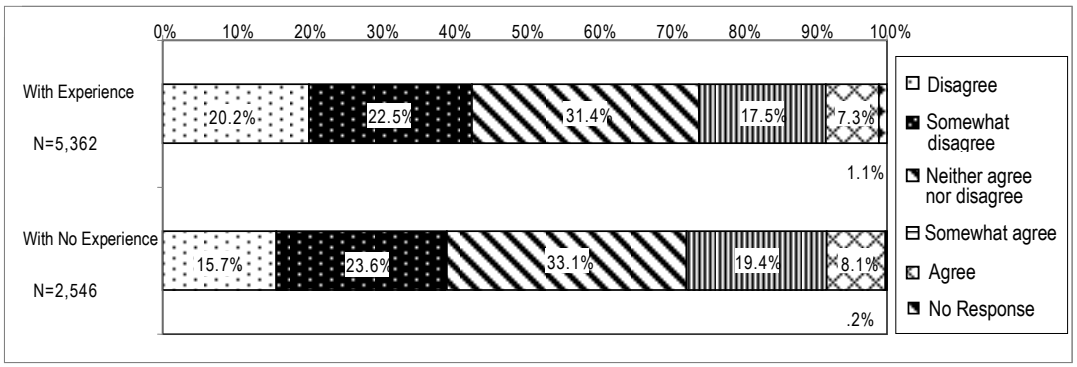


Interactive science cafes and workshops.

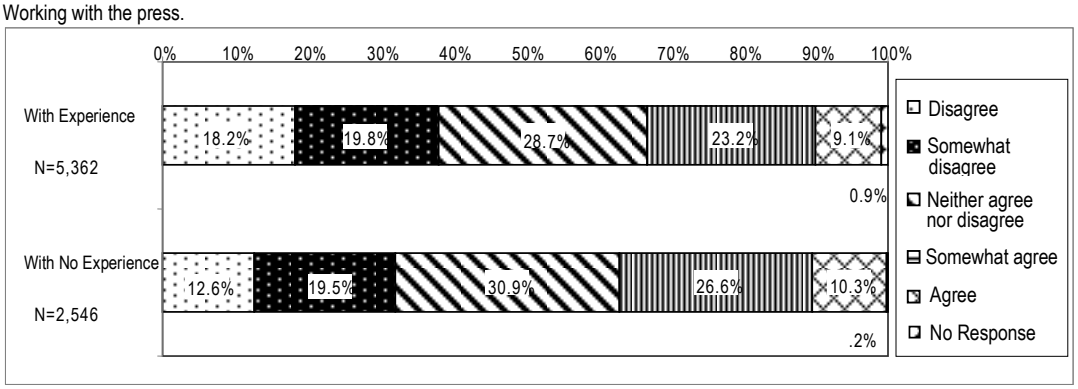


(Con't.)

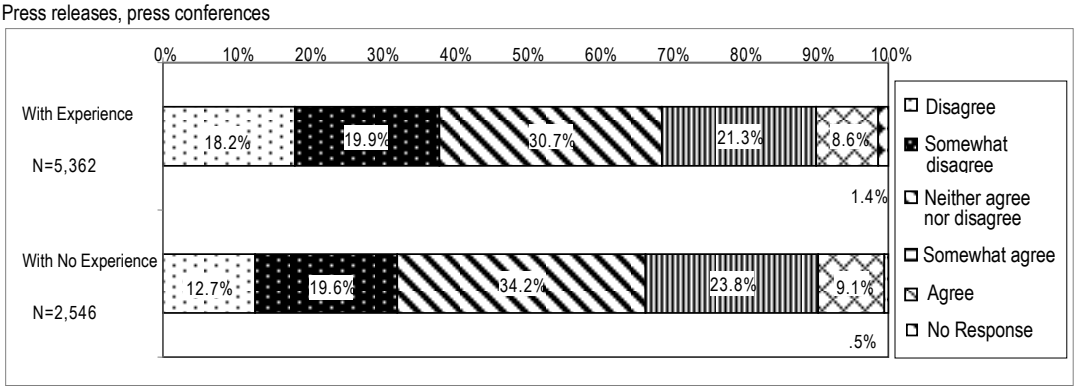
Media appearances on television and radio, etc.



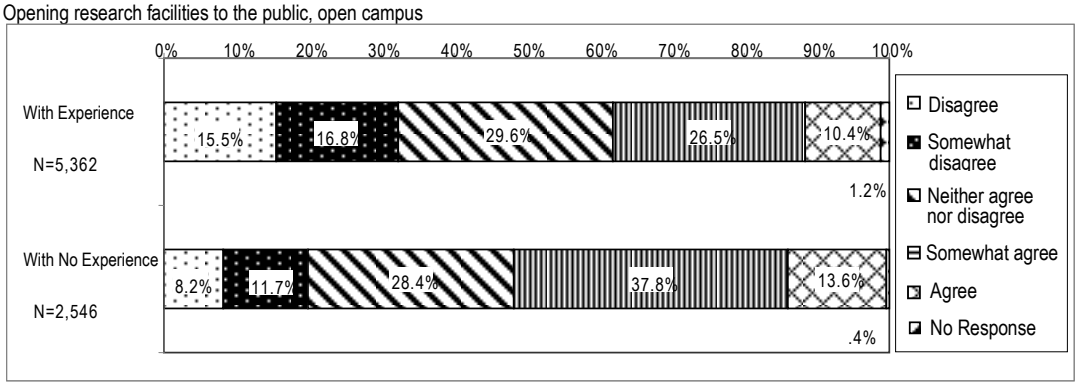
Working with the press.



Press releases, press conferences

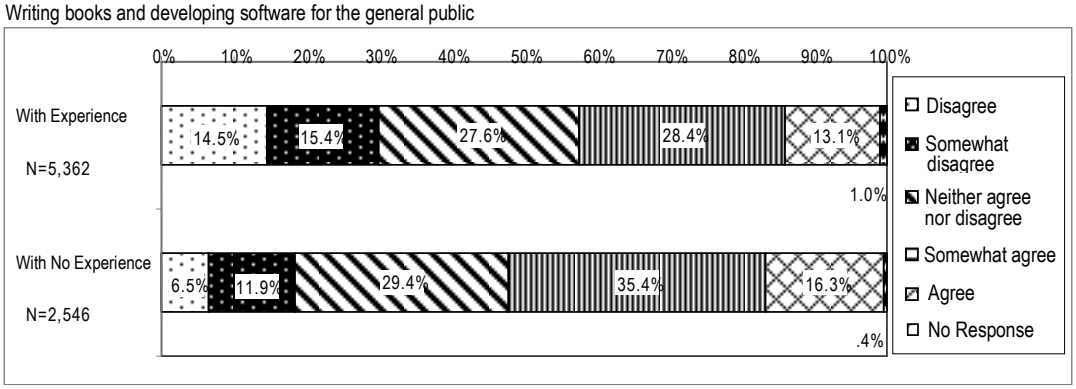


Opening research facilities to the public, open campus

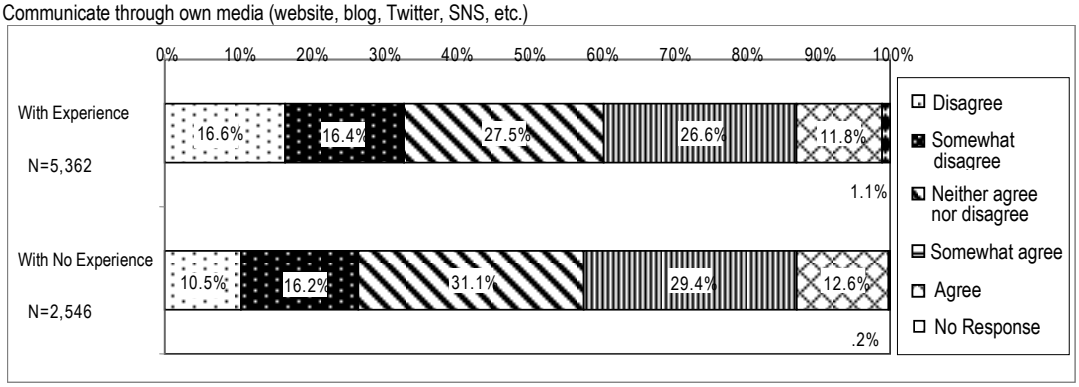


(Con't.)

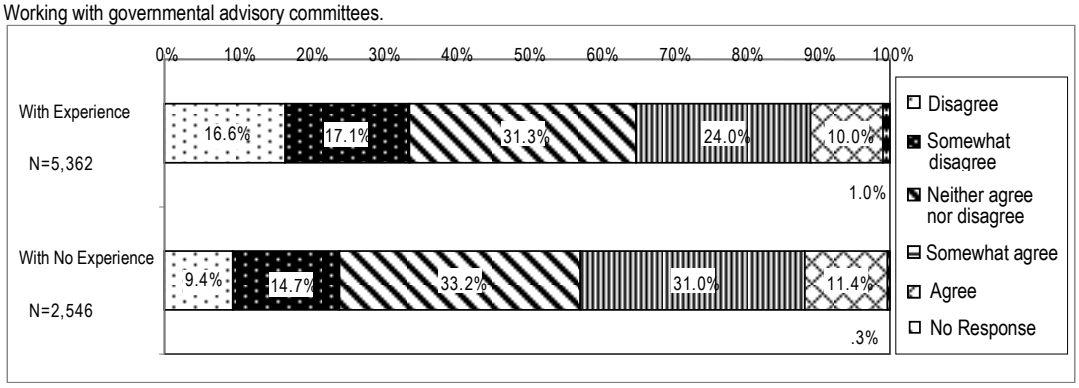
Writing books and developing software for the general public



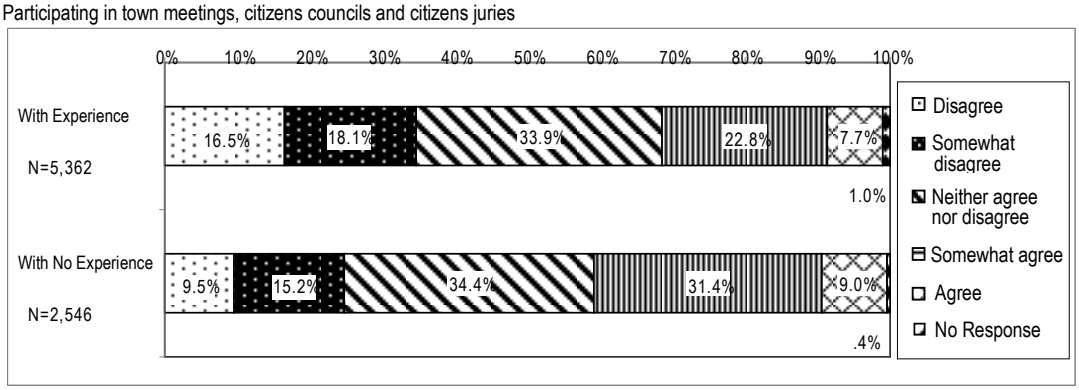
Communicate through own media (website, blog, Twitter, SNS, etc.)



Working with governmental advisory committees.

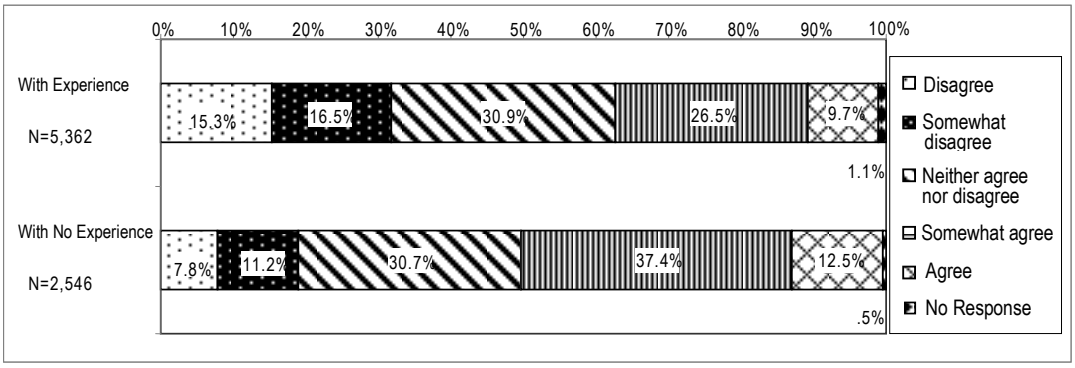


Participating in town meetings, citizens councils and citizens juries

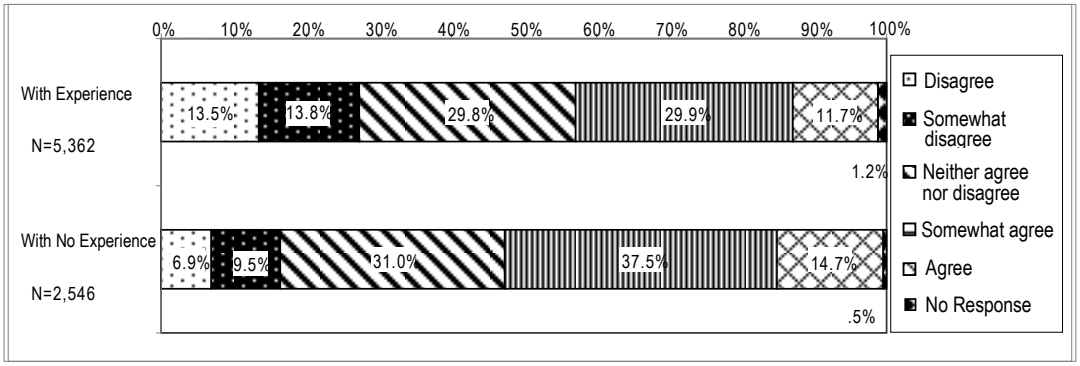


(Con't.)

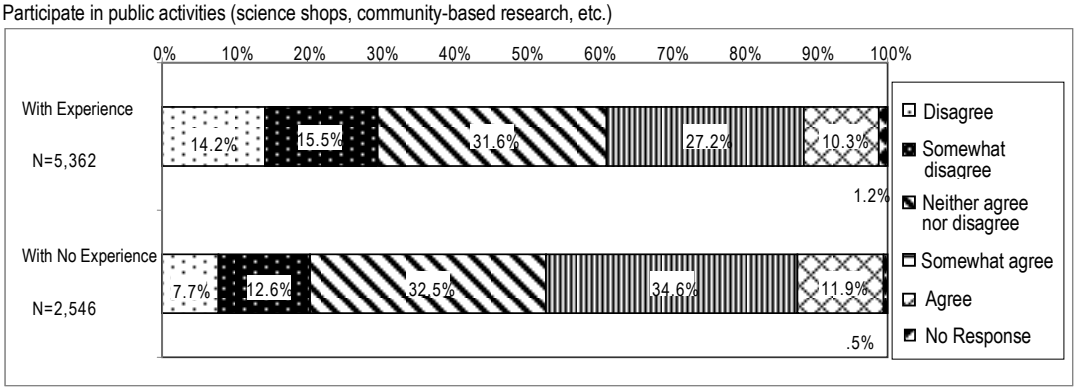
Collaborations with companies or private organizations



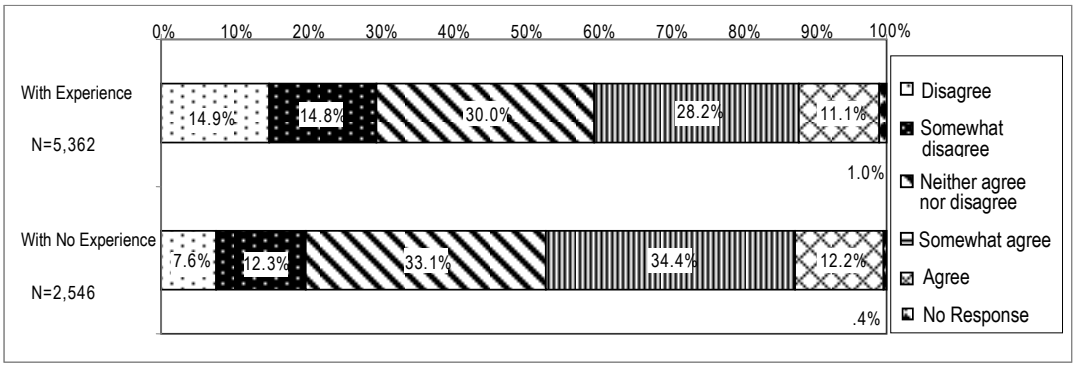
Work with science museums



Participate in public activities (science shops, community-based research, etc.)

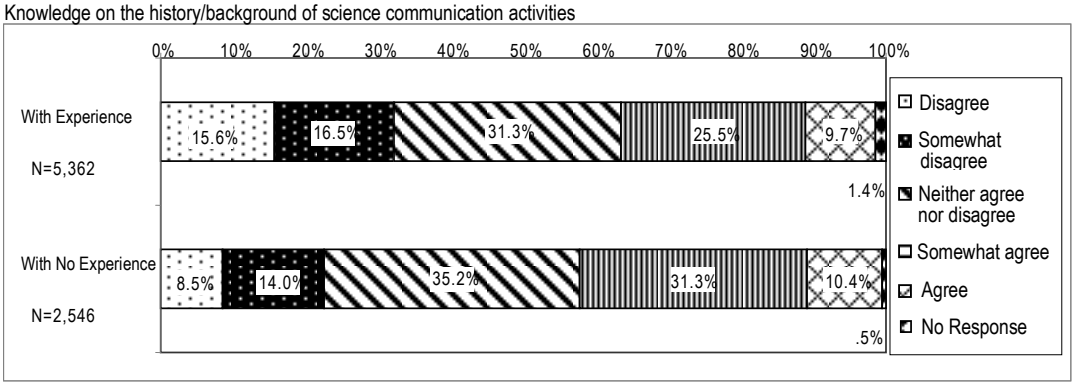


Overview/Introduction to science communication activities

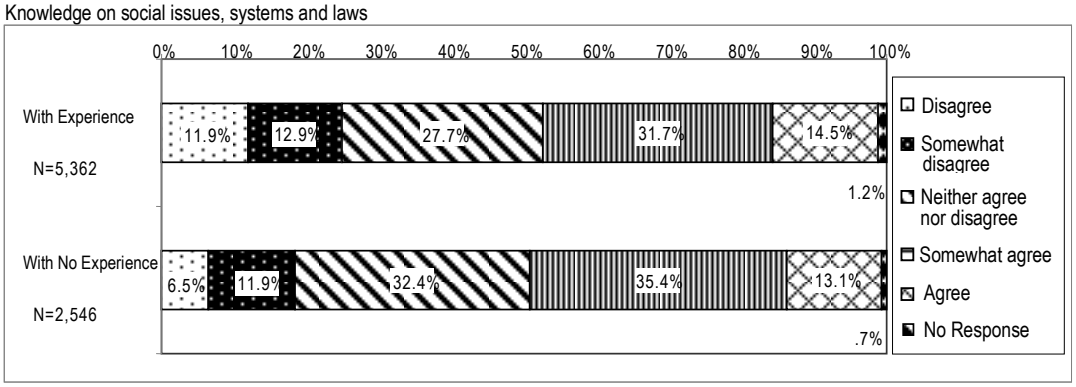


(Con't.)

Knowledge on the history/background of science communication activities



Knowledge on social issues, systems and laws



2-4 Impact of Government Policies on Scientist Involvement in Science Communication Activities

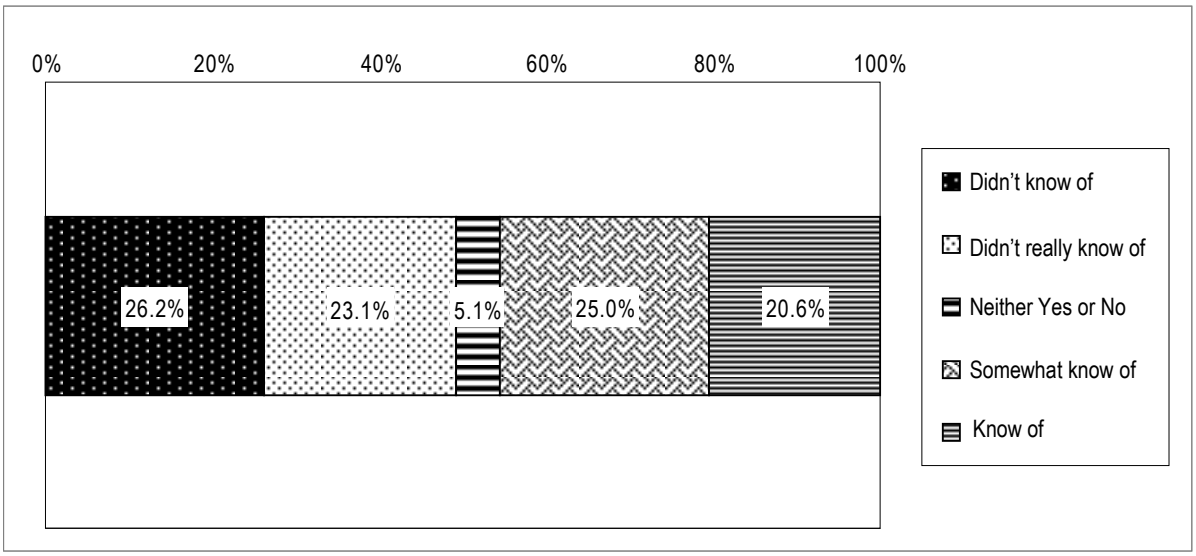
This survey looked at government policies on science and technology, including science communication activities, and the impact thereof.

First, we asked the respondents if they know of the government policy that states that "researchers who have received a certain amount or more of national research funds are required to actively communicate with the public on the content and results of their research activities" (4th Science and Technology Basic Plan). The responses are as follows.

Table 8 Awareness of Government Policy

	Frequency	Percent (%)
Didn't know of	2069	26.2
Didn't really know of	1830	23.1
Neither Yes or No	401	5.1
Somewhat know of	1979	25.0
Know of	1629	20.6
Total	7908	100.0

Fig. 28 Awareness of Government Policy



N = 7,908

The results of a cross tabulation of awareness of government policy and the total amount of annual research grants to individuals showed a positive correlation between the total amount and awareness of the government policy (i.e., the larger the amount, the greater the awareness).

Table 9 Cross Tabulation of Awareness of Government Policy and Total Amount of Annual Research Grants to Individuals

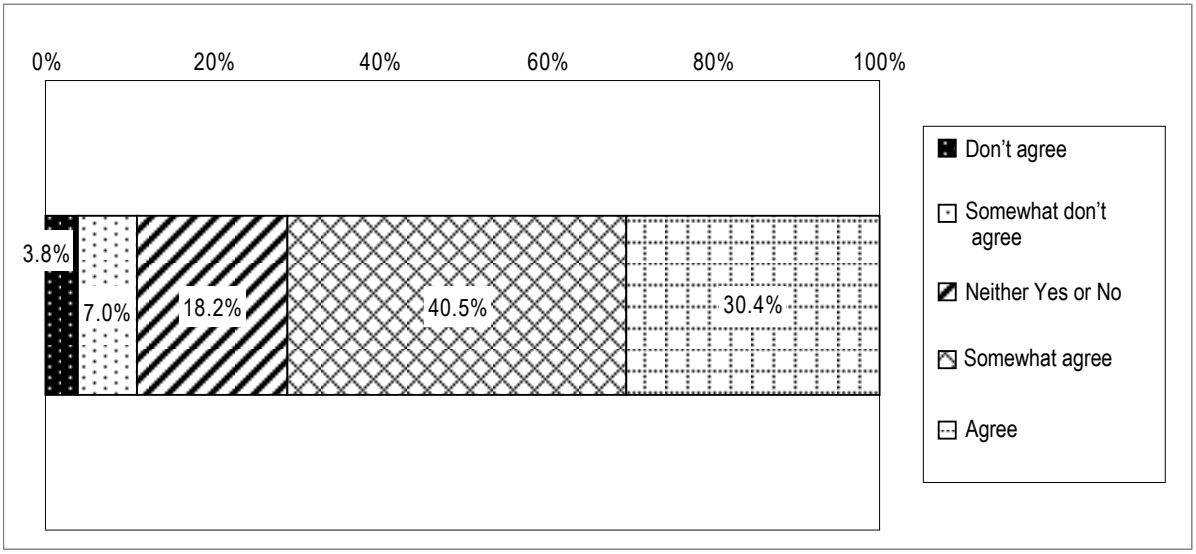
Annual research grants in an individual's name		Didn't know of	Didn't really know of	Neither Yes or No	Somewhat know of	Know of	Total
¥50 million or more	Frequency	9	11	1	32	57	110
	Percent (%)	8.2%	10.0%	0.9%	29.1%	51.8%	100.0%
¥30 million to ¥50 million	Frequency	13	18	3	26	62	122
	Percent (%)	10.7%	14.8%	2.5%	21.3%	50.8%	100.0%
¥10 million to ¥30 million	Frequency	71	78	22	168	237	576
	Percent (%)	12.3%	13.5%	3.8%	29.2%	41.1%	100.0%
¥3 million to ¥10 million	Frequency	260	285	64	360	310	1279
	Percent (%)	20.3%	22.3%	5.0%	28.1%	24.2%	100.0%
Less than ¥3 million	Frequency	855	834	173	854	609	3325
	Percent (%)	25.7%	25.1%	5.2%	25.7%	18.3%	100.0%
Annual Research Grants not in an individual's name	Frequency	861	604	138	539	354	2496
	Percent (%)	34.5%	24.2%	5.5%	21.6%	14.2%	100.0%

The results of agreement with the abovementioned government policy are as follows.

Table 10 Agreement with Government Policy

	Frequency	Percent (%)
Disagree	302	3.8
Somewhat disagree	556	7.0
Neither agree nor disagree	1442	18.2
Somewhat agree	3205	40.5
Agree	2403	30.4
Total	7908	100.0

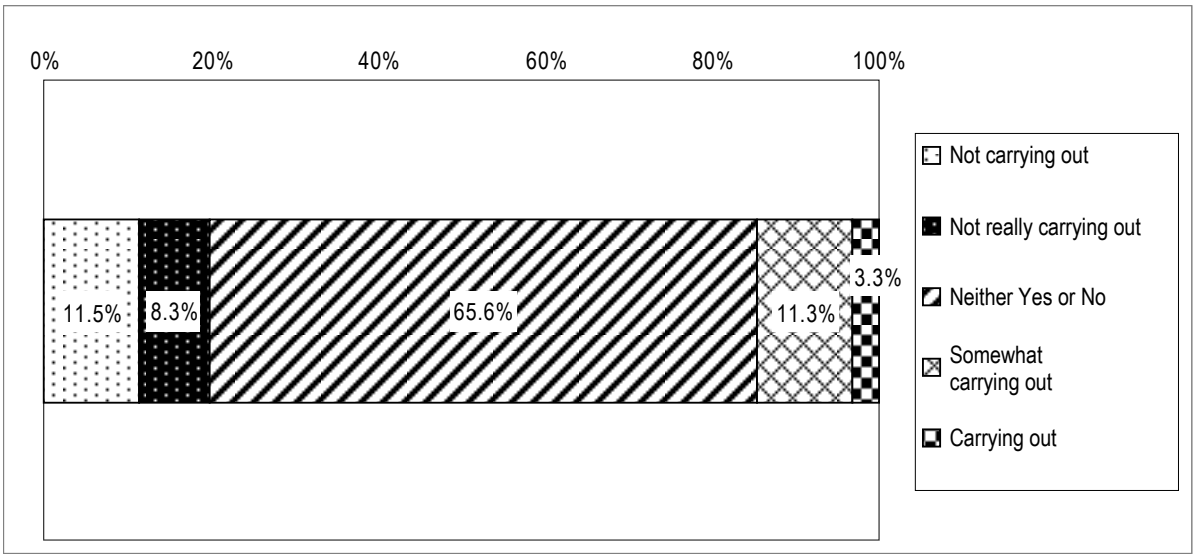
Fig. 29 Agreement with Government Policy



N = 7,908

The results of carrying out science communication activities based on the abovementioned government policy are as follows.

Fig. 30 Carrying Out Science Communication Activities Based on Government Policy



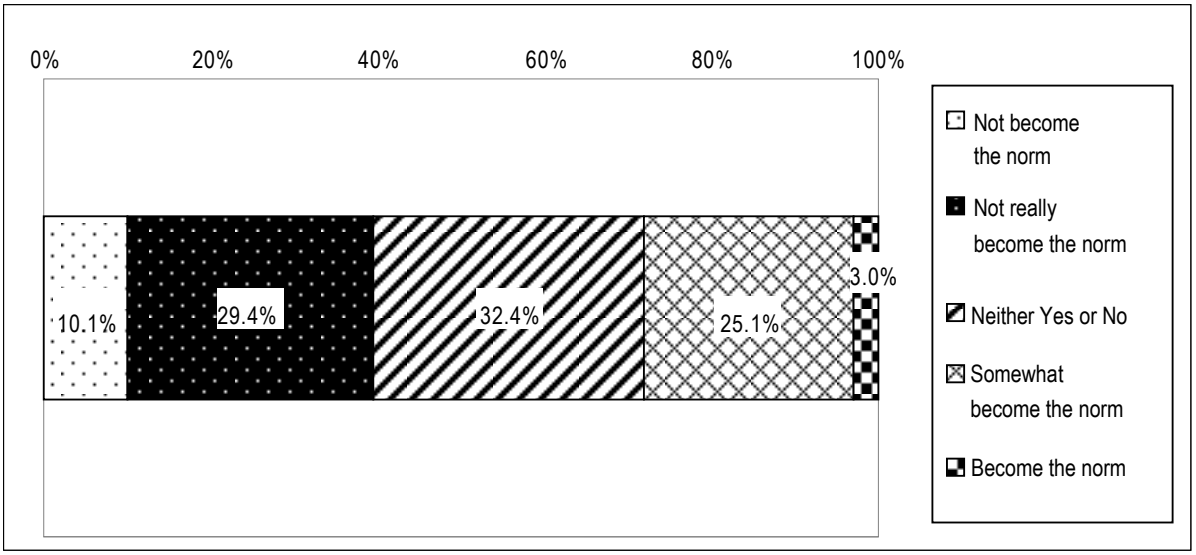
N = 7,908

The results as to whether voluntary science communication activities by scientists has become the norm are as follows.

Table 11 Voluntary Science Communication Activities by Scientists Has Become the Norm

	Frequency	Percent (%)
Not become the norm	802	10.1
Not really become the norm	2323	29.4
Neither Yes or No	2560	32.4
Somewhat become the norm	1984	25.1
Become the norm	239	3.0
Total	7908	100.0

Fig. 31 Voluntary Science Communication Activities by Scientists Has Become the Norm



N = 7,908

List of Figures and Tables

Practical Research on the Science Communication Activities of Scientists in Universities and Research Institutes

An Investigation into Scientist Involvement in Science Communication Activities

July 2013

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