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ARTICLE

Science News Agencies in science communication: an exploratory index for evaluating and enhancing public interest in mass-distributed press releases

Monique Batista de Oliveira, Mariana Hafiz, Alice Fleerackers, Luiá Bolonha Nunes and Germana Fernandes Barata

Abstract

Scientific press releases are reaching the public directly through press reproduction and institutional dissemination. Science News Agencies (SNAs) mediate this process, distributing texts to thousands of journalists while also "leaking" them on their websites and social media. This comparative case study examines four SNAs — BORI, SMC UK, AlphaGalileo, and EurekAlert! — regarding their role in circulating public scientific information. Through literature review, SNA analysis and principles such as openness and inclusion in science, we converted scholars' concerns into a preliminary index potentially capable of assessing SNAs' public suitability. SARP (Social Adequacy Rating for Press Releases) suggests a shift from purely public relations content towards serving the public interest, highlighting areas needing attention in SNAs' social function, to be refined in future research. Clear guidelines, links to open scientific articles, and explicit notices on press releases' purposes are simple yet effective ways to address issues concerning science public relations' pervasiveness in the public sphere.

Keywords

Diversity, equity, inclusion and accessibility in science communication; Popularization of science and technology; Science and media

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1 ▪ Context: SNAs and the role of press releases in science communication

A fundamental concern that defines science communication studies is the process by which information about new advances in science reaches the public [Horst et al., 2017] in a process that has been defined as "social conversation around science" [Bucchi & Trench, 2021]. Traditionally, this flux involves journalists developing their own stories, conducting interviews with experts and other social actors, and then reaching their audience. Alternatively, scientific press releases may reach reporters, who are expected to use the material as inspiration or a starting point for writing their own stories. Press releases can be defined on a spectrum — from purely promotional content to pre-formatted news specifically designed for media uptake. This pre-formatted news material must balance two requirements: following journalistic genre criteria while promoting their institution, all while maintaining the intent of a professional distance typical of a journalist's text [Lassen, 2006; Maat, 2007]. Evidence from the literature detailed below, however, suggests that this pathway (press release » journalists » public) has experienced various disruptions — not to mention the complex multi-agent system involving digital information today. Our focus is on the increasing trend of press releases reaching the reader directly. This phenomenon has generated scholarly concern for some time, with some researchers arguing already in 2007 that, as a result of this, science communication is no longer given a forum for further discussion [Göpfert, 2007, p. 215]. We provide a starting point for filling an important gap, as limited attention has been given to how the mass distribution of press releases by Science News Agencies (SNAs) affects public perception, understanding, and engagement with science.

Major SNAs primarily provide services to organisations and journalists by maintaining a mailing list (or subscriber base) of journalists who use institutional press releases as a basis for their news stories. Smaller agencies also provide original material to journalists by curating and writing press releases themselves [Melanie, 2010; de Vrieze, 2018; Broer & Pröschel, 2022; Righetti et al., 2022]. Although targeted at journalists, these materials also reach citizens through nearly verbatim media reproduction or direct access on SNAs websites [Comfort et al., 2022]. That's why it is pressing to investigate how SNAs operate and the effects they have in science communication. They can potentially help bridge the gap between citizens and scientific knowledge, and address classic and contemporary science communication opportunities and challenges, such as controversies related to mediation and the growing influence of public relations materials in the field [Weingart, 2022].

Issues raised in the literature regarding the role of SNAs in science communication tend not to focus directly on them, but rather on how press releases have been permeating to the public directly, without mediation. One of the reasons cited for this is related to economic pressures in journalism [Allan, 2011; Franks et al., 2022], with this leading to the continuous decrease in the already limited number of science journalists in mass media [Massarani et al., 2021, p. 36]. This situation has resulted in a "hybridisation in science communication" — with the mixing of promotional and scientific discourse [Y. Zhang, 2018] — and science journalists shifting from original material to the use of press releases [Bossema et al., 2019; Murcott & Williams, 2013]. Institutional efforts to disseminate (and, typically, promote) science can bypass the role of journalists, informing what science stories make headlines and how they are told [Franks et al., 2022] — to the point that some have argued that science journalism only persists in newsrooms due to the widespread use of public relations materials from science institutions [Ashwell, 2014].

In the face of the widespread use of press releases in science communication, many scholars have expressed concerns about their public influence [Gilbert & Ovadia, 2011; De Dobbelaer et al., 2017; Koso, 2020], with some noting that their use in journalism may contribute to science communication tending to value science positively, prioritising scientific interests [Intemann, 2020]. Press releases can also distort or exaggerate the science they promote [Brechman et al., 2009; Choi & Feller, 2021; Petrocelli et al., 2022; Sumner et al., 2016]. An investigation produced by 20 British universities showed that 40% contained exaggerated advice, 33% presented exaggerated causal claims, and 36% suggested that results based on animal research applied to humans [Sumner et al., 2014]. In Health Sciences, press releases are reported to fail in informing readers about therapy risks, often presenting experimental treatments in an overly optimistic manner [Sumner et al., 2016]. Similarly, researchers have identified frequent use of clickbait headlines, colloquialisms, hyperbole, and superlative adjectives in press releases [Dolgova & Orekhova, 2022], as well as information presented in a deterministic and simplified way [Brechman et al., 2009].

From a more positive perspective, press releases may encourage media outlets to publish more science news [Comfort et al., 2022], and materials that accurately communicate study results can have a positive impact on science news [Franks et al., 2022]. Local science coverage, however, can overly rely on these materials, resulting in a heavy dependence on international sources [Massarani et al., 2007; González-Pedraz et al., 2017]. Press releases have become so pervasive in science communication that even social media posts by citizens have been found to originate from these materials [Verstappen et al., 2022]. To our knowledge, no study has directly examined SNAs' role in disseminating scientific information to the broader public, beyond their function as support for journalists. This research aims to address this gap through a comparative case study of four SNAs: EurekAlert!, AlphaGalileo, Science Media Centre (SMC) UK, and BORI Agency. The study explores the mechanisms by which these agencies distribute material to the public and identifies criteria that could enhance the public suitability of these texts as a means to fulfil the SNAs' role in promoting science's societal relevance.

2 ▪ Objectives

We provide a fresh perspective on the role SNAs play in mediating science directly to the public by examining the following specific research questions:

RQ1: do SNAs conceive public science communication as part of their role and to what degree are press releases distributed by SNAs suitable for a public audience?

RQ2: what criteria could be used to evaluate SNAs' ability to have a boundary-spanning function (i.e., building bridges between science and society)?

RQ3: based on the framework, would a mixed qualitative-quantitative indicator help synthesise and evaluate how SNAs shape science's interaction with the public?

3 ▪ Theoretical framework

Many issues raised by the literature review on the pervasiveness of press releases in science communication can be summarised as facets of the "mediation problem". Historically,

journalistic mediation plays a role in sparking public debate about science, not only by translating knowledge or informing, but also by ensuring accountability, particularly in societies where public policies are increasingly influenced by science and technology [Kennedy, 2010]. Texts with journalistic mediation tend to have greater polyphony and heterogeneity, as they assemble different voices and public views [Botelho et al., 2016]. They also include more "knowledge translation" practices, highlighting the relevance of scientific studies for society [Botelho et al., 2016].

Mediation, therefore, not only makes science knowledge more accessible to a larger audience, it also brings societal demands and values into the scientific field. It blurs the boundaries between science and society that scientists construct through "boundary work" [Rödder, 2011]. This concept, first presented by Gieryn [1983], describes how scientists maintain their cultural authority by labeling non-scientific knowledge as pseudoscience and by keeping scientific knowledge encoded. Scientific dissemination materials, such as news stories, press releases, and research articles, can facilitate boundary work by promoting the interests of scientists. However, if such materials highlight the relevance of science to society, use understandable language, and provide public access to scientific knowledge, they can act as "boundary spanning units," or contact points between the scientific community and other environments [Rödder, 2011]. These activities can enable SNAs to also act as knowledge brokers, or "people whose job it is to move knowledge around and create connections between researchers and their various audiences" [Meyer, 2010, p. 118].

Broadly, communication is a key factor in the relationship between science and society. It plays a role in the development of scientific culture, in terms of making methods and epistemologies known to the public — both in terms of opening science to the demands and participation of society and in opening society to scientific methods and claims [Godin & Gingras, 2000; Vogt, 2011]. Openness is essential to enabling these science-society interconnections. As the recent COVID-19 pandemic has made clear, everyone benefits when scientific information is made widely, rapidly, and freely accessible to all [Wellcome Trust, 2020].

Historically, the open science movement has emphasised how providing free access to scientific research leads to a more inclusive science, fostering wider use and participation in knowledge creation [Barbour & Borchert, 2020; UNESCO, 2021]. While the scientific community is partially engaged in the open science debate [David, 2008; Burgelman et al., 2019], the discussion surrounding "openness" is still in its early stages in Science communication[Barata, 2022; Fleerackers et al., 2023]. Openness is a valuable consideration in the context of press releases, as both journalistic material and scientific papers are often behind paywalls, accessible only to subscribers. Therefore, press releases frequently serve as the only openly available information about new research findings. These open texts are distributed by SNAs and, potentially, reach the public.

4 ▪ Methods and analytical framework

This exploratory comparative case study analyses four SNAs using a three-step process, culminating in a mixed qualitative-quantitative index we will call SARP (Social Adequacy Rating for Press Releases). Case studies are appropriate when certain institutions (SNAs in this case) exemplify social phenomena (i.e., science communication), and can contribute to

the advancement of scientific theory in the field [Walton, 2009]. SARP synthesises these institutions' materials suitability for the public, drawing on criteria and concerns highlighted by science communication scholars in previous literature and grounded in our theoretical framework. The mixed-method perspective argues for combining qualitative and quantitative resources to achieve both depth and synthesis [Leavy, 2017; Tashakkori et al., 2021]. Our preliminary approach considers the index feasibility, in a first step of a practical-theoretical framework that, at this stage, aims to demonstrate the index's potential utility. We take a pragmatic stance that implies potentially useful research, with the guiding principle of considering the consequences of knowledge in a creative appeal, according to a view that "science, within the context of democracy, could improve society" [Gillespie et al., 2024, p. 11]. Each stage of the analysis addresses a research question (see Objectives section) and contributes to the formulation of the subsequent investigation phase, culminating in the index construction.

1. A general characterisation of each agency, including their goals and social media presence;
2. An analysis of a sample of press releases distributed by these agencies guided by a framework that assesses SNAs' suitability as boundary spanning units (the ability of bridging science and society);
3. The construction of a preliminary mixed qualitative-quantitative index to be refined in future research.

4.1 ▪ *Phase 1: SNAs profiles and online presence*

The initial phase involved selecting agencies for analysis and assessing the extent to which they consider their distributed material to have a public function. This step tested the hypothesis of whether these institutions have a public social role, and whether an index in this regard would be justifiable beyond the concerns of science communication scholars. We examined four science news agencies: two national — BORI Agency (Brazil) and Science Media Centre (UK) — and two international — AlphaGalileo and EurekAlert!. These organisations were chosen as they represent diverse content production and distribution models across different geographic and cultural contexts. Additionally, each SNA is backed by a prestigious scientific organisation (see results for SNAs description). In this phase, we also conducted an analysis of each agency's mission statement and social media presence.

4.2 ▪ *Phase 2: a framework for press releases analysis*

Since the case study methodology provides empirical grounding for social theories using in-depth qualitative analysis [Babbie, 2007], it is well-suited to small samples. As such, we performed a qualitative analysis of 20 press releases from these agencies (five documents from each one), available on each agency's homepage on 21 February 2023. The analysis of press releases featured on these agencies' homepages was selected due to their inherent editorial curation process. Examination revealed that other materials released during the same period were not displayed on the homepage. This selection process demonstrates that the agency's team carefully curates certain press releases, analogous to traditional journalistic practices, where headlines and featured stories are chosen based on relevance, public interest, and content quality. We contextualised our analysis by examining each SNA's

website and policies, allowing us to ensure the selected texts reflect the editorial rules these agencies follow to standardise their content. For instance, SMC UK maintains an editorial policy of interviewing sources who are not directly involved in the scientific study [Rodder, 2014], and this criterion was observed in the analysed sample of texts. However, our small sample and qualitative approach do not allow generalised conclusions; instead, it provides a framework to be refined in future investigations.

After selecting the agencies and the sample, we developed an analytical framework for evaluating to what degree press releases distributed by each SNA enabled boundary spanning (i.e., building bridges between science and society). To assess press release suitability for the public, we derived criteria from the literature reviewed above, acknowledging what scholars have observed as key concerns. From this literature, we identified three main press releases public suitability criteria: "Public Impact", "Hyper PR Influence", and "Source Diversity". "Public Impact" refers to whether the text discusses how the reported study impacts society or the scientific field, making it a category related to the mediation problem. The category of "Hyper PR Influence" focuses on exaggerated or sensationalised language, such as descriptions of studies as breakthroughs without supporting data, a concern pointed out in the literature review. "Source Diversity" assesses whether sources unrelated to the study were interviewed, an item also related to mediation issues. Open science practices, such as making scientific articles freely available to readers, were also considered a necessary boundary-spanning function of science communication material and included as an element in the framework. To these criteria, we added quality criteria from science journalism proposed by Eysenbach et al. [2002]: "Technical Information", "Design", and "Readability", Collectively, these criteria enabled us to assess whether press releases made the research "conceptually accessible" to the public [Kelly & Autry, 2013].

In short, the framework's seven criteria (TI, ES, PI, HPR-I, R, D, OA) were directly derived by translating academics' concerns regarding science dissemination into measurable features of the press releases. We integrated quality criteria from science journalism (TI, D, R) to assess conceptual accessibility. The codification of the SARP index primarily followed an inductive approach (bottom-up). The operationalisation rules were not defined by an exhaustive, pre-established list of terms; instead, they were developed and refined through iterative analysis of the sample to ensure the criteria precisely captured the emergent characteristics and shortcomings present in the press releases. This inductive refinement process provided the empirical foundation for the strict coding rules that follow.

To ensure full transparency and satisfy replicability, we have made the complete coding data publicly available. This includes tables detailing the titles of all 20 press releases, direct links to the full texts, and explicit justifications for all "inadequate" ratings assigned during the analysis. This supplemental material is available at: https://github.com/moniqueboliveira/sciencenewsagencies.

4.3 ▪ *Phase 3: a preliminary qualitative-quantitative index*

The construction of the indicator involved an exploratory analysis of a sample of press releases distributed by these agencies, based on agency analysis and literature review. The aim was to verify whether these categories could be identified in some of these texts, as they reflect these agencies' editorial policies. If so, this would affirm the suitability of the

Table 1. Evaluative criteria of the Science Agency Rating Programme (SARP) index for assessing public interest in press releases.

Criterion	Abbreviation	Definition	Coding rule: Adequate (A)
Technical information	TI	Includes publication date, institutional source, and link to the scientific article.	Coded 'A' only if: the release explicitly included the full publication date, the institutional source, and a direct, working hyperlink to the original scientific article (or a clear explanation if a link was not applicable).
External Sources	ES	Incorporates sources not associated with the scientific study.	Coded 'A' only if: the text incorporated a quote or commentary from sources not associated with the scientific study in question (i.e., external experts).
Public Impact	PI	Provides context to indicate the societal relevance and public implications of the research.	Coded 'A' only if: the text provided clear context to indicate the societal relevance and public implications of the research.
(Hyper) PR Influence	HPR-I	Use of sensationalised or exaggerated expressions without supporting explanation or data.	Coded 'A' only if: the text did not feature sensationalised or exaggerated language (e.g., "breakthrough") without concrete data or explanation.
Readability	R	Written in language that is understandable to a public audience, avoiding unexplained technical terms.	Coded 'A' only if: the language was generally comprehensible to a lay audience, avoiding unexplained jargon. If complex terms were used, a simple, accurate explanation was provided immediately afterwards.
Design	D	Utilises layout characteristics that enhance readability (e.g., subheadings, section division).	Coded 'A' only if: the release utilised layout characteristics that enhanced readability (e.g., appropriate text size, short paragraph divisions, and the use of subheadings).
Open Access	OA	Ensures that the press release and cited materials are free for the public to access in their entirety.	Coded 'A' only if: the press release and the cited scientific articles or related materials were freely and fully accessible to the public, requiring no payment or subscription.

indicators for this kind of evaluation. This phase could also serve as further evidence of the public aspect of this material. We then evaluated each press release in our sample (N=20) against the criteria from Phase 2. Texts were categorised as either "adequate" (A) if they met all criteria, or "inadequate" (I) if they did not meet the criteria. We provided reasons for each

"inadequate" rating.[1] Overall adequacy, or SARP (Social Adequacy Rating for Press Releases), represents the proportion of "adequate" ratings an agency received across all categories. A 100% SARP indicates full compliance with all criteria — suggesting the press release has the potential to act as a boundary spanner between science and society.

The scoring process constitutes the quantitative phase of our analysis, quantifying adequacies through basic descriptive statistical frequency counts. This mixed-method approach uses quantitative data to succinctly present qualitative analysis results. The phase has precedents in communication indicators, such as the CDC's Clear Communication Index [CDC, 2014], which assesses health text clarity based on specific criteria. In the CDC index, when all criteria are met, the text receives a score indicating its clarity level. It's worth noting, however, that given our small sample size, the agency scores are experimental and intended solely to demonstrate SARP's feasibility and potential utility.

5 ▪ Results: science news agencies and their potential as mediators of science

This section is organised into three stages, following the research questions presented above.

5.1 ▪ *SNA's public presence and operational models*

The analysis of the SNA websites revealed that all four agencies aim to reach the general public indirectly by enhancing scientists' engagement with the media. However, there's also evidence of a "hybrid model" (combining PR and journalism practices) that seeks to reach the public directly. This shared goal of providing a service that supports media coverage of research across all disciplines is rooted in the belief that communicating research beyond academia is vital. AlphaGalileo's website, for instance, asserts that "communication of scientific research is fundamental to the creation of knowledge-based societies", while EurekAlert! and its operator, AAAS, "encourage the broad communication of scientific research worldwide".

The operational models of these agencies provide additional evidence supporting the hypothesis of a potential shift in public relations towards public interest. This shift results in a more hybrid role for these agencies within the science communication infrastructure. Two agencies, BORI Agency and SMC UK, have explicitly adopted a hybrid approach to producing texts that incorporate PR practices (i.e., promoting new studies) with journalistic mediation principles that serve the public interest. These journalistic practices include conducting interviews with experts not directly linked to the released study (in the case of SMC UK) and implementing guidelines focused on impact, diversity, and inclusion (as seen with BORI). Contrastingly, EurekAlert! and AlphaGalileo operate on a more classic PR model, disseminating press releases produced by scientific institutions and charging a fee for this service.

To analyse SNAs' ability to reach the public directly, we also characterised each agency's presence on social media platforms (SMPs) and compared this information with the

1. Complete tables guiding this analysis, which include the titles of the press releases, links to the full texts, and reasons for inadequate ratings, are available at: https://github.com/moniqueboliveira/sciencenewsagencies.

objectives they report in public statements. Table 2 shows the active accounts each SNA maintains on SMPs. Generally, all four SNAs had at least one active account on an SMP. BORI was the most active SNA, with presence on all five analysed SMPs, while SMC UK was the least active, present on only the X platform. The data suggest that these agencies work to maintain broad, public visibility, potentially reaching an audience that extends beyond the journalists who subscribe to their services. Below, the detailed analysis of these agencies' models and their presence on social media highlights their tendency towards a hybrid nature.

Table 2. SNAs presence in social media platforms. *Note:* AA = Active accounts, F = Followers, S = Subscribers.

	X		**Facebook**		**YouTube**		**Instagram**		**LinkedIn**	
	AA	F	AA	F	AA	S	AA	F	AA	F
AlphaGalileo	yes	3.280K	yes	4.7K	no	-	no	-	yes	213
BORI	yes	12K	yes	2.3K	yes	386	yes	7K	yes	2K
EurekAlert!	yes	45.4K	yes	54K	yes	577	no	-	no	-
SMC UK	yes	23K	no	-	no	-	no	-	no	-

5.2 ▪ *EurekAlert!*

EurekAlert! is a non-profit science news agency initially established at Stanford University (Costas) and now affiliated with the American Association for the Advancement of Science (AAAS) in the United States [Orduña-Malea & Costas, 2023; J. Zhang et al., 2024]. As of 2015, the agency had 11,000 registered journalists and had published 270,000 press releases since its founding in 1996 — averaging 74 releases per day. The agency exclusively accepts materials from PIOs (Public Information Officers), professionals who facilitate communication between scientific institutions and the public. [Orduña-Malea & Costas, 2023; J. Zhang et al., 2024] All submissions must meet specific eligibility criteria and require an annual fee of up to USD $4,725, though acceptance isn't guaranteed. Registered journalists can access a special section containing embargoed news releases and PR materials, while a separate section serves the general public. According to their website: "all embargoed news releases are made freely available to the public at designated embargo-release time".[2] This commitment to public access is widely recognised — our analysis and other sources note that EurekAlert! makes all materials freely available after embargo, regardless of media coverage [Orduña-Malea & Costas, 2023; J. Zhang et al., 2024]. Quantitative analyses show that from its founding in 1996 through 28 February 2021, EurekAlert! has published 455,703 online press releases [Orduña-Malea & Costas, 2023]. The platform maintains an active social media presence, posting daily on X and Facebook, while updating YouTube less frequently, every 2–3 months.

5.3 ▪ *AlphaGalileo*

AlphaGalileo[3] is the European version of EurekAlert! created in 1998 in the United Kingdom to support "communication between researchers, journalists and the public". Kiernan [2003]

2. Information on the EurekAlert! agency website. Available at: https://www.eurekalert.org/help. Accessed: February 2023.
3. Information on the AlphaGalileo agency website. Available at: https://www.alphagalileo.org/en-gb/AlphaGalileo/About-us/Who-we-are. Accessed: February 2023.

argues the agency was created as an alternative to EurekAlert! since researchers across Europe were concerned by the dominance of American science achievements in the news. Based on information from the agency's website, it was initially funded by the European Commission and the governments of France, Germany, and the United Kingdom. Since 2013, the agency has been fully funded by subscriptions and sponsorships, reaching more than 7,000 journalists. Research organisations and businesses pay up to $3,320 for a 12-month subscription to post press releases and other materials. Journalists, contributors, bloggers, and journalism students can subscribe for free. The agency keeps a portion of its content open to the public, and designates the general public as one of its intended audiences. Certain materials, however, remain exclusively accessible to journalists. Regarding social media presence, AlphaGalileo is most active on X (formerly Twitter), posting daily and engaging with contributors' content. The agency is less active on Facebook, posting quarterly, and moderately active on LinkedIn, posting monthly. Both Facebook and LinkedIn showcase content similar to X.

5.4 ▪ *SMC UK*

The clear intention of becoming a reliable source of quality science/research news is particularly illustrated by SMC UK's approach of selecting experts whose quotes will be sent to journalists. SMC[4] was founded in the UK in 2002 and produces and disseminates its own materials. Today, SMCs exist in Australia, Canada, New Zealand, Germany, Taiwan, Kenya, Japan, and Spain [Broer, 2023]. SMC UK pairs information about new studies with quotes from unaffiliated experts, which are then sent to journalists. The agency has a section in which scientists react to published studies guided by an official philosophy that "the media will 'do' science better when scientists 'do' media better" [Fox, 2011, p. 257]. Other activities of SMCs include maintaining a database of academic experts, organising press conferences, and disseminating resources for journalists [Fox, 2011; Broer, 2020]. From a business perspective, SMC UK is funded through a mix of grant money and sponsorships and donations from university and research centres, rather than collecting income through advertisers or subscriptions [Fox, 2011]. SMC maintains only one active social media account on X. It posts once or twice daily, highlighting the latest content from its website.

5.5 ▪ *BORI agency*

BORI Agency[5] is a Brazilian SNA that focuses on disseminating Brazilian research to journalists, reaching around 3,000 reporters in the country. It was founded in 2020 and has received funding by various organisations such as Google, the São Paulo Research Foundation (Fapesp), Serrapilheira Institute, and Getúlio Vargas Foundation (FGV). BORI has a designated press team that curates scientific articles from Brazilian and Ibero-American journals index (e.g., SciELO). Press releases are partially produced by a team of freelance journalists who follow a hybrid-text model established by BORI's editorial team. The model contains criteria that reporters must attend to when writing the releases. The resulting "explanatory texts" describe four essential aspects of the research in question: "1) What is the main finding of the research? 2) How was the research conducted? 3) How do the results

4. Information on the SMC UK agency website. Available at: https://www.sciencemediacentre.org/. Accessed: February 2023.
5. Information on the BORI agency website. Available at: https://abori.com.br/. Accessed: February 2023.

impact people's lives? 4) How do the results change what we already know in the field of knowledge?" [Righetti et al., 2022, p. 11]. BORI is the agency in our sample with the greatest number of active social media accounts. They maintain X, Facebook, Instagram, and LinkedIn profiles as well as a YouTube channel.

Taken together, these data underscore a critical finding: while SNAs primarily serve journalists, they also possess a direct public reach. This conclusion is substantiated by a multi-layered body of evidence: the institutional missions of SNAs indicate a commitment to a public role beyond simply serving the media; literature confirms that their press releases reach citizens through nearly verbatim media reproduction that retains original quotations; and empirical figures in Table 2 (e.g., EurekAlert!'s substantial following of 45.4K followers on X and 54K on Facebook) demonstrate that the material is permeating and directly consumed by the public. This collective evidence fully substantiates the argument that mass-distributed press releases require careful evaluation for public suitability, which is the foundational purpose of the SARP index.

5.6 ▪ *Testing SNAs materials for public suitability*

The preceding analysis of RQ1 shows that these agencies have connections with the public directly and some employ operational models that blend press releases with journalistic content, already incorporating criteria for public suitability. This finding, along with the literature review, points to the importance of understanding the public suitability of SNAs' content. RQ2 contributes to developing this understanding by exploring the feasibility of establishing criteria for SNAs to have a boundary-spanning function. Press releases (N=20) were evaluated considering the following categories (see methodology section for detailed description): Technical Information, External Sources, Public Impact, (Hyper) PR influence, Readability, Design, and Open Access.

Tables were constructed to evaluate press releases of each of the four agencies. Each table contained the press release title, access link, and a classification of "adequate" or "inadequate" based on selected criteria[1]. Reasons were given for each "inadequate" rating. Table 3 shows the adequacy percentage for each agency, indicating how often their press releases met the criteria across all analysed press releases. The Social Adequacy Rating for Press Releases (SARP) represents the overall adequacy — the proportion of "adequate" ratings an agency received across all categories. For instance, an agency achieving 100% suitability had press releases meeting all criteria (such as external sources and public impact).

Table 3. Science News Agencies' Adherence to Public Suitability Criteria. *Note:* TI = Technical Info, ES = External Sources, PI = Public Impact, HPR-I = Hyper Public Relations Influence, R = Readability, D = Design, OA = Open Access, SARP = Social Adequacy Rating for Press Releases.

Agency	TI	ES	PI	HPR-I	R	D	OA	SARP
SMC UK	100%	100%	100%	100%	80%	100%	80%	94%
BORI Agency	40%	I	100%	100%	100%	100%	40%	68%
EurekAlert!	80%	I	80%	60%	100%	100%	40%	66%
AlphaGalileo	80%	I	80%	80%	80%	100%	I	60%

The analysis demonstrates the feasibility of creating an indicator to assess the public adequacy of press releases. All categories were present in the evaluated texts, allowing classification as either “adequate” or “inadequate” based on established criteria.

6 ▪ Discussion

Previous research has described SNAs as “boundary-spanning units” [Rödder, 2011], "knowledge brokers” [Meyer, 2010], and “network gatekeepers” [Barzilai-Nahon, 2008], however, these terms are typically used to describe how SNAs bridge gaps between science and journalism, rather than science and the public. As such, the current project aimed to consider how SNAs have the potential to directly connect the public with science through press releases. Through our analysis of existing literature documenting the circulation of these materials, combined with an examination of SNAs’ business models and social media strategies, we investigated their reach. By converting concerns about press release quality found in existing literature into an index that may help scholars and practitioners succinctly assess the public suitability of this circulating material, we hope that we have called attention to the boundary-spanning potential of these organisations. Future studies can assess the use of these materials by the public and their influence on public decision-making.

While the indicator is exploratory and cannot hierarchically classify agencies, it could be enhanced with larger samples and additional categories beyond dichotomous classifications. Still, the case study reveals that some agencies and their materials already follow rigorous public adequacy criteria. Notably, in this analysis, all agencies achieved a score above 60% — indicating potential to reach the public with some degree of adequacy and also demonstrating room for improvement, without a need to completely change the text structure or their operational model.

Additional preliminary conclusions, to be verified in larger samples, can be drawn from this multiple case study. Design and readability are categories likely well-addressed by the agencies. All SNAs employed well-structured texts with sections and subheadings (100%) and used language that was relatively easy to understand, even without scientific expertise. However, except for SMC, agencies seldom provided links to scientific articles, negatively affecting their adequacy score for the technical info category. The open access category — which requires not only a link but also free access to the scientific article — also warrants further investigation, as no agency achieved 100% suitability in this area. AlphaGalileo’s absence of a score in the open access category stems from their decision to restrict public access to press releases after a certain period — a change that occurred between data collection, analysis, and drafting of this research article. The agency’s website lacks clarity on why some texts remain open while others don’t. The low scores in these categories, and the lack of a stated mission by SNAs to lead citizens to scientific sources, indicate this issue is both low-priority and neglected. Access to original sources not only democratises scientific knowledge but also allows for fact-checking of press release information. Press releases that provide such access could play a relevant role in leading citizens toward scientific knowledge, enabling them to analyse scientific data themselves.

Though the sample is too small for a definitive ranking, SMC UK’s experimental SARP of 94% stands out. This may be attributed to their editorial policy of interviewing experts unaffiliated with the study under discussion — a common element in all their analysed texts (see

"external sources" category). We do recognise that this practice arguably leads to the production of content that goes beyond the traditional definition of a press release; however, as stated previously, some agencies have been adopting hybrid practices — and SMC UK is one of them. However, since this strategy is uncommon and likely requires a dedicated team, testing was conducted with this category excluded. The resulting SARPs were: SMC UK (90%), BORI Agency (80%), EurekAlert! (77%), and AlphaGalileo (70%). Reiterating that this indicator is still being refined and under construction, we can draw from this analysis a plausible hypothesis that hybrid models, with specific guidelines for public adequacy (such as those employed by SMC UK and BORI), might have an advantage over other models in terms of facilitating boundary-spanning between science and society.

Concerning these hypotheses, we can add that BORI Agency and SMC UK scored slightly higher in public impact and Hyper PR Influence, likely due to their editorial models. Nevertheless, it's plausible that EurekAlert! and AlphaGalileo could introduce public suitability guidelines for organisations submitting press releases and still improve their SARP scores without needing to hire a dedicated team. This provides one example of how the index could be used to synthesise and evaluate how SNAs influence science's interaction with the public, as well as point to potentially more suitable operational models and specific criteria for improvement.

The mass distribution of press releases by SNAs positions them as key targets for improving the public adequacy of this content. This can occur both during the writing of these texts — for agencies with in-house newsrooms — and through guidelines for screening materials submitted by science institutions to SNAs. The index criteria capture characteristics of the press releases that provide the public with "conceptual access" to research [Kelly & Autry, 2013] — i.e., communicating new findings in ways that are accurate, understandable, and relevant to society — as well as "material access" — i.e., ensuring research articles are freely available to interested readers. The analytical framework proposed here provides a lens for supporting both types of accessibility and for addressing scholars' concerns about the growing importance of SNAs in science communication. The proposed index prompts questions warranting further consideration from scholars and practitioners, such as: how can institutional promotion be mitigated in press releases, what language should be avoided, and how can the public implications of research be effectively communicated?

The constructed categories and corresponding ratings, culminating in the preliminary index, provide a foundation for potential action to address these questions. Some of the adequacies are easily achievable, such as better management of hyperlinks to scientific articles. Enhancing inclusion in science can also be achieved by pointing interested readers to the original source, where they can fact-check the information presented in the press release, and gain more context and detail about the study. These refinements could be implemented through the development of guidelines or a checklist, potentially based on our framework, during the production of these texts.

Furthermore, this analysis and the index suggest a plausible hypothesis: the elevated public suitability of a hybrid model where agencies adopt criteria closely aligned with journalistic practices. Key in this regard is the SMC's approach of consulting external sources to evaluate the study's social and scientific impact. Although this is a relevant choice for ensuring public suitability, it's worth considering the logistical challenges associated with such a practice, including potential reductions in press release output. To address this issue when external

consultation is not feasible, press releases could include a notice acknowledging that interviews were conducted with the study authors themselves. This transparency would highlight potential bias in the text, which is particularly relevant given that press release quotations often appear in journalistic texts without additional sourcing. For instance, a study of science coverage in British and Dutch press revealed that only 7% of journalistic pieces derived from press releases incorporated an original quotation; the few articles that *did* include external quotes showed a lower tendency to exaggerate study findings [Bossema et al., 2019]. Moreover, SNAs should include a notice to inform readers about the implications of a press release. Merely stating the source of the information, as most agencies do, may not be sufficient. Instead, it would be advisable to specify what considerations should be taken into account when interpreting a seemingly journalistic text produced by the institution where the study took place.

Also, beyond SNAs, various stakeholders within scientific institutions are well-positioned to undertake the social responsibility of making press releases more suitable for the general public. This process can be initiated within the dissemination of material orchestrated by these organisations, enabling them to transition beyond the realm of public relations and communicates with the public. Considering the mission of science institutions — some of which are publicly funded — the move towards scientific dissemination that perceives the press release not merely as cost-free publicity [Sleurs et al., 2003], but as a means of inclusion in science, would be a welcome step. Scientists and science institutions must initiate internal dialogues concerning their roles in society [Rowe & Alexander, 2010], given the observed stagnation in their communication practices and attitudes [Peters, 2013], despite societal changes. This means a hybridization of existing types of texts and narratives, as well as the materializing of values, such as the democratization of science being aligned with inclusive science communication and open science practices.

Although the index intended to include categories associated with openness and inclusion, it's worth noting that, due to an attempt to contribute feasibly, it can be seen as relatively conservative, aligned with conventional journalism practices. It does not integrate recent dialogues pertaining to the necessity for more dialogic models of communication [Brossard & Lewenstein, 2009; Metcalfe, 2022], the requirement for epistemic flexibility to engage in public dialogue [Broer & Pröschel, 2022], or the employment of external sources encompassing diverse disciplines and even the public, considering citizen science approaches.

The SARP index demonstrates that high scores align directly with the 'science in society' roles often claimed by SNAs. Categories such as Open Access (OA) and Public Impact (PI) are not just supplementary; they are core indicators of the agency's commitment to public interest, transcending a purely PR function. The index thus serves as a practical, measurable guide for agencies aiming to materialise their mission of serving the public.

The analysis provides a fresh perspective on the role of SNAs in enhancing public inclusion in science and identifying areas that could enable these institutions to fully realise this potential. By adopting specific criteria for making scientific knowledge accessible and societally relevant, SNAs can work as intermediaries between science and the public, potentially assuming, at least partially, the mediator role that has classically been played by journalism. The data suggests that these agencies already work to maintain broad, public visibility, potentially engaging an audience that extends beyond the journalists who subscribe to their services, with some of them implementing specific, public-oriented guidelines.

Future research could deepen our understanding of SNAs' operational priorities and challenges through interviews with SNA leaders. This qualitative approach would reveal whether the SARP framework is perceived as a meaningful tool for measuring or guiding their public outreach efforts, offering valuable insights into the decision-making processes that underpin their content strategy.

7 ▪ Conclusions

The primary purpose of SARP is to demonstrate to agencies, scientific institutions, and communicators that there are opportunities to enhance the public suitability of institutional press releases, considering that such public access is already occurring and that many organisations are public-oriented and funded. This index can serve as a benchmark to determine if there is an SNA operational model best suited for this public responsibility and to identify categories for improvement, if resources and intentions allow. The inclusion of additional categories and the analysis of larger samples, as well as more nuanced classifications that go beyond the adequate-inadequate dichotomy, could help refine the index. These enhancements could turn SARP into a tool for guiding the public-oriented mission of these agencies, extending beyond the preliminary nature of this study.

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About the authors

Monique Batista de Oliveira is a researcher at the National Institute of Citizen Science (INCC) and the University of São Paulo (USP). She previously held a postdoctoral fellowship at Unicamp and a research stay at the LSE. With 20 years of experience in science journalism, she holds degrees in Social Sciences and Journalism, and a PhD in Public Health. Her work intersects Science Communication, Citizen Science, STS, and Health Promotion. She is a former co-director of RedeComCiência.

info@moniqueoliveira.org

Mariana Hafiz is a PhD student in Science and Technology Policy at State University of Campinas (Unicamp). Her research focuses on the science journalism, communication and research impact assessment.

marihafiz@gmail.com

Alice Fleerackers is Assistant Professor of Journalism and Civic Engagement in the Department of Media Studies at the University of Amsterdam. Her research examines the intersections of journalism, scholarly communication, and health, science, and environmental communication. She is also an (occasional) freelance writer, a research associate of the

Scholarly Communications Lab, and Vice President of the Public Communication of Science and Technology Network (PCST).

a.l.fleerackers@uva.nl

Luiá Bolonha Nunes is a master's student in Social Anthropology at the State University of Campinas (Unicamp). She is currently conducting research on HIV Pre-Exposure Prophylaxis (PrEP) in the city of Campinas, São Paulo, Brazil, with research interests in HIV/AIDS, public health, gender, sexuality, and science. She is a scholarship holder with the South America PrEP Project.

bolonhanunes@gmail.com

Germana Barata is a science journalist and researcher at the Laboratory of Advanced Studies in Journalism (Labjor), State University of Campinas (UNICAMP), Brazil. She has a BA in Biology, a MSc, and a PhD in History. Her research has focused on science communication, social media, scientometrics, and scholarly communication. She coordinates the Laboratory for the Inclusion in Communication and Science (LABinCC), and the Collaborative Network for Ocean Communication — Ressoa Oceano. She is part of the scientific committee of the Public Communication of Science and Technology (PCST) Global Network (2018–2027) and of the Brazilian Association of Science Editors (ABEC) in Brazil (2024–2028).

germana@unicamp.br

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