REVISTA INTERCOM | Brazilian Journal of Communication Sciences ISSN 1809-5844

Original Article 10.1590/1809-58442026112en Open access

# **Copy or create?** Some possibilities for enriching journalistic narratives about science and technology based on press releases

*Copiar ou criar? Algumas possibilidades de enriquecimento das narrativas jornalísticas sobre ciência e tecnologia a partir de press-releases*

*¿Copiar o crear? Algunas posibilidades para enriquecer las narrativas periodísticas sobre ciencia y tecnología a partir de comunicados de prensa*

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**Editorial Details**
*Double blind review system*

***Article History:***
*Received:* 05/29/2025
*Accepted:* 02/02/2025
*Available online:* 03/30/2026
*Article ID:* e2026112
***Editors in Chief:***
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***Reviewers:***
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*Felicity Clarke (English)*
*Federal University of Rio de Janeiro (UFRJ)*
***XML Editing and Markup:***
*IR Publicações*
***Funding:***
*CNPq*
***How to cite:***
*FIORAVANTI, C. H. Civic bots: Copy or create? Some possibilities for enriching journalistic narratives about science and technology based on press releases. São Paulo: INTERCOM - Revista Brasileira de Ciências da Comunicação, v. 49 (2026), e2026112. https://doi.org/10.1590/1809-58442026112en*
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**Abstract**
This study examines how press releases (PRs) are used and how they could be improved during the journalistic production process. A sample of 322 PRs published in the EurekAlert! repository was examined through content analysis, complemented by a sociotechnical approach and observation of journalistic production practices. The findings indicate that churnalism (the full or partial reproduction of the original text) is prevalent: one in four PRs was reproduced *ipsis litteris* (verbatim), one in two underwent minor alterations, and one in five received complementary additions that increased its journalistic value. The analysis reveals an inverse relationship between the laboriousness of a strategy and its frequency of use. This is evidenced by the less frequent application of more demanding techniques, such as: interviewing researchers not directly involved in the reported work, citing caveats, or warning that results announced at conferences are merely abstracts of ongoing studies. Expanding upon these results, the theoretical and practical framework suggests nine possibilities for enriching journalistic stories based on PRs. These possibilities emphasize the inclusion of actors beyond those directly involved in the research, highlighting their connections and the uncertainties regarding the results and the continuation of the scientific work.
**Keywords:** Scientific Journalism; Scientific Dissemination; Actor-Network Theory; Press Releases.

**Resumo**
Este estudo investiga como os *press-releases* (PR) são usados e como poderiam ser aprimorados durante o processo de produção jornalística. Uma amostra de 322 PR publicados no repositório EurekAlert! foi examinada por meio de uma análise de conteúdo, complementada por uma abordagem sociotécnica e pela observação das práticas de produção jornalística. Os resultados indicam que o churnalismo (reprodução total ou parcial do texto original) predomina: um em cada quatro PR foi reproduzido literalmente, um em cada dois sofreu pequenas alterações e um em cada cinco recebeu acréscimos complementares que aumentaram seu valor jornalístico. A análise revela uma relação inversa entre a complexidade de uma estratégia e sua frequência de uso. Isso é evidenciado pela aplicação menos frequente de técnicas mais exigentes, como: entrevistar pesquisadores não diretamente envolvidos no

**CRediT**

- Conflicts of Interest: The authors certify that they have no commercial or associative interests that represent a conflict of interest regarding the manuscript.
- Author Contributions: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Software; Supervision; Validation; Visualization; Writing – original draft; Writing – review and editing: FIORAVANTI, C. H.

**Acknowledgments:**
Regina Fioravanti, José Roberto Ferreira, and Sarah Schmidt, through their critical readings, greatly helped improve the quality of this work. César Fioravanti provided valuable assistance in checking calculations and preparing the graphs.

**Data Availability:**
All data supporting this article are contained within the body of the text.

INTERCOM encourages data sharing; however, in compliance with ethical guidelines, it does not require the disclosure of any means of identifying research participants, thereby preserving their privacy. The practice of open data aims to enable the reproducibility of results and ensure full transparency of published research outcomes, without requiring the identification of research subjects.

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**Plagiarism Check:**
Intercom Journal submits all documents approved for publication to plagiarism verification using a dedicated tool.

trabalho relatado, citar ressalvas ou alertar que os resultados anunciados em conferências são meramente resumos de estudos em andamento. Expandindo esses resultados, o arcabouço teórico e prático sugere nove possibilidades para enriquecer matérias jornalísticas baseadas em PR. Essas possibilidades enfatizam a inclusão de atores além daqueles diretamente envolvidos na pesquisa, destacando suas conexões e as incertezas quanto aos resultados e à continuidade do trabalho científico.
**Palavras-chave:** Jornalismo Científico; Divulgação Científica; Teoria Ator Rede; *Press-Releases*.

**Resumen**
Este estudio examina cómo se utilizan los comunicados de prensa (CP) y cómo podrían mejorarse durante el proceso de producción periodística. Se examinó una muestra de 322 CP publicados en el repositorio EurekAlert! mediante análisis de contenido, complementado con un enfoque sociotécnico y la observación de las prácticas de producción periodística. Los hallazgos indican que el churnalismo (reproducción total o parcial del texto original) es prevalente: uno de cada cuatro CP se reprodujo ipsis litteris (texto textual), uno de cada dos sufrió modificaciones menores y uno de cada cinco recibió adiciones complementarias que aumentaron su valor periodístico. El análisis revela una relación inversa entre la complejidad de una estrategia y su frecuencia de uso. Esto se evidencia en la aplicación menos frecuente de técnicas más exigentes, como entrevistar a investigadores no directamente involucrados en el trabajo reportado, citar advertencias o advertir que los resultados anunciados en congresos son meros resúmenes de estudios en curso. Ampliando estos resultados, el marco teórico y práctico sugiere nueve posibilidades para enriquecer las historias periodísticas basadas en CP. Estas posibilidades enfatizan la inclusión de actores más allá de los directamente involucrados en la investigación.
**Palabras clave:** Periodismo Científico; Divulgación Científica; Teoría del Actor Red; Notas de prensa.

Press releases (PRs, which refers to both singular and plural forms) are a key source of information for journalists who report on science and technology. They are used in addition to other journalistic practices, such as direct contact and interviews with scientists and directors of research centres and funding agencies, visiting laboratories, monitoring expeditions, conferences and other scientific events, and having direct access to publications and other materials.

PRs are official documents for disseminating relevant information from public or private institutions. Their reach is broad: Oliveira et al. (2024) examined four science news agencies—two international ones, EurekAlert! and its European counterpart AlphaGalileo, and two national ones, the UK's Science Media Centre and Brazil's Bori—and concluded that their content, being accessible online to anyone interested, can reach an audience that extends beyond registered journalists. Presented in a journalistic format, the PR provides an overview of recent scientific findings. This increases the visibility of both the research and the institution and, through complementary information such as contact details for interviews, seeks to motivate media teams to develop journalistic stories (Carver, 2014).

Orlandi considers PRs—and, more generally, scientific dissemination—a version or reformulation of scientific papers (Orlandi, 2010, 2001). PRs are generally produced by teams of journalists, public relations, and/or marketing staff, and, like journalistic stories, they follow the principles of scientific dissemination outlined by Livramento Chaves and Alvarez (2022): they are aimed at a general public, who supposedly would not be able to understand the specialized information, and they seek to expand knowledge about scientific and technological production. They do, however, have essential differences: a PR always disseminates a positive view of a product, company, or institution—which is why it is considered a public relations tool, aiming to reinforce institutional image and credibility (Carver, 2014; Vogler & Schäfer, 2020)—while journalistic news should inform in an impartial and balanced way. The PR presents only the institution's point of view, whereas the news should also expose different perspectives after checking and verifying the information (Escola DNC, 2024). In this way, the role of journalists also differs when they are in distinct positions: the press officer, who usually produces the PRs, is responsible for the institution they work for or provide services to, while the journalist for independent publications must examine the relevance of the research and the institutions, presenting them in the proper context (Autzen, 2014; Zhang et al., 2024).

Some studies have explored the relationship between PRs and their source material. Vogler and Schäfer (2020) detected a growing influence of PRs in Switzerland by examining 5,378 PRs produced between 2003 and 2017 by the University of Zurich and the 13,985 news reports they generated in four major newspapers in the country. Sumner et al. (2014) warn of the partiality of PRs, which, when compared with the scientific papers that gave rise to them and the resulting press news, show an excessively optimistic news tone and exaggerated causal claims. The news reports often reflected the exaggerations of the PRs and sometimes presented conclusions different from those of the original scientific article.

Although PR have some shortcomings, they are valuable to journalists as they offer essential details on subjects to report, helping save time and streamline their workflow. However, interdependence has been created, to the extent that, in some cases, more than 65% of the sentences in science reports reflected a high similarity to the original PR, according to an analysis by Comfort et al. (2024) of 414 scientific papers published in *Nature* and *Science*, which resulted in 298 PRs and 678 news reports. This interdependence, which has implications for both PR creators and news consumers in publications considered independent (Comfort et al., 2024), leads to a phenomenon known as "churnalism". The term, derived from "churn out," was created by BBC journalist Waseem Zakir to describe the rapid, high-volume production of low-quality material. It is used to designate the production of second-hand journalistic material, without verification or independent reporting, with little or no alteration, simply by rewriting or fully using material from PRs or agency news, as a way of circumventing an excessive workload, a scarcity of journalists in newsrooms, and cost and time pressure (Harcup, 2015, p. 8; Pack, 2020, pp. 6-13; Mellor, 2024, p. 11; Jackson & Moloney, 2015).

Heyl and Guenther (2020), analyzing a sample of 40 press releases issued by South African universities over a five-month period and 40 corresponding news articles, concluded that the country's media generally republish press releases without properly crediting their sources, as only 11 news stories contained additional information or interviews. In doing so, journalists set aside the critical and investigative role expected of them, limiting themselves to biased coverage and to a distorted, because unilateral, view of science. Heyl and Guenther warn that access to press releases should not replace journalists' work of reading scientific articles, interviewing researchers, and writing their own stories.

This study has a similar objective to that of Comfort et al. and Heyl and Guenther in comparing PRs with the texts derived from them, but instead of looking for similarities, that is, evidence of churnalism, I intend to go further and look for the transformations in language and focus generated from the PRs to see what strategies have emerged and what other strategies could potentially be used.

A casual discovery motivated this research. In 2023, as a professional journalist, I found a PR from the University of Cambridge, in the United Kingdom, about the return to Nigeria of 116 objects kept in its Museum of Archaeology and Anthropology, which had been taken by the British armed forces during the looting of Benin City in 1897 (Cambridge..., 2022). The PR motivated a report in the newspaper *The Guardian*, which expanded the news, adding comments from two people who were not in the PR—an expert who knew the situation, identified only as a university spokesperson, and the Nigerian culture minister, who had been interviewed in a previous report—and examples of three other European museums that had already returned objects from Nigeria or Greece (Clinton, 2022).

The use, expansion, and modification of the PR inspired the central questions of this paper: Which types of transformations are most frequent? What elements could a writer of ST&I news add to their narrative, even if time is short? What else, apart from the standard options, could be done? Would other types of transformations be possible?

## Methodology

I examined the PRs and the texts derived from them using two complementary approaches, to which I added, whenever possible, my observations as a professional ST&I journalist since 1985.

The first is content analysis (CA), defined as "a scientific research technique based on systematic, intersubjectively validated, and public procedures to create valid inferences about certain verbal, visual, or written contents, seeking to describe, quantify, or interpret a certain phenomenon in terms of its meanings, intentions, consequences, or contexts" (Sampaio & Lycarião, 2021, p. 18). More specifically, a categorical CA, which "works by operations of dismembering the text into units, into categories according to analogical regroupings" (Sampaio & Lycarião, 2021, p. 101). Categories, in turn, are "elements that give us the means to describe the phenomenon under investigation," "generally based on the research question, the selected unit of analysis, relevant theories, previous research, and even based on the data itself" (Sampaio & Lycarião, 2021, p. 45). Its operationalization takes place through three stages: 1) pre-analysis, which consists of choosing the documents to be submitted for analysis, formulating hypotheses and objectives, and developing indicators to support the final interpretation; 2) exploration of the material, when the raw data is worked on and aggregated into units; and 3) the treatment and interpretation of the results obtained (Bardin, 2016, pp. 63-67).

The second is Actor-Network Theory (ANT), a strand of the constructivist approach to the sociology of science, which considers the production of knowledge a collective process (Knorr-Cetina & Mulkay, 1985). From this perspective, scientific production is the result of the interaction of different groups of actors, not just scientists, with different interests, while the traditional approach, also called classical, portrays scientists and engineers as the exclusive actors of scientific discoveries and technological innovation, with little or no interaction with other groups and a clear separation between the internal world of the laboratory and the external world (Latour, 2000, pp. 258-262).

Within ANT, achievement is never assured, regardless of how remarkable a discovery or innovation may be, since numerous social actors can support, slow down, or prevent the progress of ST&I. In this approach, scientific dissemination is one of the elements in the processes of constructing scientific facts and convincing scientists of the relevance of the work they do (Latour, 2001, pp. 117-132). For ANT, an actor is "anything that modifies a state of affairs by making a difference" (Latour, 2005, p. 71). Actors can also be non-human—a text, a machine, an institution—and determine the limits of the human actor. A network involves flows, circulations, alliances (Freire, 2006), and an actor's ability to "make others do the unexpected" (Latour, 2005, pp. 128-131), rather than being a physical structure with many connected points.

Already seen as a useful tool for examining and improving scientific journalism (Fioravanti & Velho, 2010; Fioravanti, 2013), ANT also adopts the concept of displacement or translation, understood as "the transposition from one place to another": "Translating interests means, at the same time, offering new interpretations of these interests and channeling people in different directions" (Latour, 2000, p. 194). Displacement may also be understood as "a detour, a mediation, or the creation of a new relationship that did not exist before, which, in some way, changes the participants involved and, as a result, alters the network" (Pedro, 2000). Prior to exploring ways to enhance news generated from PR, it was important to first review existing practices.

For this purpose, due to the abundant production, I selected the news distribution platform EurekAlert!, one of the most comprehensive PR services, which significantly influences global ST&I coverage (Zhang et al., 2024). Established in 1996 and operated by the American Association for the Advancement of Science (AAAS), EurekAlert! has around 5,000 paying clients (universities, journal publishers, medical research centres, government agencies, companies, and other organizations linked to scientific research). The PRs—in English, Japanese, Chinese, French, German, Spanish, and Portuguese—are free for public access, and journalists, upon request, can receive embargoed materials. In October 2023, it sent daily emails with links to recently published or embargoed papers to around 11,000 registered journalists from approximately 90 countries (Overview, 2024). Comparados com os artigos científicos dos quais se originaram, os PR confirmam o papel dos assessores de imprensa em tornar a produção científica mais acessível ao público e à mídia. Mais da metade dos PR publicados na EurekAlert! tratam de ciência básica (Zhang, et al., 2024).

The news releases, as PRs are called, are divided into five categories: Peer-Reviewed Publication (PP), Meeting Announcement (MA), Grant and Award Announcement (GA), Reports and Proceedings (RP), and Business Announcement (BA) for meetings between authorities, hirings, or agreements between institutions.

All PR display, above the headline, the date of publication and, below it, the category to which they belong and the institution responsible for their release. Media contact information—provided in case journalists wish to request interviews or additional information—appears in the upper right corner, along with the reference to the publication that motivated the press release and a link to the original publication (a scientific journal or the website of a university or medical association), the agency that funded the work, and the keywords. A captioned photograph is placed at the top right of the text, and the press release typically concludes with a profile of the institution responsible for the release or of the journal in which the study was published.

To examine the transformation practices on PRs, I chose the month of September 2024, close to the initial writing of this essay.

**Results**

The advanced search mechanism identified 322 PRs published on the EurekAlert! website between 1st and 30th September 2024. The initial breakdown, as proposed by Sampaio & Lycarião (2021, p. 101), indicated a predominance of the PP category (135), followed by RP (72), GA (56), MA (40), and BA (19). The PRs adhere to some rules of journalistic writing (objectivity, clarity, conciseness), but do not include the impartiality that is one of the tenets of journalism. PRs presenting limitations of the studies are quite rare; only three emerged, all within the RP category.

As recommended by the ANT, I followed the news derived from the PRs. By using the title of each PR in the Google search engine, I sought out stories derived from the PRs on non-academic and non-governmental, open-access news websites. I did not consider the universities, foundations, NGOs, journals, or companies from which the Eurekalert PR originated.

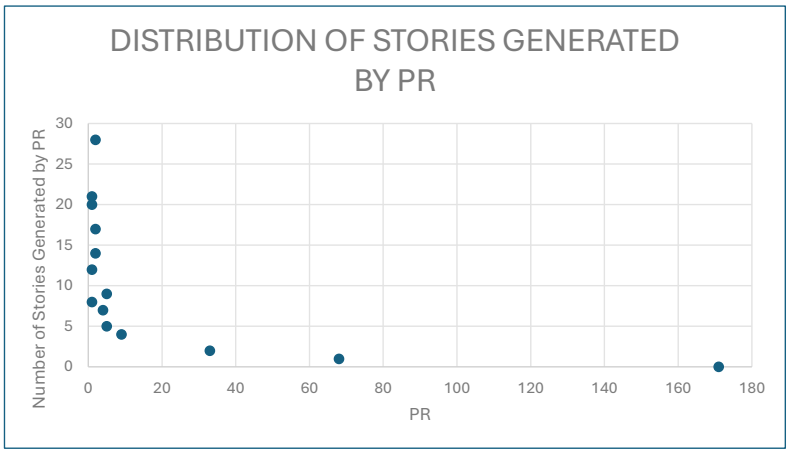
Of the 322 PRs, 171 did not generate any coverage, while the other 151 generated a total of 498 stories, with varying degrees of transformation from the original PRs. In this sample, the use of the PRs was 46.89%, indicating that nearly half of them generated a subsequent article. The average number of derived stories per PR was 1.54, ranging from 0 to 28 (Figure 1). The PRs from which stories were reproduced or recreated were predominantly PP (83), followed by RP (47), GA (6), MA (6), and BA (5).

The 498 stories derived from PRs were published across 231 websites, which were grouped into three categories—*producers*, *replicators*, and *transformers* (Sampaio & Lycarião, 2020, pp. 45 and 101). Now, the two methodological approaches overlap, as these categories also reflect different groups of actors who enact displacements—of space, focus, or time—leading the reader in different directions and revealing alternative aspects of reality (Latour, 2000, p. 194; Pedro, 2000).

**Producers** are the primary news distributors. Here, I will only mention EurekAlert! due to its comprehensive role. EurekAlert! sends the same PR, published on the site, to registered journalists on behalf of its clients (universities, companies, professional associations, scientific journals, research funding agencies, and research centres), who generally do not distribute them to potential interested parties.

Of the 231 websites, 62 act as **replicators**. These are websites aimed at specific professional categories or news portals that publish entire copies of the original PR or copies from other sites.

**Figure 1** - Distribution of stories generated by PR




A further 176 websites fall into the **transformers** category. These include general news sites, science websites, journalistic magazines, news agencies, and newspapers, which publish versions of the PRs that are more or less redone. There are two distinct subgroups within the transformers, each adopting a different strategy regarding the original text:

- The 127 low transformers (LT) publish summarised versions of the PRs, using partial content, sometimes with additional resources, as detailed below.
- The 49 high transformers (HT) offer broader, more complete, and more contextualised versions of the PRs.

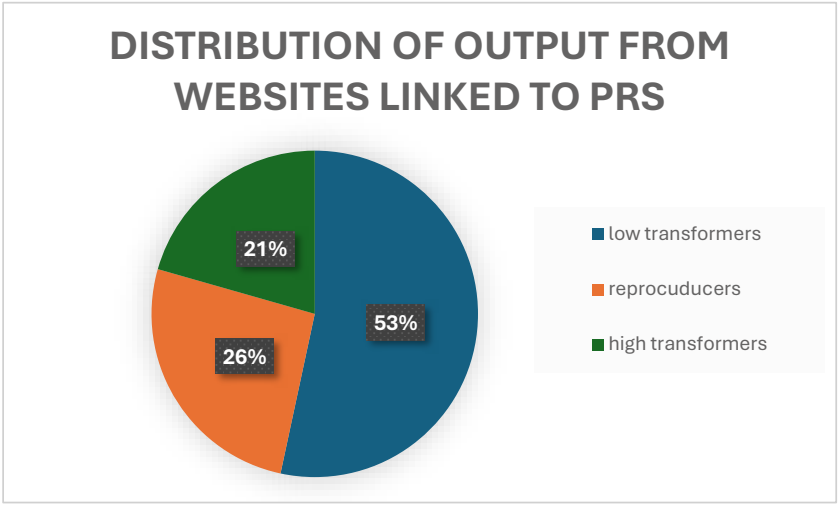
The sum of these sub-groups is 238 websites because seven of them employed two or more distinct strategies.

This sampling suggests that one in four PRs will be reproduced *ipsis litteris*, one in two will undergo minor transformations, and one in five will receive careful editing and complementary additions that increase its journalistic value (see Figure 2).

The 62 Replicators published 164 copies of the original PRs or copies sourced from other websites; notable in this group are two websites, ScienceDaily, with 39 fully copied PRs, and Medical X Press, with 13. Curiously, 74 of the stories (45%) fail to cite the PR or another original source (41.34%); even high-circulation outlets such as *Newsweek*, *Guardian*, *The Independent*, *BBC*, and *AP* cite excerpts and comments extracted from PRs without attributing the sources.

The 127 LT sites published 179 stories, primarily in the form of summaries; Phys.org is the foremost among the low transformers, with 11 published stories. This constitutes a hybrid group, at times merely summarising the PR, and at others enriching it with other elements.

**Figure 2** - Distribution of output from websites linked to PRs



The 49 HT sites published 155 stories derived from PRs; the leader in this category is Healio, with 11 published stories. This is the group whose stories exhibit the highest journalistic quality, as they present counterpoints and caveats to the news. Intriguingly, six PR titles displayed the conjunction "but," a clear signal of opposition or caution, which, however, only appeared in the subtitle of a single article from the HT group (in a report on a medication published on the TCTMD website). Conversely, the celebratory tone common in PRs is rare in the stories derived from them: the adjective "ground-breaking," which signifies extreme confidence in the success of the research or technology, appears in only three LT stories and two HT stories.

There are common strategies employed by the three types of websites to enrich the PRs. Table 1 describes six transformation practices used by the three categories of websites. The same story may incorporate more than one strategy.

**Table 1 -** Transformation practices

| TRANSFORMATION PRACTICES | | | | |
|---|---|---|---|---|
| **Strategy (Additions: A; Modifications: M)** | | **Replicators** | **Low Transformers** | **High Transformers** |
| (A) Graphic Elements* (from the PR or article) | Infographic | 5 | 23 | 10 |
| | Video | 1 | 28 | -- |
| | Map | 1 | 3 | 1 |
| (A) Endogenous information (from the site itself) | Links to proprietary stories | 13 | 23 | 12 |
| | Glossary | 1 | 5 | -- |
| (M) Perspective | Title (affirmative to interrogative) | - | 3 | 3 |
| | Focus (theoretical to applied) | | -- | 3 |
| | Alternative language (register) | -- | -- | 1 |
| (A) Academic reinforcement | Comments from the research author(s) | -- | 13 | 17 |
| | Comments from external researchers | -- | 3 | 10 |
| | Similar studies | -- | 1 | 9 |
| | Excerpts from the article | -- | -- | 2 |
| (A) Counterpoints | Uncertainties, limitations of the research/technolog, or caveats | -- | -- | 15 |
| | Competing products/companies | -- | -- | 1 |
| (A) Concreteness | Demonstration of the equipment | -- | -- | 1 |

Note: *I did not consider photographs or illustrations, as they are a very common resource in all three categories.

The simpler a strategy is, the more widely it is adopted. This is the case with links to stories already published on the site, a resource adopted by all three groups. Maps, which require more editing attention, are already used less frequently. Including interviews with the author or authors of the reported research is a resource adopted by both the LT and HT groups, but more intensely by the latter.

The more laborious a strategy is, the less it is used. Both LT and HT sites cite interviews with researchers not involved in the reported work, but the second group adopts unique strategies. Only HT sites cite uncertainties (e.g., *Live Science*), limitations of the research/technology (*Reuters*), or caveats (mainly *Medscape*), by explicitly detailing the small number of study participants, side effects of medications, conflicts of interest and sponsors, or by warning that results announced at conferences are only abstracts of ongoing studies and not the complete, peer-reviewed work. Only HT sites also quote excerpts from the original article that gave rise to the news, which demands a high degree of editing skill, or change the focus, for example, by emphasising a disease caused by a fungus instead of the fungus itself, as in the PR (*ScienceNews*). Still within this group, only one site featured a demonstration of the reported equipment (*Reuters*), or adopted an alternative language for the report (a comic strip, *DogoNews*).

The HT sites recreate the PR and offer surprising stories: they soften the typical institutional focus characteristic of PRs and enhance the value of the object, the conclusions, or the implications of the research, which are also examined through comments from external researchers or similar studies. This group includes

the most complete journalistic pieces, with views complementary to those of the original research, such as those from *Reuters*, the *BBC*, or *Smithsonian Magazine*.

## Discussion

Following the PRs revealed that the majority of news websites simply reproduce or summarise them, rarely adding value to the original text. The situation raises the question of why so many websites, their writers, and editors merely reproduce or summarise the original material. Some possibilities, the analysis of which is beyond the scope of this work, include: the material offered is sufficient to meet the supposed needs and interests of the readers, making additional work unnecessary.

It can also be considered that they may not have the time to rework the PR, even by adding resources that would likely take little time, such as mentioning other stories published on their own site. Another possibility is that the writers do not know how to find complementary studies or information to make the PRs more appealing.

It should be noted, however, that the dissemination of journalistic material without mentioning sources—a practice that proved significant in the Replicators group—constitutes a tacitly consented-to and unchallenged form of plagiarism. This occurs because the PR producers are interested in the broadest possible dissemination, and the media outlets value the opportunity to offer supposedly original information. In the Low Transformers group, many stories cite secondary sources that copy the primary ones, such as *ScienceDaily*, suggesting that the writers may not know what the primary sources are or are not concerned with citing them. Gomes verified how common the absence of sources is in reports in three Brazilian weekly magazines and warned that, without sources, "the text loses credibility and the responsibility for errors and mistakes falls entirely on the reporter". When sources are not explicit, the reader tends to believe the information "not because of the professional, but because of the institution that houses the text" (Gomes, 2004).

Enriching narratives is more laborious than just copying what arrives. The journalist will have to: 1) study or update themselves as much as possible on the subject they are writing about, including at least a superficial reading of the scientific papers on which the news is based (Randerson, 2012); 2) interview the researchers responsible for the reported work or related work, which is not always simple, because experts fear that the results of their work will be distorted; and 3) work on the text resulting from the research and interviews, eliminating what is not of interest, adding what might be of interest to the reader, and reordering the information according to their priorities (Gomes, 2002).

Enriching a news story by listening to the research authors and other experts also implies defining and constantly improving the relationship with interviewees, making trust and credibility overcome the suspicion that experts generally hold towards journalists, especially in the first conversations (Carlson, 2009). As the journalist establishes a friendly relationship with sources and gets to know the ins and outs of scientific production better, they can also move away from the common tendency to sacralize science and seek other, even opposite, views, since, in general, there are no challenges: "The discourse of science appears as absolute truth, as if the results of research, new medicines, or treatments could not be wrong or mistaken" (Gomes, 2004).

## Conclusions

Following the PRs and the texts derived from them revealed three basic strategies adopted by journalists: the "immediatist," which consists of simply copying the PR, a typical attitude of churnalism; the "self-centered," which cites previous studies reported on the same site; and the "analytical," when the original material is enriched or reordered with interviews and similar studies.

Moving from churnalism to originality implies clarity about journalistic methods, limits, and ethics, and knowledge about possible risks and pitfalls, as well as the interests of the target audience, as already proposed by Dorothy Nelkin in her classic book *Selling Science* (Nelkin, 1995). It also implies, now with the perspective of ANT, abandoning the role of the intermediary, who only transmits information like a mail carrier or a spokesperson for scientists, for that of a mediator, reflecting independently on the information and its consequences (Fioravanti, 2013). It implies moving from a classical approach, with weak displacements that reinforce institutional propaganda through positive comments about a discovery or scientific event, to an expanded approach, with strong displacements that work on context and a comparative and analytical view (Fioravanti, 2013). From a journalistic point of view, it implies exercising detachment, neutrality, and independence, which are basic virtues of journalistic work (Deuze, 2005).

Bauer and Gregory (2007, pp. 33–52) recognized that time pressure makes journalists, at least those in the United Kingdom, increasingly resort to ready-made materials, without verifying the information. Göpfert (2007, pp. 215–226), for his part, examining the media in Germany, concluded that the strengthening of public relations teams, including communication advisory services, which produce PRs, implies the weakening of independent scientific journalism—an indication of this situation in Brazil is the full use of materials produced by research-related institutions by major newspapers, thus preserving the strategy of producing news with minimal teams and costs. However, as the reports in group High Transformers indicate, there is room for creativity, even with restricted working conditions, as long as some reporting and editing strategies are adopted to avoid signs of exaltation of any researcher or institution.

Finally, the question whose answer may eventually strengthen journalistic practice: would there be other possibilities for enriching the initial text, besides those identified? The observation of the texts from the two groups, the constant reading of newspapers and magazines, and ANT—by valuing the network of actors, the diversity of interests, the uncertainties, and the negotiations that permeate scientific and technological research and are responsible for its success and failure—indicate at least nine possibilities for enriching news, some of them already adopted. Such possibilities help us to understand and contextualize the results, surround the research with other elements that explain its importance, and express a broad and social view of scientific and technological production. They can be more easily explored when there is more time to produce a report, but they can also be adopted, depending on the time, interest, and convenience, in news to be researched, written, and published in a short time (usually on the same day).

They are:

1. **Explore the spaces.** What are the scenarios that the researchers describe (landscapes, rocks, forests, galaxies, stars) and where do they work or have they worked (laboratories, in the field, telescopes)?
2. **Explore the objects and instruments (non-human actors).** What are the objects that the researchers describe, what are their uses and meanings? Are there similar ones elsewhere? What machines and facilities did they use to get the results? Where are these devices, how do they work, and what notable features are worth highlighting?
3. **Explore the personal views of the authors,** in addition to the usual explanations of the research. What is their opinion about this? How do they evaluate this situation? Personalized comments, opinions, and impressions about the impacts and consequences of the facts presented can enrich and balance the explanations of the research.
4. **Explore other voices.** There are four possibilities: a) participants from the same research group, younger, older, or with another specialty, who can add other views ; b) representatives of groups studied by the researchers (patients, indigenous peoples); c) representatives of other research groups, who can be informed by the interviewees or identified in the references of the scientific papers and could validate the findings and relativize their relevance; d) potential interested parties in the applications of the research (entrepreneurs, users, the readers themselves).
5. **Explore tacit or explicit comparisons.** Similar papers can show that other research groups have done similar work and with what results and where similar situations have occurred.
6. **Explore the times.** If the research is not connected to the present or is considered timeless, which period or era does it address? When did the work begin? If it took a long time, why? Is there any interesting scenes or episodes during the research? What difficulties and unforeseen events did they have to face?
7. **Explore the connections (the size and strength of the actor network).** With whom and with what groups have researchers collaborated? The more connections with other institutions, government agencies, and other groups of researchers, users, and companies, the stronger the network and the greater the probability that the work will advance. Conversely, the more isolated the researcher, the less chance they have of advancing.
8. **Explore the uncertainties.** Will there be broader experiments that could confirm or challenge the results? What are the possibilities for the work to continue? Do the researchers already have teams, spaces, and funding to continue the work? Are there alternative methods that could be employed to investigate these objects? Are the researchers in contact with entrepreneurs or groups to continue the work?

9. **Explore the developments.** What are the consequences and implications and applications of the research? How viable are the possible applications? What is the scenario outlined by the research for the coming years, decades, millennia, or millions of years?

Including every complement isn't always feasible or needed; it depends on available time, space, and the publication's focus. A report on genetics, for example, will not be able to show the genes, but it might be able to show the devices used in the research or concretely indicate the consequences or effects of the genes. Long reports, such as those in the Brazilian magazine *piauí* and US publications collected in *The Best American Science and Nature Writing* (Mariner Books), often address historical narratives, exploring the evolution and difficulties of research over time. The British magazine *Economist* frequently emphasizes the uncertainties about the results and the continuation of the work, with conditionals such as "If the scientists are right, it may be that..." or "If the work advances...".

These displacements are in addition to other narrative strategies beyond those identified by the methodological proposals adopted in this essay. Das and Rath (2024) emphasize that the public expects journalists not only to provide simplifications but also other devices that allow them to better understand scientific events and concepts, such as analogies—a black hole thus becoming a cosmic vacuum cleaner—and the increasingly important visual resources and interactive digital elements. Radford (2007) emphasizes the importance of telling stories instead of making people more informed and educated, like Queen Scheherazade, who entertained the sultan with good stories to escape the death that seemed imminent. Seeking, gathering, and having these elements at hand will possibly allow to truly understand the research and, when writing, to construct good openings, closings, and story structures, as proposed by Blum et al. (2022, pp. 52-60), in addition to testing personal preferences for one narrative path or another.

Of course, learning should be continuous. Fortunately, there are courses that aim to improve journalists' skills. A series of them, free, showing how to structure reports, conduct interviews, or create innovative approaches, is offered by The Open Notebook (TON, https://www.theopennotebook.com/). A lesson from one of the TON courses suggests identifying the most emotional moments in the research development. This approach helps avoid purely descriptive scientific discourse and encourages more engaging storytelling about scientific and technological successes or failures.

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