

Supplementary information

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Scientists under attack

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Nature survey of scientists on impact of speaking to the media.

The *Nature* survey was e-mailed by science media centres in the United Kingdom, Canada, Taiwan, New Zealand and Germany to researchers on their COVID-19 media lists. (Australia's science media centre had already polled its researchers; this survey is based on their poll). *Nature* also e-mailed it to researchers in the United States and Brazil who had been prominently quoted in the media. Some researchers may have forwarded it to other scientists. Respondents' answers are anonymous; although some took the option of leaving their names and emails with *Nature* reporters.

Demographics

321 scientists who had talked to the media about COVID-19 responded to the survey.

Where in the world are you?

United Kingdom	123	38%
Germany	62	19%
United States	53	17%
New Zealand	30	9%
Canada	16	5%
Croatia	6	2%
Taiwan	5	2%
Other*	26	8%

*Other: Brazil, Australia, Singapore, Netherlands, Austria, Switzerland, South Africa, Norway, Malaysia, Israel, Ireland, China, Belgium.

What is your gender?

Female	113	35%
Male	203	63%
Non-binary	1	
Other	1	
Prefer not to say	3	

Which of these best describes the organization you work for? (You may select multiple options).

Government	12	4%
Industry	8	2%
Hospital	46	14%
University	268	83%
Medical Research Institute	38	12%
Government Advisory Group	27	8%
Research funder	1	
Other	21	6.5%

Media experiences

How often do you speak to journalists or have contact with the media about the COVID-19 pandemic?

Every day	29	9%
A few times a week	87	27%
About once a week	44	14%
A few times a month	67	21%
Once a month	27	8%
Less than once a month	32	10%
A few times a year	35	11%

What aspects of COVID-19 have you been commenting on? (You may select multiple options).

Epidemiology	179	56%
Vaccination and vaccines	202	63%
Contact tracing including apps	61	19%
Government response, e.g. quarantine, vaccine rollout, border closures	145	45%
COVID-19 treatments	81	25%
Virology	120	37%
The origin of the virus	79	25%
Social science, such as vaccine hesitancy	84	26%
COVID impacts on people, such as mental health, long COVID, economic impacts	83	26%
Other*	63	20%

*Most frequent aspects collated in other (write-in) free-text responses included:

Genomics & variants (6); immune response (3); children and schools (2); diagnostics and testing (7); modelling or statistics (6).

How would you rate your experiences with the media during the COVID-19 pandemic?

Always positive	43	13%
Mostly positive	229	71%
Neutral	31	10%
Mostly negative	15	5%
Always negative	2	1%
Prefer not to say	1	

Have any of the following barriers stopped you from speaking to the media during the COVID-19 pandemic? (You may select multiple options).

I get too overwhelmed by requests	145	45%
I don't have time to take media enquiries	136	42%
I don't want to risk making a scientific error in public	116	36%
My area of research was/is too political	75	23%
I've had bad experiences with the media in the past	58	18%
My institution discourages or prevents me from speaking to the media	29	9%

Positive and negative impacts of speaking to the media and social media experiences

Have you had any of the following positive experiences after speaking to the media during the COVID-19 pandemic?

I was able to get my message out to the public	268	83%
Speaking to the media was personally rewarding	203	63%
It improved my communication skills	168	52%
It has had a positive impact on my scientific reputation among colleagues	115	36%
It has helped me make contacts with government, other researchers, public, medical groups	118	37%
It has helped me secure funding or opened pathways for potential funding	22	7%
Other	0	

Have you experienced trolling or personal attacks after speaking about COVID-19 in the media?

Always	32	10%
Usually	48	15%
Sometimes	92	29%
Rarely	89	28%
Never	60	19%

Which social media platforms have you used to discuss COVID-19 with the public? Have you been subjected to trolls or personal attacks after speaking about COVID-19 on these platforms?

	<i>Always</i>	<i>Usually</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>	Total	
Facebook	12%	11%	18%	26%	33%	89	28%
Twitter	17%	17%	31%	24%	10%	201	63%
Instagram	8%	2%	14%	24%	53%	51	16%
Tiktok						9	3%
LinkedIn	3%	2%	10%	27%	59%	112	35%
SnapChat						5	2%

(Proportions in italics out of total respondents who indicated using that platform; for respondents >10).

**Respondents were invited to write in additional platforms; one or two mentioned YouTube, Reddit; many responded they'd been attacked on e-mail (not a social-media platform).*

Have you experienced any of the following negative impacts after speaking about COVID-19 to the media, or posting on social media? (You may select multiple options).

Attacks on credibility	189	59%
Emotional or psychological distress	134	42%
None of the above*	96	30%
Reputational damage	95	30%
Threats of physical or sexual violence^	72	22%
Death threats^	47	15%
Other**	47	15%
Physical attacks	6	2%
<i>^Death threats OR phys/sexual violence</i>	82	26%

**'None of the above' placed below other options in list given to respondents.*

*** 'Other' included: Aggressive emails (7); doxxed and/or sent packages at home (5) ; twitter or website hacked (2); racist attacks (2); complaints to employer (2); fence sprayed (1); person turned up at home (1); referred to professional/regulatory body (1); PhD students attacked on twitter (1); accused of murder (2); coordinated harassment (2); media used quotes out of context (1), and others.*

**** Statisticians advised that numbers were too small when subdivided – and given the self-selecting nature of respondents to the survey – to report differences by female/male respondents, or by aspect respondents commented on. Eg:*

	Female		Male	
Physical attacks	0		6	3%
Death threats	16	14%	30	15%
Threats of physical or sexual violence	29	26%	43	21%
Attacks on credibility	64	57%	121	60%
Reputational damage	32	28%	61	30%
Emotional or psychological distress	56	50%	76	37%
None of the above	29	26%	66	33%
Other	19	17%	27	13%

How much have your experiences with trolls and personal attacks affected your willingness to speak to the media in the future?

An enormous amount	21	7%
A lot	25	8%
A moderate amount	48	16%
A little	94	30%
Not at all	126	40%
N/A*	7	

*As 7 respondents wrote in 'not applicable to me' or 'haven't experienced'; percentages calculated out of 314 remaining respondents.

Cross-tab analysis of two questions, reported in Nature's feature:
those who (i) reported a higher frequency of attacks or trolling after speaking to media about COVID-19, were
(ii) more likely to say their experiences had affected their willingness to speak to the media in the future.

How much have your experiences ... affected willingness to speak to the media in the future?	Have you experienced trolling or personal attacks after speaking about COVID-19 in the media?					Total	Total (%)
	Always attacked	Usually	Sometimes	Rarely	Never		
An enormous amount	9	6	4	1	1	21	7%
A lot	8	6	7	3	1	25	8%
A moderate amount	3	16	18	10	1	48	15%
A little	4	10	38	38	4	94	29%
Not at all	8	10	25	37	46	126	39%
NA (Doesn't apply)	0	0	0	0	0	7	2%
Total	32	48	91	88	53	321	
Total (%)	10%	15%	28%	27%	17%		

**How much support did your employer offer after you experienced trolling or personal attacks?
(This question is shown to those who indicated that they experienced such attacks).**

Question shown to 261 respondents who previously said they had received trolling or personal attacks; 35 said they didn't have an employer or the question didn't apply to them, so percentages are shown out of remaining 224 respondents.

I didn't tell them	100	44%
They were very supportive	50	22%
They were somewhat supportive	44	19%
They were not at all supportive	24	11%
Other (write-in response unclear)	8	4%
<i>I don't have an employer</i>	4	
<i>This question doesn't apply to me</i>	31	

Analysis:

Of those who said they told their employer:

They were not at all supportive	24	20%
They were somewhat supportive	44	37%
They were very supportive	50	42%

*Of the 80 respondents who, in a previous question, had indicated they 'always' or 'usually' received trolling or personal attacks:**

I didn't tell them	19	24%
They were very supportive	17	22%
They were somewhat supportive	26	33%
They were not at all supportive	15	19%
Other (unclear)	2	3%
<i>I don't have an employer</i>	1	

Do you have any other comments or suggestions for how scientists could be better supported?

Most-repeated answers in free-text responses:

Social media firms need better governance / need to be more proactive in removing threats or harassment

Scientists should receive more training on communications and dealing with threats

Scientists should avoid social media, or avoid it on some topics

Scientists need mentors and better institutional support (institutions need to be aware of steps they can take to support researchers).