Science Journalism in Latin America and the Caribbean 2022

the perspective of science journalists

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Science Journalism in Latin America and the Caribbean 2022 – the perspective of science journalists

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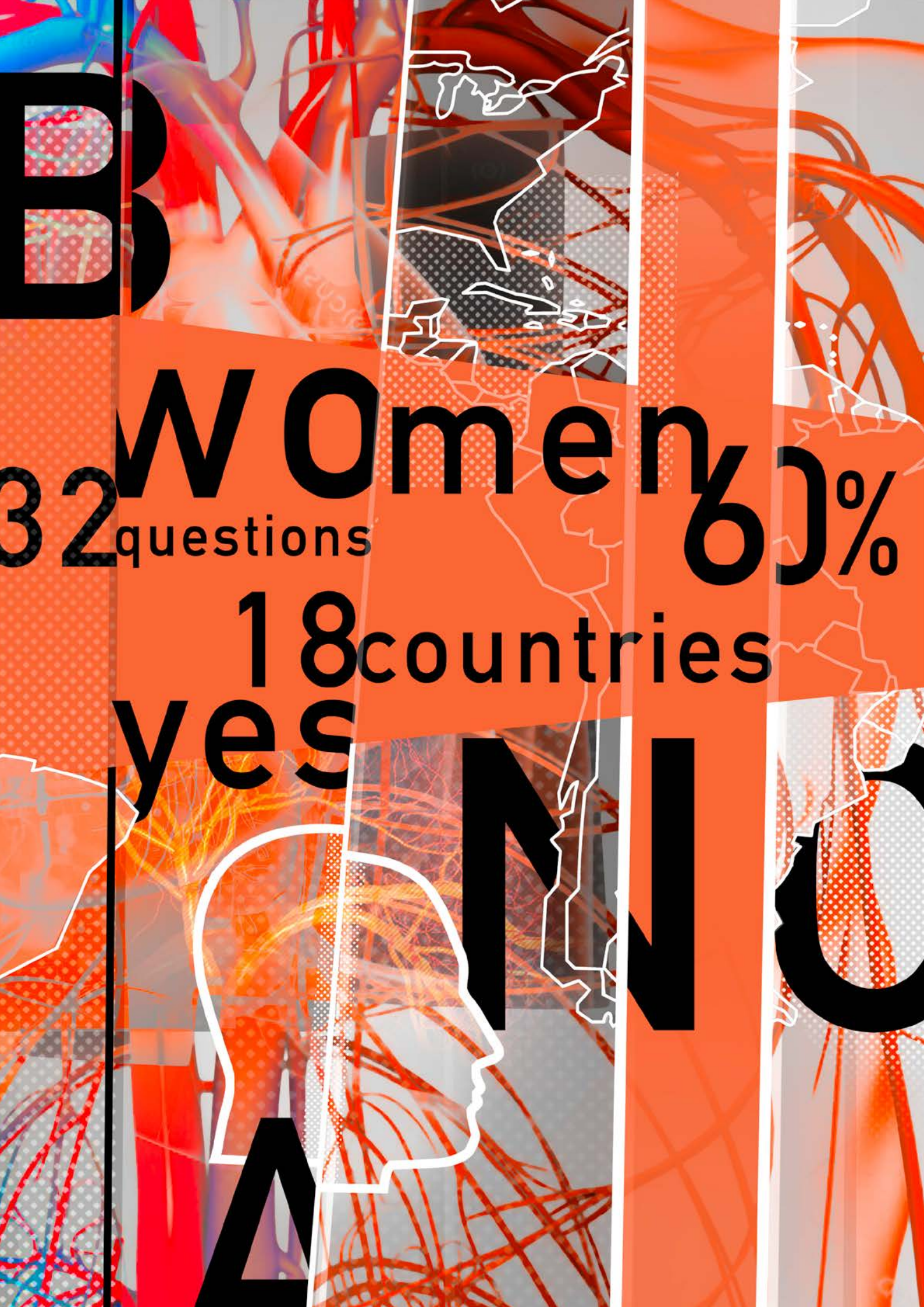
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Women
32 questions
60%
18 countries
yes
NO
A

Executive **Summary**

In this report we present the results of a survey that aimed to map the views of science journalists on science journalism in Latin America and the Caribbean. The report is a joint initiative of The Kavli Foundation, the World Federation of Science Journalists (WFSJ) and the Brazil's National Institute of Public Communication of Science and Technology. The survey was carried out using a questionnaire containing 32 questions, between 7 and 20 February 2022. We obtained 179 responses from professionals from 18 countries in the region.

The questionnaire contained questions about ethical issues, such as the legitimacy of establishing the ethical priorities of science journalism, knowledge of professional associations and codes of ethics, and ethical protections and violations. The responses also provide insights into professionals' attitudes toward topics such as coverage neutrality, scientific controversies, scientific uncertainties, fraud, errors and retractions, and the advantages and disadvantages of the embargo system. We also questioned the participants about their criteria for choosing sources and their relationship with them. At the end, we included questions designed to understand the profile of Latin American science journalists, their employment situation and their professional ethos.

MAIN **RESULTS**

- The sample is composed mostly of women (60%), aged between 35 and 44 years (33%), and with more than 16 years of experience in the area (32%)
- The majority of respondents have a degree in journalism/communication (75%).
- An important percentage of the respondents have a university degree (44%) and a master's degree (41%).
- Science journalism is the main occupation for 46% of the respondents; the main professional employment position of more than one-third of the respondents (37%) is as a full-time staff member (37%).
- Respondents' work appears in diverse media but there is a predominance of online media, such as websites (25%) and social media (23%).
- About one-third of the respondents consider that the main roles of a science journalist are to inform (32%) and to explain science (32%). Following this are promoting science (16%) and being a public watchdog (9%).
- Latin American science journalists are evenly divided on whether they can be neutral on the subjects they cover, with the proportion of those who do not believe in this neutrality being slightly higher (49%) than the proportion of those who believe in it.
- The majority think that scientific findings should not be reported as certainties (74%).
- 67% agree that it is acceptable to send material to their sources prior to publication in the case of complex stories.
- Most respondents also agree that fraud (80%), retractions (72%) and errors (75%) should always be reported.
- There is almost consensus among the respondents that the embargo system is useful for preparing stories in advance (94%).

- The sources most used by the respondents (75%) are the most prominent scientists in the field. The participants also look to have a balance of gender (52%) and prefer to interview scientists who are more accessible (33%). Age and experience are the least used criteria for choosing a source (20%).

- In the case of a local disease outbreak, local scientists are the main sources (96%). Journalists also use health professionals (92%), people affected by the disease (86%) and the local community (68%) as important sources for such stories.

- In this situation, 48% believe that the opinions of scientists and non-scientists should be reported differently, although a smaller, but important, portion think they should not (39%).

- The Latin American science journalists who responded to the survey tend to favor pro-vaccination sources in a story about the development of a new vaccine (60%), as well as those who believe in the anthropogenic causes of climate change (71%). In the first case, there is a relatively considerable percentage that considers it necessary to have a balance between pro- and anti-vaccination sources (39%).

- For 63% of respondents, it is acceptable for journalists to become friends with their sources (63%).

- 43% also find it acceptable to receive gifts, invitations and tickets in some circumstances, as well as to cover organizations that have paid for their work (54%).

- However, the majority say that journalists must declare their funding sources (72%).

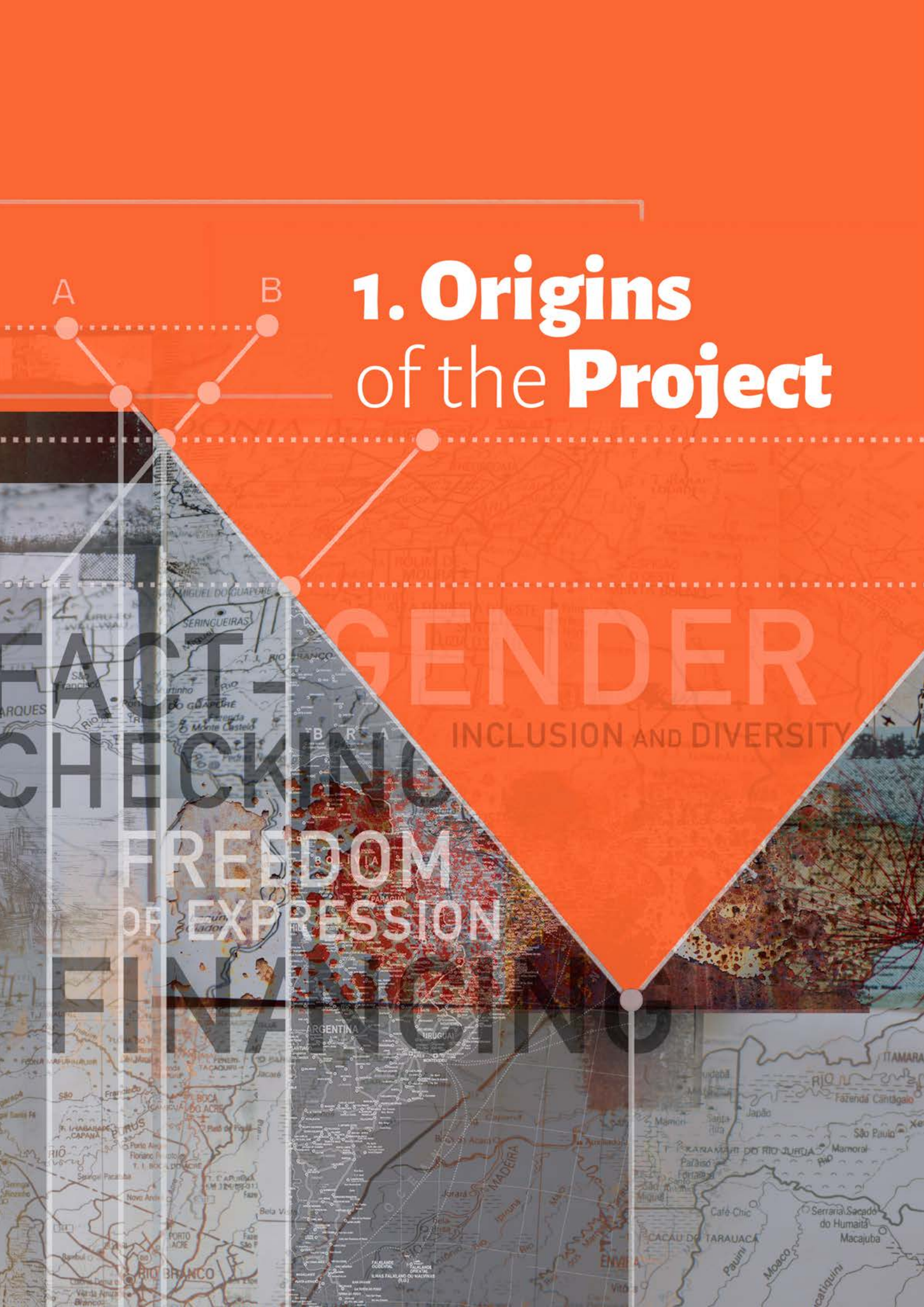
- 60% of participants think that the ethical priorities of science journalism should not be shaped by professionals from areas other than journalism.

- Most respondents say that there is a science journalism association in their country (73%), but about half of them are unaware of the existence of a code of ethics (55%).

- The protection of media ethics in countries was rated as poor by 52% of journalists.

- Low payment is the main problem pointed out by professionals in the region (77%), followed by fake news (64%), pressure to provide news that will attract an audience (57%), and political or corporate spin (56%).

1. Origins of the Project



The Kavli Foundation, established in 2000 by Norwegian-American physicist Fred Kavli to promote science for the benefit of humanity, has regularly partnered with the WFSJ on various projects. The WFSJ, a non-profit Canadian organization incorporated in 2005, is made up of more than 60 member associations in 51 countries, and has an extended membership of some 10,000 people who work in various areas of science journalism and science communication. Kavli and the WFSJ share an ongoing interest in the principles and values that guide the practice of science journalism, which in 2020 led to a project dedicated to framing these concepts in a formal statement that could be adopted by the WFSJ on behalf of its members.

This undertaking began with a strategic two-day workshop held in San Jerónimo (Antioquia, Colombia) in November 2021, which included stakeholders in science journalism. Their discussions yielded a document that laid the foundation for a regional survey of science journalists across Latin American countries, with the ultimate aim of expanding this exercise to a global level.

The discussion topics covered in the workshop were divided into the following 12 categories, to facilitate and delimit the debate:

- training as a science journalist
- deontology of science journalism
- freedom of expression
- financing
- intellectual property and copyright
- fact-checking
- scientific dissemination versus science journalism
- the 'rediscovery' and 'recolonization' of Latin America
- gender
- inclusion and diversity
- the role of associations and communities of science journalists
- digital footprint

In a second step, Brazil's National Institute of Public Communication of Science and Technology was invited to come on board to field the regional survey of science journalists, based on its 20 years of experience in designing surveys for different sectors of society, including for science journalists (see Massarani et al., 2012, 2013; Bauer et al., 2013; Massarani et al., 2021a, 2021b).

1.1. Science journalism in Latin America: a bit of history

Across contexts and cultures, science stories have always been present in the news, since the beginning of what we know today as the mass media (Dunwoody, 2008). In Latin America, this history goes back to colonial times. There are records of scientific notes in newspapers such as *O Patriota*, from Brazil, in 1813 (Moreira & Massarani, 2002), and the *Telégrafo Mercantil Rural, Político-Económico e Historiográfico del Río de la Plata*, the first newspaper in Argentina, founded in 1801 (Pasquali, 2021). In Mexico, the scientific journal *Los Lunarios*, published between 1672 and 1701, provided information on astronomy and meteorology (Anaya, 2016).

But it was in the 20th century that science journalism started to become a specialized area, especially after World War II, with the increase in interest in nuclear physics and the space race (Bauer & Gregory, 2007; Dunwoody, 2008). The professionalization of the area also led to the organization of science journalists through events and associations. In Latin America, this movement began in the 1960s.

One of the first recorded initiatives of this kind was the First Inter-American Seminar on Science Journalism, held in October 1962 in Chile (Massarani, 2021). The event was organized by the Pan American Union of the General Secretariat of the Organization of American States (OAS) and the Technical Center of the Inter-American Press Society. Over three days, scientists and media professionals from eight countries (Argentina, Brazil, Chile, Colombia, United States, Great Britain, Peru and Venezuela) discussed the challenges of science communication in the region.

The event is considered a milestone as it was the trigger for other similar meetings in the region. At the time, the importance of science communication for the promotion of citizenship was already being discussed, particularly by Brazilian doctor and journalist José Reis. In 1969, after a seminar in Madrid, Spain, the Ibero-American Association of Science Journalism was created, under the presidency of Spanish journalist Manuel Calvo Hernando (Massarani et al., 2012). The association initiated a series of Ibero-American congresses and stimulated the creation of national associations of science journalism.

"We have long since come to the conviction that science (...) requires the understanding of the community for the support it deserves. But this understanding is not achieved, contrary to what scientists seem to imagine, by the mere exaltation of the merits of science; it is achieved by patiently educating the people about what it does and the implications of its conquests."

– José Reis, Brazilian doctor and science journalist (1974)

"Science journalism is called to be one of the informative stars of the millennium in which we have just entered, one of the informative specialties of our time most charged with content and emotion, because they communicate to everybody the discoveries that are changing lives and the social structure of a part of humanity." – Manuel Calvo Hernando, Spanish science journalist (2005)

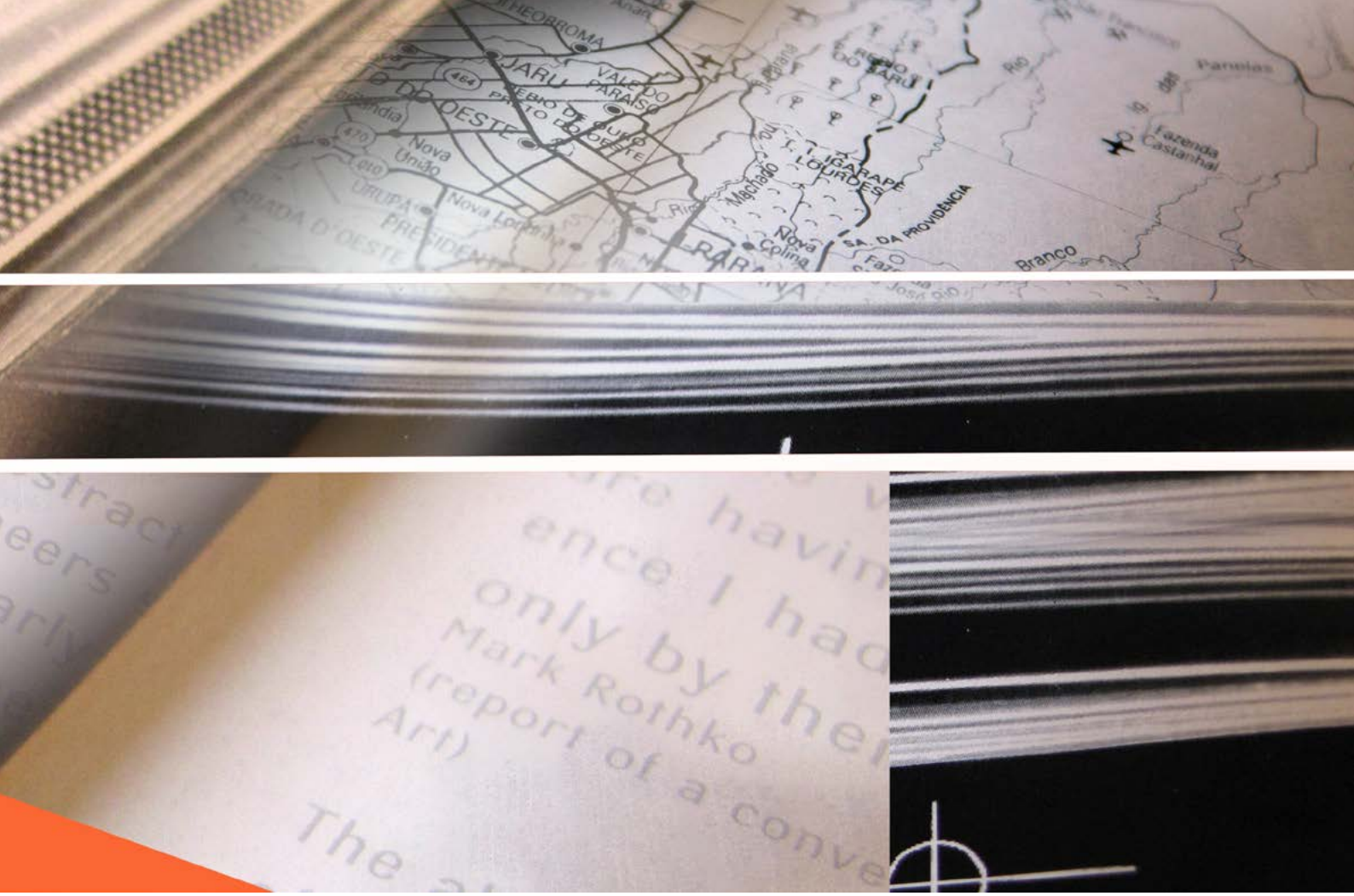
At the present moment, there are eight national associations in Latin America associated with the WFSJ:

- Argentinian Network of Science Journalism (RADPC)
- Brazilian Network of Science Journalists and Communicators (RedComCiência)
- Chilean Association of Science Journalists (ACHIPEC)
- Colombian Association of Science Journalism (ACPC)
- Network of Science Journalists & Communicators of Haiti (NESJCOMH)
- Mexican Network of Science Journalists (redMPC)
- Peruvian Association for Science Journalists and Communicators (APCiencia)
- Panama Association for Science Journalists and Communicators.

2. Methodology

The questionnaire consisted of 32 questions – eight closed and two open, and 22 mixed, in which, in addition to choosing an option, the respondent could justify or comment on their answer. Nineteen of the questions were new, being specifically designed for this survey; these were dedicated to thinking about ethical issues in science journalism. Two other questions related to government protection of media ethics and violations of ethical reporting were adapted from the Media Ethics in the Post-Truth Era survey (CIME, 2018), while six questions related to professional ethos were adapted from the Global Science Journalism Report 2021 (Massarani et al., 2021), which, in turn, used a revised version of the questionnaire applied in the first edition of that survey, in 2013 (Boltanski & Maldidier; 1977; McGovern et al., 2004; Pew Research Center, 2004, 2007; Brumfiel, 2009; Massarani et al., 2012). The remaining five questions were demographic questions.

The responses were collected between 7 and 20 February 2022. The distribution of the questionnaire, available in Spanish, Portuguese and English, was carried out through the science journalism associations of the countries in the region and through science journalism



groups on social media, such as Facebook. We also contacted stakeholders and asked them to complete the survey and to share it with other science journalists.

As in the Global Science Journalism Report (Bauer et al., 2013; Massarani et al., 2021), we emphasize that there is no exact definition of what a science journalist is, in terms of educational qualification, employment situation, or professional practice. In this sense, the survey participants are considered science journalists because they identify themselves that way. Therefore, some questions sought to identify the respondents' relationship with science journalism.

For the same reason, it is equally difficult to estimate the number of science journalists in the region. Hence, it is impossible to define a population and what would be a representative sample. Our survey is based on a random sample consisting of 179 responses, and our results are presented in terms of descriptive statistics. As it was not mandatory to answer all the questions, some respondents left some questions blank. Therefore, when presenting the results, we always indicate the n value corresponding to the question. Although the composition of the sample is a limitation of the survey, we emphasize the survey's valuable contribution to identifying trends and patterns in science journalism in Latin America.

3. Results

3.1. The profile of the respondents

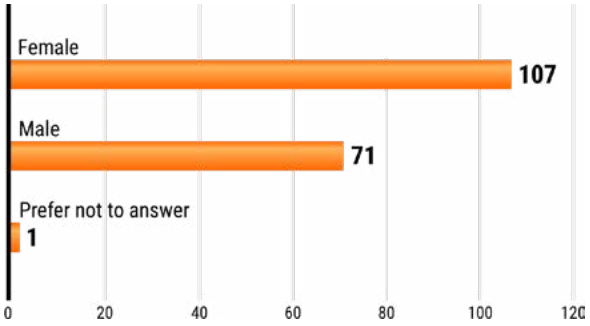
Science journalists from 18 countries in the region participated in the survey. More than half (55%) of the 179 participants are from Mexico, Brazil and Chile (Table 1). There was also significant participation of journalists from Argentina and Colombia.

Table 1: Respondents per country

Mexico	45
Brazil	30
Chile	24
Argentina	19
Colombia	18
Panama	8
Uruguay	7
Paraguay	6
Peru	6
Costa Rica	3
Cuba	3
Bolivia	2
Guatemala	2
Venezuela	2
Ecuador	1
El Salvador	1
Honduras	1
Jamaica	1
Total	**179**

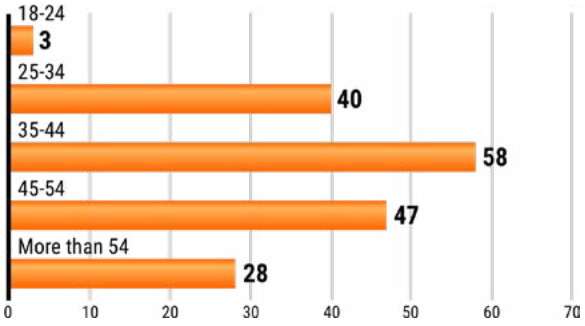
Our sample is mostly composed of women – 60% female and 40% male (n=176) (Figure 1). In regard to age, there is a predominance of journalists aged between 35 and 44 years (33%; n=176), followed by the age groups from 45 to 54 years (27%) and from 25 to 34 years (23%). The lowest percentages are in the age groups over 54 years old (16%) and from 18 to 24 years old (2%). The average age is 43 years (Figure 2).

Figure 1: Gender of respondents



n=176

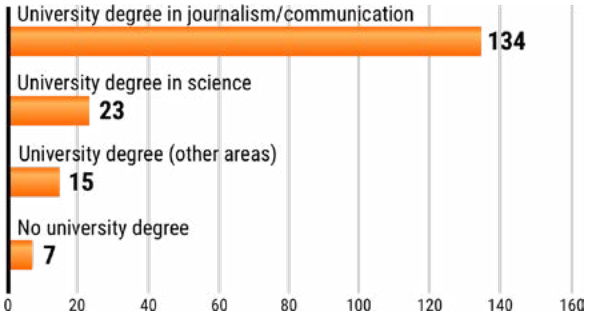
Figure 2: Age of respondents



n=176

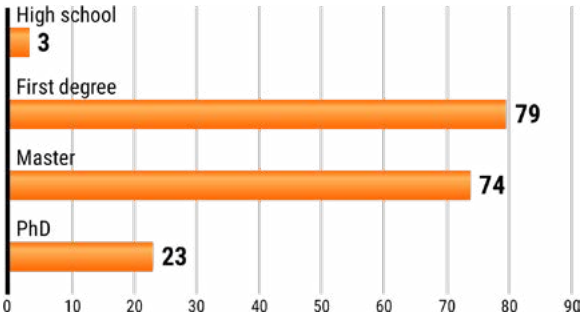
The majority of respondents have a university degree in journalism/communication (75%; n=179) (Figure 3). The remainder have a university degree in science (13%), in other areas (8%) or do not have a university degree (4%). Having a first degree is most frequent (44%; n=179), but it is worth mentioning the presence of many journalists with a master's degree (41%) (Figure 4). A portion of respondents have a PhD (13%) and only a small amount have high school as their maximum level of education (2%).

Figure 3: Training background



n=179

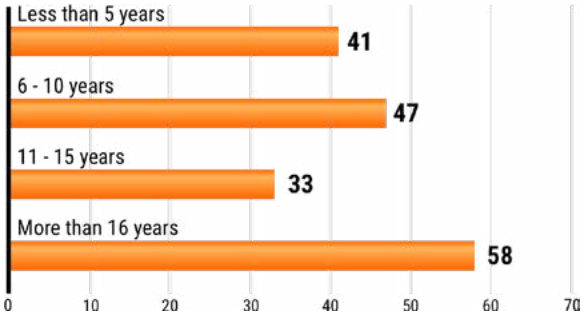
Figure 4: Level of education



n=179

One-third of the respondents are experienced professionals, with more than 16 years of experience in journalism (32%; n=179) (Figure 5). Next come journalists with six to 10 years of experience (26%), with less than five years of experience (23%) and with 11 to 15 years of experience (18%).

Figure 5: Experience in journalism



n=179

3.2. Professional area and employment situation

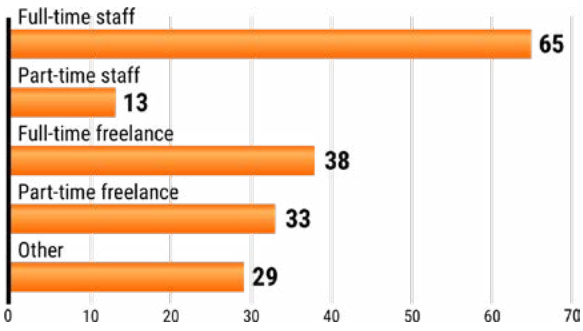
Of the 178 participants, the majority (46%) have science journalism as their main occupation (Figure 6). Another 25% are communicators who occasionally work on science issues, 6% are scientists who occasionally write for a broad audience, and 4% are public relations officers working with communicators. Thirty-five respondents (20%) indicated that they have other roles not listed above, such as professor, researcher or graduate student.

The most frequent employment position held by the respondents is full-time member of staff (37%; n=178) (Figure 7). Twenty-one percent report working as a full-time freelancer, 19% as a part-time freelancer, and 7% as a part-time member of staff. Other modalities were declared by 16% of professionals, such as public employment, media owner, and independent professional.

Figure 6: Main activity

n=178

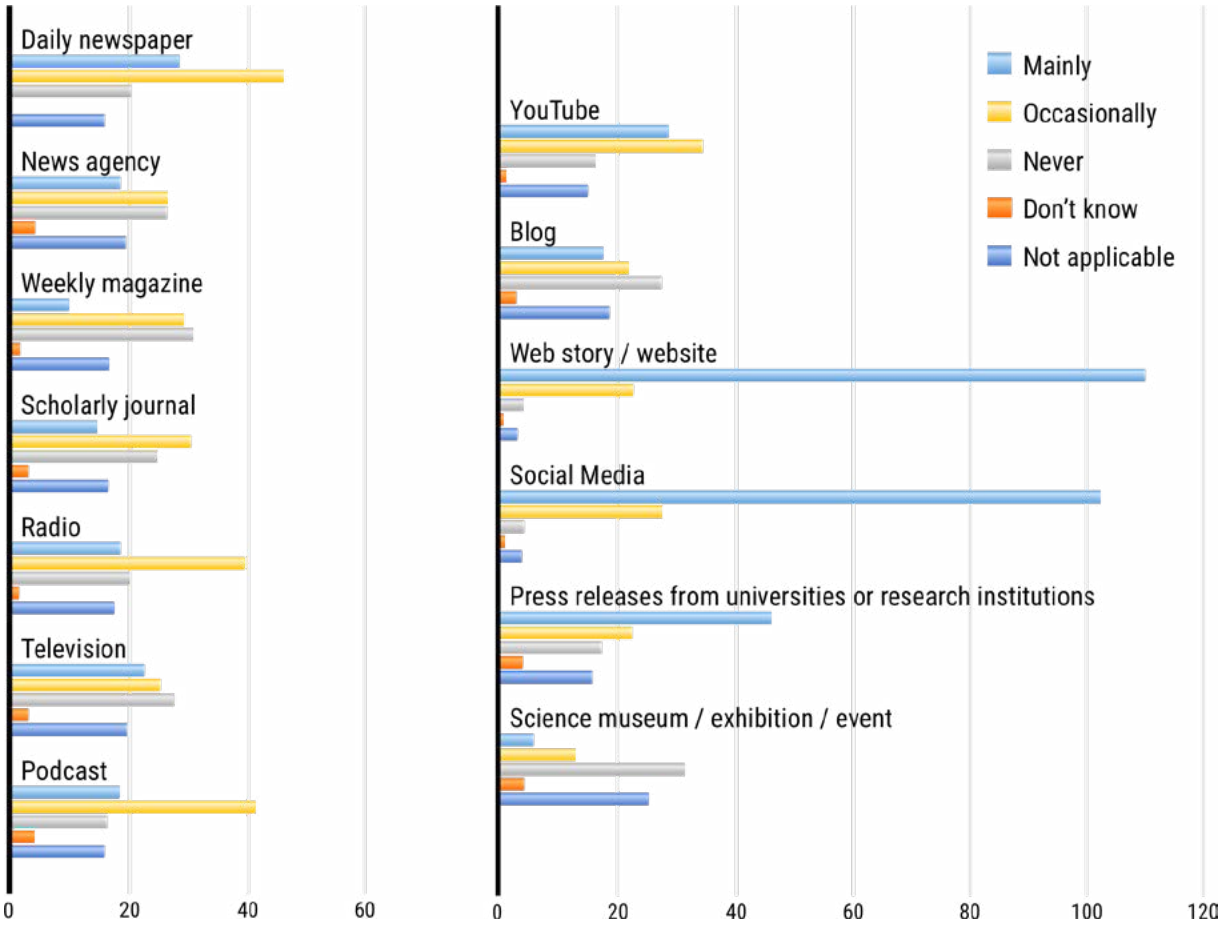
Figure 7: Employment position



n=178

Online media are the place where the work of Latin American journalists appears most. Websites and social media were indicated as the main media in 25% and 23% of the responses, respectively (n=448 of the "mainly" option; this question allowed for more than one answer) (Figure 8). At a lower level, but with relative prominence, are press releases from universities or research institutions (10%). The most frequent occasional media reported were daily newspapers (12%; n=387 of the "occasionally" option), podcast (11%), radio (10%) and YouTube (9%). Science museums/exhibitions/events (12%; n=272 of the "never" option) and weekly magazines (11%) were the media for which respondents least often produced content.

Figure 8: Media in which the work appears

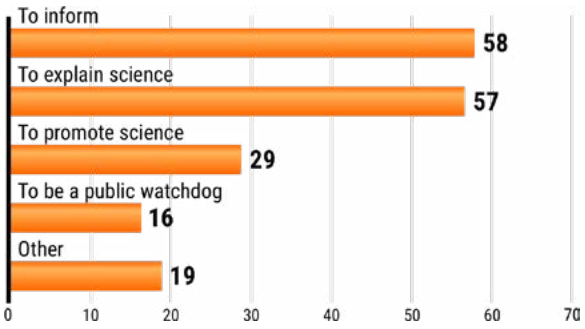


n=1,344

3.3. Reporting science: roles, neutrality and uncertainties

Informing and explaining science are the two tasks that best define the role of the science journalist, in the view of professionals in Latin America. These options were chosen by 32% of them (n=179) (Figure 9). Following this are promoting science (16%) and being a public watchdog (9%). Eleven percent of respondents indicated other roles, such as teaching science journalism, connecting science to society, and contextualizing science.

Figure 9: Science journalist roles



n=179

Note: The question was worded as follows: "How would you define your role as science journalist? (Please select only the one that best describes your role)."

Almost half of respondents (49%; n=179) believe that science journalists cannot be neutral about the subjects they cover (Figure 10), while 43% believe they can. A smaller portion (8%) did not know how to respond. In the open-ended responses, participants shared the opinion that, although there is an ideal of neutrality, it is impossible to achieve it.

> *"Nothing is neutral, not even science. So, the science journalist cannot be neutral either. They need to reflect and critically evaluate what they cover, listen to researchers outside the study on which they report, and even show situations that are not correct, as in cases of denialist governments."* (Respondent from Brazil).

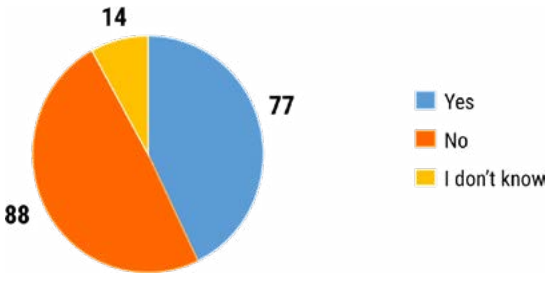
> *"In general, science journalists take the information, verify it, and once verified, we transmit it as rigorously as possible. However, in my personal opinion, we cannot always remain neutral on some particular facts. I think we should do it, it is a daily practice in my case, although I am not sure that we can always achieve it."* (Respondent from Argentina).

The majority of respondents (74%; n=179) think that scientific findings should not be reported as certainties (Figure 11). Sixteen percent stated that this is possible, and 11% did not know how to answer. In justifying their answers, some journalists mentioned the uncertainties inherent in science.

> "*There are no certainties in science; on the contrary, opening doors of certainty opens a thousand doors of doubt, the beginning of a new investigation and a new finding, which are possibilities rather than certainty.*" (Respondent from Chile).

> "*Science assumes that studies have a limited scope and it is important that citizens become familiar with the idea that scientific advances can be expanded, improved or refuted as studies go deeper.*" (Respondent form Venezuela).

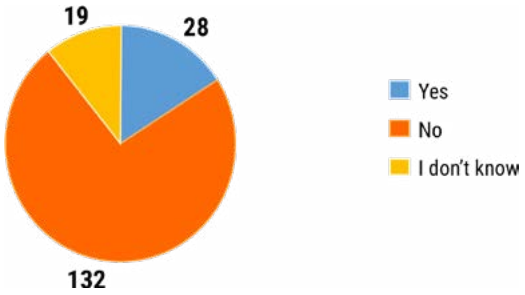
Figure 10: The possibility of neutrality in science journalism coverage



n=179

Note: The question was worded as follows: "In your opinion, can science journalists be neutral about the subjects they cover?"

Figure 11: Reporting scientific findings as certainties

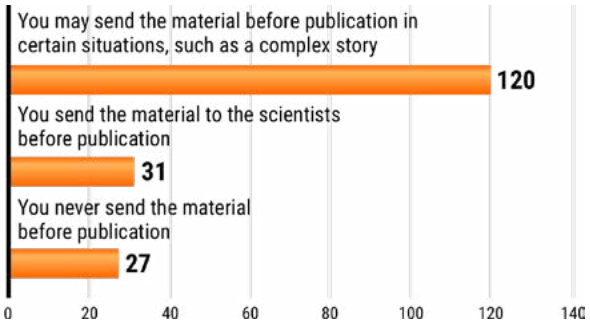


n=179

Note: The question was worded as follows: "Should scientific findings be reported as certainties?"

The practice of sending material to the interviewee before publication is common among Latin American science journalists, but only in certain situations, such as a complex story. This was the option chosen by 67% of respondents (n=178) (Figure 12). A smaller proportion (17%) stated that they submit material beforehand regardless of complexity, and 15% never submit material before publication.

Figure 12: Sending material before publication



Note: The question was worded as follows: "Some interviewees ask science journalists to send them the material before publication. What do you do when a scientist asks you to send the material before publication? (Please select only one answer)."

n=178

Also prevalent in the region is the notion that the science journalist needs to cover the follow-up if a scientist accused of fraud is later found to be innocent (80%; n=176) (Figure 13). For 18%, the journalist should try to cover the follow-up, but they said that this is not always possible. Only 2% responded that it is not necessary to cover the follow-up in such cases.

The stance is slightly similar in a case where a reported paper is later retracted by the journal. The majority (72%; n=178) stated that they would report that the paper was retracted (Figure 14), while 23% would only report that the paper was retracted if there were major reasons for this, such as fraud. Only 1% said there is no need to report the retraction. In the case of errors made by a journalist and identified after publication, 75% of the participants (n=178) responded that they would correct them (Figure 15). For 23%, the correction would only be made if they considered them to be major errors.

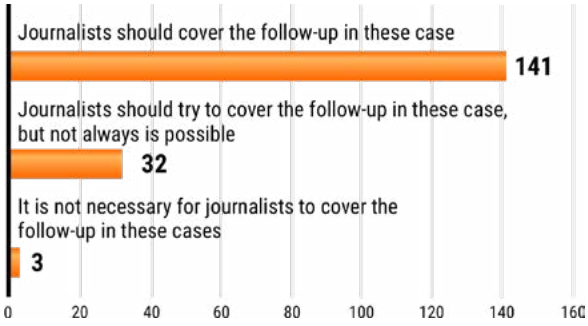
The answers to the above set of questions reveal a broad notion of the scope of science journalism.

> "*It is important to cover the follow-up of all kinds. Example: how the administrative protocols work, what the fraud was and why it does not involve the scientist, why fraud occurs in research, and, above all, clarify that science in its knowledge is inherent to human ethics and morality.*" (Respondent from Colombia)

> "*In the scientific world, this type of complaint is very important for a professional career, so continuing coverage is the ethical thing to do.*" (Respondent from Brazil)

> "*Science journalism is not reduced to reporting scientific findings, but to situate science and the activity of those who practice it in society.*" (Respondent from Peru)

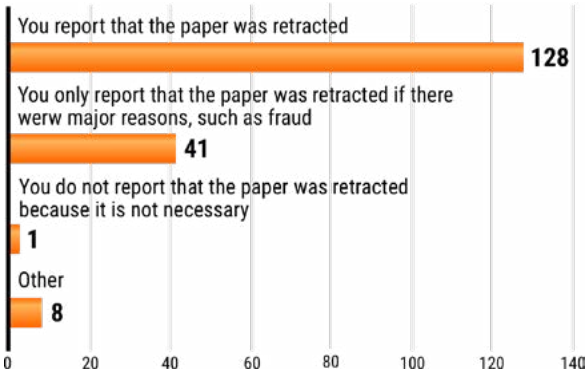
Figure 13: Coverage of fraud



n=176

Note: The question was worded as follows: "Imagine a situation in which a fraud involving a scientist has been reported in the media. However, it is later discovered that this scientist was innocent. Given this new situation, what should journalists do?"

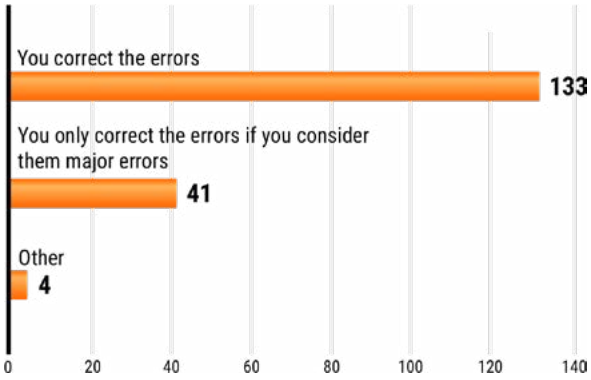
Figure 14: Coverage of retracted papers



n=178

Note: The question was worded as follows: "Imagine a situation in which a scientific paper you reported on was retracted by the journal. What do you do?"

Figure 15: Correction of errors in coverage

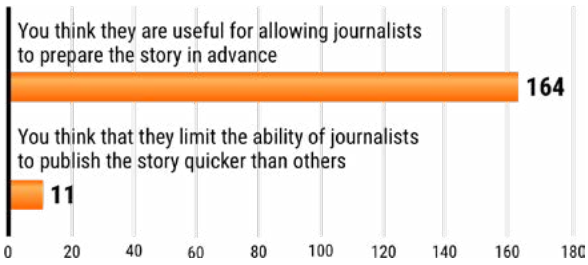


n=178

Note: The question was worded as follows: "You realize that there are some errors after publishing coverage on a specific science topic. What do you do?"

Regarding the embargo system, respondents were almost unanimous in stating that it is useful, as it allows journalists to prepare their story in advance (94%; n=175) (Figure 16). Only 6% think it limits journalists' ability to publish the story more quickly than others.

Figure 16: Embargo system



n=175

Note: The question was worded as follows: "About the embargo system... (Please select only one answer)."

3.4. Sources

We asked journalists how they choose sources when preparing a story. Most said that they look for the most important scientists in the field (75%; n=179 – this question allowed for more than one answer) (Figure 17); 52% look to have a balance of gender; 33% prefer to interview scientists who are more accessible, even if they are not the most prominent experts in the subject; and 20% look to ensure a balance in terms of their sources' age and time of experience in science.

Although the justifications varied widely, the difficulties imposed by the time within which a story must be produced were frequently mentioned by some journalists in regard to their choice of source.

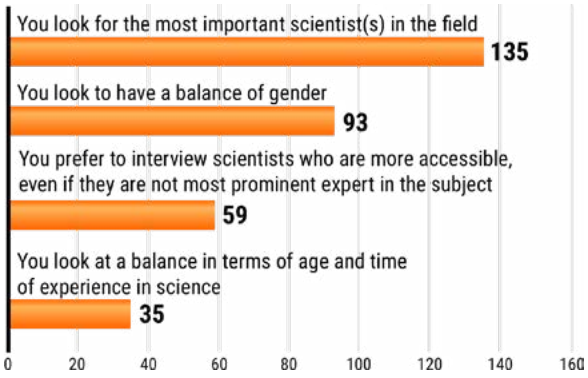
> *"A top expert who doesn't like/want to be interviewed is worth less than one who expresses himself well and understands what he says to a journalist. The idea is to balance expertise and availability."* (Respondent from Brazil)

> *"Although I try to have a balance in my sources, many times I end up consulting the most accessible sources because there is no time to wait any longer."* (Respondent from Mexico)

> *"I wanted to incorporate a gender balance, but I don't always find the options, because most studies have a male scientist as the main author."* (Respondent from Venezuela)

> *"I prefer to work with female scientists to increase their presence in the media, and because the treatment of a young journalist (me) has been more pleasant than with male scientists."* (Respondent from Mexico)

Figure 17: Selection of sourses



Note: The question was worded as follows: "When you are preparing a story, how do you choose your sources? (Select all the options that apply)."

n=179

Journalists were also asked about controversial topics. Regarding a story about the development of a new vaccine, 60% (n=174) of the participants said that it should only have sources that support vaccination as a form of disease prevention (Figure 18). For 39%, there must be a balance between pro- and anti-vaccination sources. Only one respondent said that the story should only have sources that contradict the idea of vaccination as a form of disease prevention.

The same was asked about covering a story about climate change. The percentage of those who would only choose sources that believe there are anthropogenic causes of climate change stood at 71% (n=173) (Figure 19). Another 29% look for a balance between sources that believe in anthropogenic causes and those that do not believe in climate change. No one chose the option of only sources that do not believe in climate change.

In these cases, journalists showed caution in regard to applying the traditional journalistic precept of "listening to both sides", although some took a stronger stance.

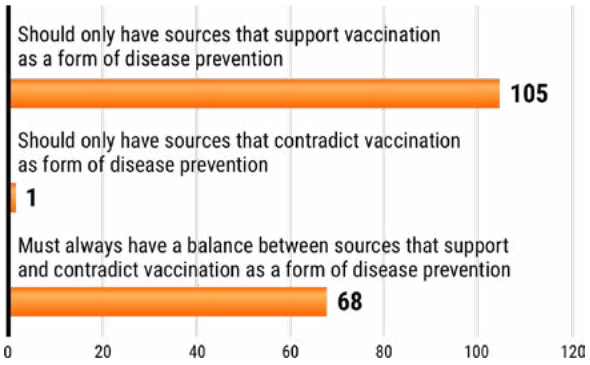
> *"Journalism (as a profession) teaches you that you should see both sides of the subject, but science journalism doesn't work like that. This is a very careful issue because, as always, there is a whole spectrum to evaluate. If there is adequate space to show that science is not a point of view, but a series of proven results, the anti-vaccine version could be included. But it depends on the context, the space and the freedom of the science journalist to deal with the subject. Never to make fun of anti-science positions."* (Respondent from Colombia)

> *"There are subjects in which the so-called 'objectivity' through the balance of sources can border on disinformation. That is why I believe that the greatest commitment of a science journalist is with the truth based on evidence."* (Respondent from Mexico)

> *"I would never give space to an anti-vaccine, a flat earther or a climate change denier in a scientific article. That is what I mean at the beginning, when I say that as a science journalist I am not neutral."* (Respondent from Chile)

> *"There is no possible balance, to the extent that those who discuss the anthropogenic origin and severity of climate change are a minority. They are not two equivalent bells."* (Respondent from Argentina)

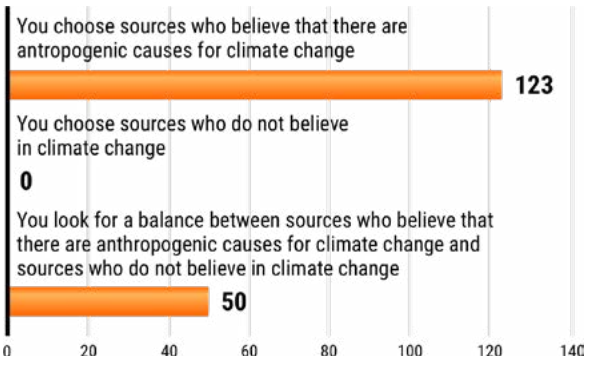
Figure 18: Selection of sources in vaccine coverage



n=174

Note: The question was worded as follows: "Do you think a story about the development of a new vaccine... (Please select only one answer)."

Figure 19: Selection of sources in climate change coverage



n=173

Note: The question was worded as follows: "You are covering a story about climate change... (Please select only one answer)."

We also asked about the choice of sources in the hypothetical coverage of a disease outbreak in a local community. The most frequently chosen option was scientists from one's country (96%; n=179 – this question allowed more than one answer), followed by health professionals (92%), people who have fallen ill or who have family who have fallen ill (86%), local people, such as indigenous peoples (68%), scientists from abroad (45%) and others (11%) (Figure 20). Government sources and political authorities were cited in the open question.

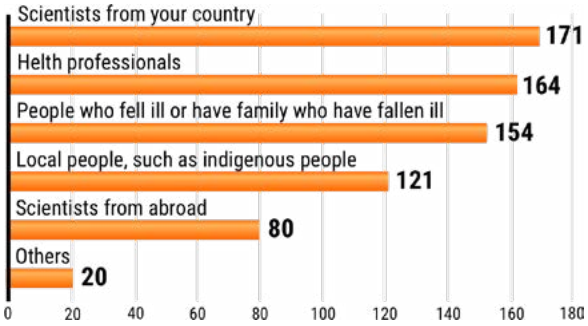
Still within this hypothetical case, we questioned whether the opinion of a scientist should be reported differently from that of a non-scientist. About half said yes (48%; n=176), while 39% said no (Figure 21). Thirteen percent said they did not know. Journalists presented different opinions on this issue.

> "*We have learned that local knowledge is a contribution to scientific knowledge and vice versa. That is, they are, I think, complementary.*" (Respondent from Chile)

> "*What a scientist says has a different weight in the text, but not more important. The testimony of an affected person can better situate the story.*" (Respondent from Peru)

> "*The scientist should be chosen to contextualize and provide information about the disease that is not yet known locally. I would give him/her more space than a non-scientist to be able to shed light on causes, risks, prevention and projections.*" (Respondent from Chile)

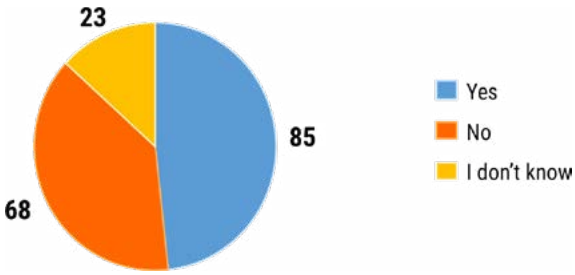
Figure 20: Selection of sources in coverage of a local disease outbreak



n=179

Note: The question was worded as follows:
"You are preparing a story about a disease outbreak in a local community in your country. Which sources do you consider to include in your story? (Select all the options that apply)."

Figure 21: Reporting the opinions of scientists and non-scientists



n=176

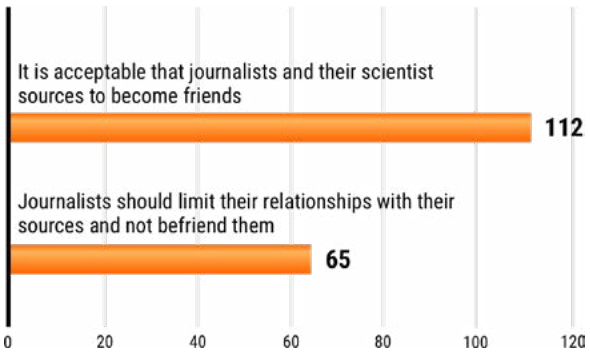
Note: The question was worded as follows:
"Continuing from the previous question, should a scientist's opinion on a subject be reported differently than a non-scientist's opinion?"

For 63% of survey participants (n=177), it is acceptable for journalists and their scientist sources to become friends (Figure 22). For 37%, journalists should limit their relationships with their sources and should not befriend them. There is also common acceptance of receiving gifts, invitations or paid trips to cover conferences from sources. For 43% (n=178), this is acceptable in some circumstances (Figure 23). For 38%, this is acceptable if they can maintain independence in their coverage. Nineteen percent consider receiving gifts, invitations or paid trips unacceptable.

> *"Often these conferences have journalistic potential and the media we work for do not have budget or willingness to support the coverage. In this case, a paid trip can serve to obtain a story of public interest."* (Respondent from Peru)

> *"I believe that invitations, gifts and paid trips should be accepted as long as it is made explicit that there is no reason to have something in return. Perhaps the journalist on a trip discovers that the conference he is attending is not of interest to him/her, or that the focus of the presentations was very businesslike. The independence of publishing or not, and what to publish and what not, must always be respected."* (Respondent from Uruguay)

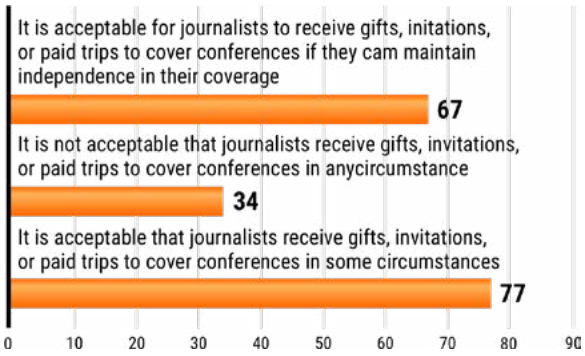
Figure 22: Relationship with sources



n=177

Note: The question was worded as follows: "Many journalists become friends with scientists they interview. What is your opinion on this matter? (Please select only one answer)."

Figure 23: Receiving gifts, invitations or paid trips

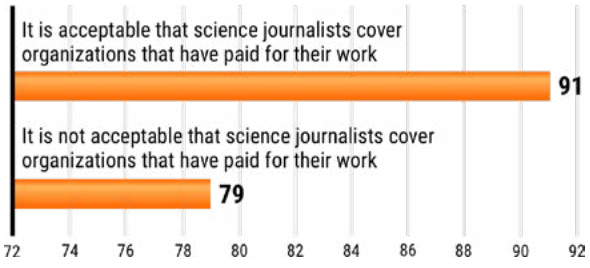


n=178

Note: The question was worded as follows: "Some journalists receive gifts, invitations, or paid trips to cover conferences from their sources. What is your opinion on this matter? (Please select only one answer)."

There is a more pronounced division regarding the relationship between journalists and organizations that pay for their work. Just over half of respondents (54%; n=170) think it is acceptable that science journalists cover organizations that have paid for their work, while 46% disagree (Figure 24). However, the majority (72%; n=177) think that science journalists should declare the source of the funding they receive to carry out their work (Figure 25). Nine percent answered that they should not declare this funding, and 19% did not know how to answer.

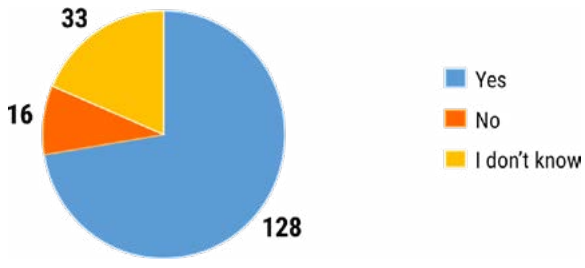
Figure 24: Covering organizations that have paid for the work



n=170

Note: The question was worded as follows: "In your opinion: (Please select only one answer)."

Figure 25: Declaration of funding source



n=177

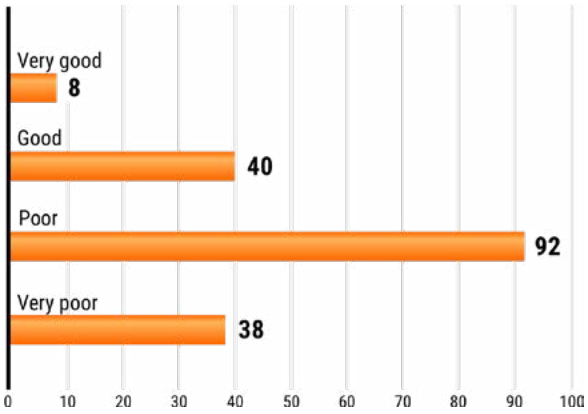
Note: The question was worded as follows: "Do you think science journalists should declare the source of their funding to carry out their work?"

3.5. Other ethical issues

The protection of media ethics was rated as "poor" in Latin American countries by about half of the respondents (52%; n=178) (Figure 26). Added to the "very poor" option (21%), the negative assessment rises to 73%. Twenty-two percent of respondents rated the country in which they live/work as "good" in terms of protecting media ethics, and only 4% as "very good".

Low pay was identified as the main issue faced by the journalists who participated in the survey (77%; n=179 – this question allowed for more than one answer) (Figure 27). This was followed by fake news (64%), pressure to provide news that attracts an audience (57%), political or corporate spin (56%), a lack of editorial freedom (24%), hate speech (20%), censorship (20%), the verification of information passed on by third parties (17%) and others (10%).

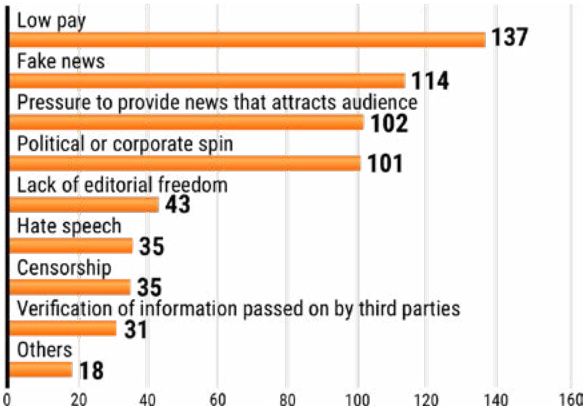
Figure 26: Protection of media ethics



n=178

Note: The question was worded as follows: "How would you rank the country in which you live/work in terms of protecting media ethics?"

Figure 27: Main issues or current violations of ethical reporting

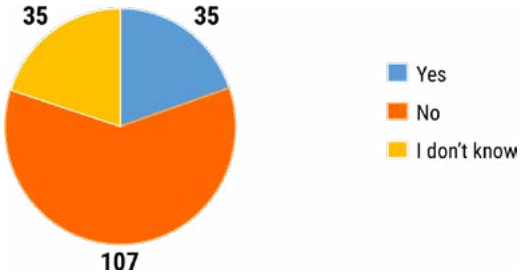


n=179

Note: The question was worded as follows: "What are the main issues or current violations of ethical reporting that you, as a science journalist, face in order to carry out your work? (Select all the options that apply)."

For most respondents (60%; n=177), professionals from areas other than journalism should not be allowed to shape the ethical priorities of science journalism (Figure 28). Twenty percent said they should, while another 20% did not know how to answer. The majority (73%; n=179) also stated that their respective countries have a science journalism association (Figure 29), but more than half (55%; n=143) reported being unaware of the existence of a code of ethics for science journalism (Figure 30).

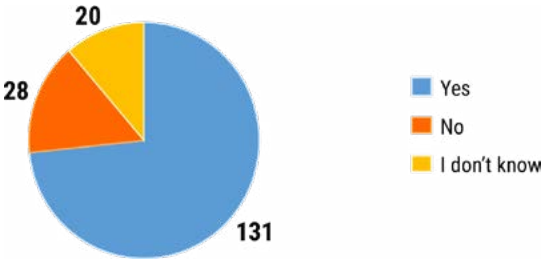
Figure 28: Shaping the ethical priorities of science journalism



n=177

Note: The question was worded as follows: "Do you think that professionals from areas other than journalists should be allowed to shape the ethical priorities of science journalism?"

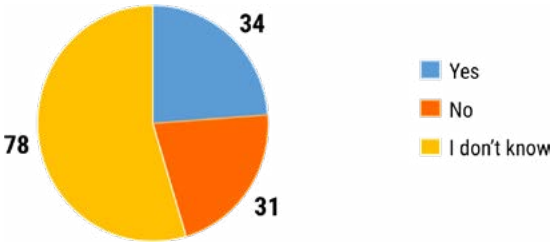
Figure 29: Existence of a science journalism association



n=179

Note: The question was worded as follows: "Is there a science journalism association in your country?"

Figure 30: Existence of a code of ethics for science journalism



n=143

Note: The question was worded as follows: "If you answered yes, does the science journalism association in your country have codes of ethics for science journalism?"

REFERENCES

Anaya, R. (2016). Historia del Periodismo Científico en Mexico: Una historia que falta por contar. RedMPC. Retrieved 11 March 2022, from https://redmpc.wordpress.com/historia/

Bauer, M. W., & Gregory, J. (2007). From journalism to corporate communication in post-war Britain. In M. W. Bauer & M. Bucchi (Eds.), *Journalism, Science and Society: Science Communication between news and Public Relations* (pp. 33–52). Routledge.

Bauer, M. W., Howard, S., Ramos, Y. J. R., Massarani, L., & Amorim, L. (2013). Global Science Journalism Report: Working Conditions & Practices, Professional Ethos and Future Expectations. SciDev.Net.

Boltanski, L., & Maldidier, P. (1977). *La vulgarisation scientifique et son public*. CORDES.

Brumfiel, G. (2009). Science journalism: Supplanting the old media? *Nature*, *458*(7236), 274–277. https://doi.org/10.1038/458274a

CIME. (2018). Media Ethics in the Post-Truth Era. Retrieved 11 March 2022, from https://mailchi.mp/77ba8dcf9ca7/media-ethics-in-the-post-truth-era-survey-results?e=5ab73e82c3

Dunwoody, S. (2008). Science journalism. In M. Bucchi & B. Trench (Eds.), *Handbook of Public Communication of Science and Technology* (pp. 15–26). Routledge.

Massarani, L. (2021). Jornalismo científico na América Latina: registro histórico do Primeiro Seminário Interamericano realizado na região em 1962. *Intercom: Revista Brasileira de Ciências Da Comunicação*, *44*(1), 273–285. https://doi.org/10.1590/1809-58442021113

Massarani, L., Amorim, L., Bauer, M. W., & Oca, A. M. (2012). Periodismo científico: reflexiones sobre la práctica en América Latina. *Chasqui*, *120*, 73–77.

Massarani, L., Bauer, M., & Amorim, L. (2013). Um Raio X dos Jornalistas de Ciência: Há Uma Nova "Onda" no Jornalismo Científico no Brasil? *Comunicação & Sociedade*, *35*(1), 111–129. https://doi.org/10.15603/2175-7755/cs.v35n1p111-129

Massarani, L., Entradas, M., Neves, L. F. F., & Bauer, M. W. (2021a). Global Science Journalism Report 2021: Working conditions and practices, professional ethos and future expectations. SciDev.Net/CABI.

Massarani, L., Neves, L. F. F., & da Silva, C. M. (2021b). Excesso e alta velocidade das informações científicas. *E-Compós*. https://doi.org/10.30962/ec.2426

McGovern, P., Smeaton, D., & Hill, S. (2004). Bad Jobs in Britain. *Work and Occupations*, *31*(2), 225–249. https://doi.org/10.1177/0730888404263900

Moreira, I. C., & Massarani, L. (2002). Aspectos históricos da divulgação científica no Brasil. In L. Massarani, I. C. Moreira, & F. Brito (Eds.), *Ciência e público: caminhos da divulgação científica no Brasil* (pp. 43–64). Casa da Ciência/UFRJ.

Pasquali, R. C. (2021). *Introducción al Periodismo Científico: Argentina Siglo XIX*. Ariel Publisher.

Pew Research Center. (2004). State of the News Media. https://www.pewresearch.org/wp-content/uploads/sites/8/2017/05/State-of-the-News-Media-Report-2004-FINAL.pdf

Pew Research Center. (2007). State of the News Media. https://www.pewresearch.org/wp-content/uploads/sites/8/2017/05/State-of-the-News-Media-Report-2007-FINAL.pdf

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