EXPERT STATEMENTS: WHERE SCIENCE COMMUNICATION DISCOURSE MEETS PEER REVIEW DISCOURSE

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Abstract

With the influx of scientific publications, journalists are often challenged in putting new research into context. The Science Media Centre (SMC) addresses this issue by publishing expert statements that review and explain new studies. As such, these statements combine elements of science communication discourse, which typically seeks wide outreach, and peer review discourse, which typically seeks privacy and anonymity. To explore how these two discourses with conflicting aims work together, this study examines all publications on the SMC UK from April 2002 to January 2024. It compares them through a keyword analysis to a corpus of academic press releases and open peer reviews. A sample of 23 articles is then analysed qualitatively using the popularization framework by Sterk and van Goch (2023). The results show the important role of the expert persona and the use of strong statements employing boosters and credibility evaluations while still adapting information to the audience. Expert statements thus bridge academic and media practices and allow experts to provide suggestions for society.

Keywords

expert statement, science communication, peer review, keyword analysis, popularization

1   Introduction

Science communication has become an integral part of research as a way of bringing scientific knowledge closer to citizens and encouraging their participation. The traditional science dissemination outlets like academic journals are often inaccessible to non-experts due to the required previous knowledge, the high information density, and the specialized academic language in which publications are written. Researchers thus communicate their findings to the public through different outlets such as traditional media, social media, personal blogs, and podcasts (see e.g., Bondi et al., 2015; Mur-Dueñas & Lorés, 2022; Plo-Alastrué & Corona, 2023; Sterk & van Goch, 2023). Information can be disseminated directly by the researcher (e.g., via social media or blogs) or through an internal or external press office (e.g., university press releases and media companies building on these press releases). Researchers and journalists are often connected directly or indirectly through public information personnel who are employed in the researchers' organizations and contact science journalists through pitches or press releases (Dunwoody, 2019, p. 446). Still,

there are many cases of spin in research abstracts, articles, and press releases, where some findings are emphasized over others (e.g., Boutron et al., 2019; Chiu et al., 2017; Demarquette et al., 2023; Jellison et al., 2019). Such spins do not represent fake news. Rather, some potentially relevant details of the study design or findings are intentionally or unintentionally omitted from prominent positions like the title of the press release (e.g., that the study is pre-clinical, see Boutron et al., 2019).

In academia, peer review is the gatekeeping and quality assurance mechanism that aims to ensure scientific integrity and avoid such misrepresentations, although spin in research abstracts and articles is still common (Jellison et al., 2019). In the media, quality assurance mechanisms such as review by editors and fact-checking bodies also exist, but it is more common to formulate attractive titles which provide a selective view of the news (e.g., Boutron et al., 2019). One of the central aims of science communication is to increase the researcher's visibility and even develop their brand (Pascual et al., 2023, p. 13). The growing need to stand out, attract readers, and deliver clear and straightforward findings may thus lead researchers and/or journalists to exaggerate the findings of studies (Sumner et al., 2014; Woloshin et al., 2009; Yavchitz et al., 2012). For instance, 40 per cent of the press releases and 36 per cent of the news pieces examined by Sumner et al. (2014) contained more explicit or direct advice than the journal article (Sumner et al., 2014, p. 3). Still, most of these spins were already present in the text of the press releases published by the academics' establishments (Sumner et al., 2014, p. 4). As science news needs to be engaging while remaining factual, it can be difficult for both researchers and journalists to judge which findings to emphasize and to what extent. In addition, experts often need to support journalists to put new studies into the context of the previous evidence. One organization that aims to provide a platform for experts to review and contextualize science news for journalists is the Science Media Centre (SMC).

The SMC is a "boundary organization" which functions independently from larger media or research institutions (Rödder, 2020, p. 174). SMC UK is part of a global network with SMCs in other countries such as Australia, New Zealand, Germany, Taiwan, and Spain. SMC UK has been publishing expert statements since 2002 and thereby supports journalists in covering various topics such as health, environment, and technology. The publications differ from science news portals, fact-checking portals, and institutional websites and blogs (Freddi, 2020; Juneström, 2021; Mur-Dueñas, 2024) in that they provide an expert critical evaluation of new studies against the state of the art. SMC UK publishes in three main genres: "roundups & rapid reactions", "briefings", and "before the headlines". It releases statements on new studies even before the embargo is

lifted (round-up) or soon after an important scientific event has occurred (rapid reaction) (Rödder, 2020, p. 178). It also organizes press briefings and reviews studies before they hit the headlines. SMCs have a database of researchers who are invited for statements on new studies or events. For journalists, the SMC offers mailing lists and assistance in finding experts to interview (SMC, n.d.). However, the SMC has received some criticism, for instance for promoting "corporate science" (Tatalović, 2014). This study will only focus on the genre of expert statements published on the SMC and not the workings of the organization. Phrasings such as "SMC's discourse" always refer to the discourse of the articles published on the platform and not the organization itself.

The expert statements published on the SMC have a review and explanation function. They combine elements of science communication, which usually seeks wide outreach due to its aim to popularize scientific findings, and peer review, which usually seeks privacy and anonymity due to the potential face threat of the evaluation. This raises the question how these conflicting aims are reflected in SMC's discourse. Given that a full discourse analysis would require a book-length treatment (as in Paltridge, 2017), the current study provides a first preliminary overview of the discourse on the SMC with a focus on exploring its similarities and differences with science communication and peer review discourse.

1.1 Science communication discourse

The field of science communication is very diverse, as it encompasses many different genres and modalities, each having their specific discourses. Some common examples include press releases, social media posts, personal blogs, podcasts, videos, and museum exhibitions. This study focuses on written science communication for the media such as press releases. Science journalism discourse is characterised by interdiscursivity (Sterk & van Goch, 2023, p. 16) as it combines academic, journalistic, and pedagogical discourse. Publications should be interesting and relevant, often communicating surprise while remaining factual and informative (Bednarek & Caple, 2012, 2017; Molek-Kozakowska, 2017, p. 74).

Researchers play a large role in science communication, as they are quoted, instrumentalized or scrutinized by others (Janich, 2019, p. 176). The discourse on researchers' findings can leave their control, as it can become subject to distorting popularization and simplification (Hilgartner, 1990). Meanwhile, when appropriate, popularization and simplification are central strategies in science communication. They take place through strategies like reformulation, exemplification, and metaphorization (Calsamiglia & van Dijk, 2004). The related strategy of recontextualization involves shifting information from

one context to another by restructuring arguments and rhetorical connections (Lorés, 2023). Lorés (2023, pp. 72–78) identifies three dimensions of recontextualization: comprehensibility (expressed through code glosses for explanation, exemplification and reformulation), credibility (expressed through evidentials) and engagement with the audience (expressed through shared experience, inclusive *we*, questions, and directives). Other verbal and non-verbal explanatory strategies include elaboration, explicitation, exemplification, enumeration, comparison/analogy, spatial organization (layout) and visual representations (Mur-Dueñas, 2024, pp. 101–104).

Overall, in science communication, researchers and journalists use different linguistic strategies to communicate scientific knowledge to the public in an understandable and attractive manner, focusing on the significance and implications of the findings.

1.2 Peer review discourse

Peer review, typically in the form of a report, aims to scrutinize academic publications like journal articles or conference papers, propose revisions and recommend the acceptance/rejection of the submission. As such, peer review incorporates evaluative language, which focuses on the expression of attitude and stance (Thompson & Hunston, 2000, p. 6). Due to the central role of praise and criticism in peer review, politeness strategies are crucial for mitigating face threat (Brown & Levinson, 1987). For instance, well-meaning reviewers structure their report starting with the "good news" followed by the "bad news", combine praise and criticism/suggestions, and employ hedging (Belcher, 2007; Diani, 2017; Hyland, 2004).

The use of these strategies depends on the status of the review. Paltridge (2017) showed that accept and minor revisions reviews express solidarity and approval, though minor revisions comments use more hedges, indirectness and metadiscoursal bracketing compared to accept reviews (p. 104). The major revisions reviews again express approval and use hedges (Paltridge, 2017, p. 106) but changes are required in a more direct manner (p. 107). In reject reviews, approval is less common and is often followed by criticism (p. 111).

In addition to the acceptance/rejection decision, another aspect which affects the politeness of reviewers' reports is whether they are open or single-/double-blind. While many of the anonymous reviews in Kourilova (1998) contain only criticism, have an authoritative attitude, and include blunt and ironic remarks, most of the open signed reviews in Nobarany and Booth (2015) mitigate criticism and tend to use more positive politeness strategies like compliments toward less experienced authors. This may be due to the higher face

threat to both the reviewers and the authors undergoing open peer review. Still, double-blind reviews are not always critical and often use politeness strategies as well (Paltridge, 2017).

One major difference between academic peer review and science communication is that reviewers avoid redundancy and do not elaborate on what is considered common ground (Paltridge, 2017, p. 77). Meanwhile, science communicators often explain concepts that are basic for the field (see Mur-Dueñas, 2024). In the SMC, experts review other scientists' studies, but for journalists rather than editors. Thus, they have to negotiate praise and criticism while adapting the information to journalists and the public on the basis of their presumed knowledge. This interesting intersection of review and popularization discourse elements will be explored in the following sections.

2   Methodology

The current study is based on all releases on the SMC UK from its first publication in April 2002 to January 2024. The 8,317 articles (6.7M words) were collected via a Python-based web scraper from the SMC website (https://www.sciencemediacentre.org/). Of these, most articles are from the category "roundups & rapid reactions" (80%), 19 per cent are "briefings", and 1 per cent are "before the headlines".

The structure of roundups and rapid reactions on the SMC usually follows a similar pattern: A title (e.g., "*expert reaction to chilli consumption and mortality*") followed by a short introduction to the issue, expert statements, a reference to the study or a report under discussion, and conflicts of interest. The "briefings" present a short summary of the topic and present the speakers who participated in the session, though without a detailed transcript of the press briefing. The "before the headlines" are similar to a peer review report: after an introduction of the study, the author presents its main claims and explains whether they are supported by the data, discusses its strengths and limitations, and provides a glossary and some background on the reviewer (such as relevant expertise).

2.1 Explorative analysis: Keyword lists

To explore the differences between the discourses of the SMC and related science communication and peer review genres, a keyword analysis was carried out in AntConc (Anthony, 2023) with SMC as the target corpus and a related media or review corpus as the reference corpus (and vice versa – the media/ review corpus as the target corpus and SMC as the reference corpus). All texts were pre-processed for the analysis, that is, they were converted to lowercase and punctuation, and some metadata (dates and review ratings) were removed.

In terms of science communication, the SMC corpus was compared to 692 university press releases and news articles from Sumner et al. (2014) (500k words). The study by Sumner et al. (2014) compares exaggeration in health-related science news and academic press releases (data: https://figshare.com/articles/dataset/InSciOut/903704?file=1785357).

In terms of peer review, the SMC was compared to a corpus of 8,306 single- and double-blind open peer reviews (6.4M words) from the International Conference on Learning Representations (ICLR) (Ivanova, 2020). While this corpus is not openly available, the texts can easily be viewed and collected from the portal OpenReview (https://openreview.net/group?id=ICLR.cc).

2.2 Qualitative analysis

A sample of 23 articles, one for each year of publication, was randomly drawn from the SMC corpus in R using the *slice_sample* function. Table 1 presents the selected articles with their publication date, headline, and word count. The articles cover a wide range of topics and were published on a variety of occasions. Experts review not only new studies or reports but also statements on events such as the resignation of the UK science minister Lord Sainsbury. Nevertheless, the majority of the articles comment on new research.

Pub. Date	Article headline	Words
05.12.2002	scientists react to publication of the draft mouse genome	707
02.02.2003	Columbia shuttle disaster – rapid reaction	32
12.07.2004	scientists respond to Government spending review	857
24.11.2005	scientists react to Professor Hwang Woo-suk's resignation	753
10.11.2006	leading scientists pay tribute to Lord Sainsbury	666
14.02.2007	obesity risk from prenatal chemical exposure	821
12.08.2008	experts comment on research into a link between poor coordination in childhood and obesity in later life, as published in the British Medical Journal	379
02.02.2009	so if it's supposed to be getting warmer, how come it's snowing? – experts put the weather in the context of climate change	226
04.06.2010	expert reaction to Easyjet's ash radar	449
24.03.2011	ongoing rapid reaction – Fukushima nuclear incident	634
02.05.2012	expert reaction to Open Letter from GM wheat field researchers at Rothamsted Research	986
12.06.2013	expert reaction to MHRA announcement on regulation of electronic cigarettes	255
10.04.2014	expert reaction to Cochrane Review on Tamiflu and Relenza for treatment and prevention of influenza	2,486

Pub. Date	Article headline	Words
10.04.2015	expert reaction to dementia and body mass index	980
17.10.2016	expert reaction to study reporting production of functional mouse eggs in culture	2,304
29.06.2017	expert reaction to CEH study of the effects of neonics on honeybees and wild bees	4,244
12.09.2018	expert reaction to greenhouse gas removal report	583
14.01.2019	expert reaction to adolescent well-being and digital technology use	1,177
22.03.2020	expert comments about current UK COVID-19 case numbers	225
18.06.2021	expert reaction to latest figures for cases of variants of concern (VOCs) and under investigation (VUIs) and technical briefings on variants of concern published by PHE	412
11.12.2022	expert reaction to conference abstract about phase 1 study looking at using base edited cells to treat resistant T-cell leukaemia	492
20.06.2023	expert reaction to study suggesting an association between regular napping and larger brain volume	302
09.01.2024	expert reaction to Copernicus 2023 Global Climate Highlights	2,307

Table 1: Overview of the SMC releases sampled for qualitative analysis

The qualitative analysis is based on the analytical framework for popularization discourse by Sterk and van Goch (2023). The framework has five themes (Subject matter, Tailoring information to the reader, Credibility, Stance, and Engagement), which are described in Table 2 with an example from the SMC corpus. The themes often overlap – for example, the excerpt *have some major difficulties of interpretation* expresses a Credibility judgement and contains a hedge (*some*) and a booster (*major*). In Sterk and van Goch (2023), each of these themes is constituted by strategies. For example, "Applied implications", "Explanations" and "Imagery" are some of the strategies part of Tailoring Information. However, the individual strategies will not be explored in detail in the current study, as its aim is to provide an overview of the discourse of the SMC and not focus on popularization strategies. Only the theme Stance was further subdivided into Stance_hedge and Stance_booster for interpretation purposes. Hedges express uncertainty and tentativeness and allow the writer to acknowledge alternative viewpoints while boosters express certainty and confidence and limit the alternative voices (Hyland, 2005, pp. 52–53). The current study will thus lay the foundations for future research that will zoom in on the strategies and (meta)discourse markers used in the SMC.

Theme	Explanation	Example
Subject matter	Discussing the content of the original study	**The study** strengths include...
TAILORING INFORMATION	Recontextualization strategies, used to represent academic findings to the general audience	...the body's response to the **appetite-regulating** hormone leptin...
CREDIBILITY	Authorial positioning in relation to other researchers and publications	The report **nicely summarises current levels of scientific understanding** and technological-readiness.
STANCE	Expressing stance and personal attitudes (e.g., through hedges and boosters)	HEDGE: There **seems** to be **some** confusion in the media about radioactive contamination. BOOSTER: A warming world **will** continue to have cold days and **even** weeks, just fewer of them.
ENGAGEMENT	Establishing connection to the readers	Activity should be promoted as a normal, healthy, and enjoyable part of **our** everyday lives.

Table 2: Examples of the popularization themes (Sterk & van Goch, 2023) part of the qualitative analysis

In addition, the type of evaluation (PRAISE, CRITICISM) was coded as a relation between the themes in cases where the authors expressed praise or criticism (see Figure 1). While the analysis of popularization themes aimed to shed light on the science communication features of the corpus, the analysis of praise and criticism aimed to explore its peer review features.
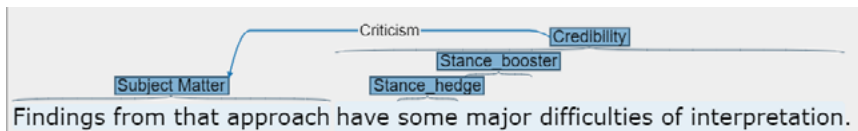

Figure 1: Screenshot of text annotation in INCEpTION

The popularization themes and evaluation relations were annotated using the software INCEpTION (Klie et al., 2018). In addition to the flexibility in the creation of annotation schemes, INCEpTION supports the manual annotation with active learning and tag suggestions. The files and annotations were exported in the UIMA CAS JSON 0.4.0 format and pre-processed with a custom Python script. Then, the data table was analysed and visualized in R with the *tidyverse* package collection (Wickham et al., 2019).

While this approach allowed the annotation of themes following an established framework, it was often difficult to determine the scope of a theme. In the example below, *will*, *prove* and *invaluable* are used as boosters, but it is up to the annotator to decide whether the phrase *will prove invaluable* should be coded as one booster or three.

(1)   *Finally we have the genetic blueprint that will unveil the mysteries of the mouse and **will prove invaluable** for human medical research.*

I opted for the more detailed approach (three Stance_booster themes) since boosters like *will* often occur on their own and it would be consistent to code them individually. Moreover, this allows INCEpTION to pick up the pattern and suggest annotations of other individual tokens of *will*. This approach resulted in many small themes on the level of hedges and boosters. A replication of the study with additional raters and a different scale of annotation would be useful to expand on the current findings on popularization themes and their use to express praise and criticism.

Overall, the detailed annotation of a sample of the corpus allowed a more in-depth analysis of different popularization and review strategies in the SMC. The following sections present and discuss the results of the exploratory and the qualitative analysis.

3   Exploratory keyword analysis

3.1 Science communication markers

Table 3 presents the keyword analysis comparing the SMC corpus and the media article corpus by Sumner et al. (2014). Table 3a displays the ten keywords with the highest keyness (likelihood) score for SMC as a target corpus and Table 3b displays the keywords for the media corpus as a target. By carrying out the same analysis with switched target and reference corpus, the keywords that are characteristic for each compared corpus can be determined.

Word	NormFreq. (Target)	NormFreq. (Reference)	Keyness (Likelihood)	Keyness (Effect)
covid	2,259	0	2,276.14	0.005
prof	2,969	374	1,816.36	0.006
this	10,887	5,603	1,546.15	0.022
is	16,491	10,541	1,221.79	0.032
not	5,855	2,682	1,065.53	0.012
i	2,262	518	974.23	0.005

Word	NormFreq. (Target)	NormFreq. (Reference)	Keyness (Likelihood)	Keyness (Effect)
climate	1,113	53	898.89	0.002
declared	882	0	888.21	0.002
expert	1,117	65	868.83	0.002
interests	974	25	861.35	0.002

Table 3a: Keyword analysis comparing the SMC and the media corpus with SMC as target, Media as reference. (Note: NormFreq. = Normalized frequency)

Word	NormFreq. Target	NormFreq. Reference	Keyness (Likelihood)	Keyness (Effect)
cent	1,314	25	2,756.48	0.003
found	2,755	533	2,081.13	0.005
researchers	2,676	570	1,846.89	0.005
heart	2,401	567	1,491.42	0.005
pain	984	66	1,435.24	0.002
scientists	2,105	485	1,341.25	0.004
blood	2,124	504	1,314.61	0.004
genes	1,175	142	1,266.36	0.002
brain	2,298	615	1,239.19	0.005
cancer	2,831	898	1,225.57	0.006

Table 3b: Keyword analysis comparing the media corpus and SMC with SMC as target, Media as reference. (Note: NormFreq. = Normalized frequency)

The word with the highest keyness score in the SMC corpus is *covid*, as the coronavirus pandemic started in 2019 and was heavily discussed on the SMC. *Covid* understandably does not feature in the 2014 media corpus. Titles like *Prof.* and designations like *expert* occur much more often in the SMC than in the university press releases. The releases from the media corpus assume the credibility of designations such as *researchers* and *scientists*. Moreover, the SMC publications usually discuss one study, which likely accounts for the high frequency of the demonstrative pronoun *this*. SMC authors also use more negation (*not*) and self-mentions through the personal pronoun *I*. This highlights the review nature and the focus on individual statements of the SMC. In contrast, in press releases, the author rarely appears with a self-mention and instead reports on the *researchers*. Other SMC keywords relate to specific topics such as *climate*. The keywords *declared* and *interests* come from *declared interests*, which is a phrase included at the end of each SMC publication to indicate potential conflict of interest of the interviewed experts.

Looking at the keywords in the media corpus, *cent* from *per cent* is the word with the highest keyness score, which indicates different reporting conventions (*per cent* instead of *%* or *percent*). The keyword *found* is interestingly much more common in the press releases. This shows a stronger focus on the findings as news in the press releases compared to the focus on reviewing and contextualising these findings in the SMC. Other keywords typical of the media corpus such as *pain*, *blood*, *genes*, *brain* and *cancer* reflect the health focus of the texts.

Overall, the SMC stands out with experts' titles and self-mentions. The press releases show a stronger emphasis on the findings of the research teams.

3.2 Peer review markers

Table 4 presents the keyword analysis comparing the SMC corpus and the open peer review corpus by Ivanova (2020). Similar to Table 3a, Table 4a displays the 10 keywords with the highest keyness (likelihood) score for SMC as a target corpus and Table 4b displays the keywords for the peer review corpus as a target.

Word	NormFreq. Target	NormFreq. Reference	Keyness (Likelihood)	Keyness (Effect)
said	3,802	161	1,150.88	0.008
prof	2,969	0	1,092.25	0.006
uk	2,730	0	1,004.27	0.005
university	2,551	0	938.25	0.005
research	3,299	215	917.22	0.007
health	2,426	16	856.30	0.005
people	2,996	182	845.54	0.006
covid	2,259	0	830.83	0.005
study	3,501	408	813.13	0.007
risk	2,489	64	804.30	0.005

Table 4a: Keyword analysis comparing the SMC and the Open Peer Review corpus with SMC as target, Review as reference. (Note: NormFreq. = Normalized frequency)

Word	NormFreq. Target	NormFreq. Reference	Keyness (Likelihood)	Keyness (Effect)
paper	10,578	897	5,634.33	0.02
iclr	3,413	0	4,539.07	0.007
learning	2,914	63	2,600.89	0.006
proposed	3,140	91	2,585.06	0.006
method	2,893	117	2,140.22	0.006
experiments	2,748	104	2,078.96	0.005

Word	NormFreq. Target	NormFreq. Reference	Keyness (Likelihood)	Keyness (Effect)
modified	2,077	44	1,871.75	0.004
model	3,188	227	1,855.70	0.006
training	2,147	70	1,704.59	0.004
neural	1,836	34	1,704.13	0.004

Table 4b: Keyword analysis comparing the Open Peer Review and the SMC corpus with Review as target, SMC as reference. (Note: NormFreq. = Normalized frequency)

The SMC corpus stands out with the word *said*, as this is a common formulation introducing the experts' statements. The peer review corpus rarely reports such quotes. Titles like *Prof.* are used consistently in the SMC but are uncommon in the peer review corpus. Many academic outlets avoid titles in order to promote equality and reduce the influence of rank. In the SMC, titles like *Prof.* increase the attributed credibility to the expert statements, which are expected to eventually reach the media and the public. Moreover, affiliations like *university* do not feature in the peer review corpus because most reviews are double-blind or do not contain the authors' affiliations. Another difference in the SMC is the use of locations like *uk*, as the discussed findings are often related to the local UK context. The scientific field also differs between the two corpora – while the ICLR is a deep learning conference, many articles on the SMC are from the life sciences. This is evident in the SMC keywords *people*, *health*, *covid* and *risk*. Another difference between the academic communities is the use of the terms *study* and *research* on the SMC in contrast to *paper* and *experiment* on the ICLR. This difference is partly due to the main subject of discussion on the two platforms, that is, research articles in the SMC and conference papers in the ICLR, although there are also some discussions of conference papers on the SMC.

In the peer review corpus, the subject of the review is often mentioned (*proposed*, *method*). As most studies discussed in the SMC are either published or accepted, words like *proposed* are rarely used to describe them. Thus, the SMC can be seen as a post-peer-review outlet. Other discipline-specific keywords in the review corpus like *learning*, *modified*, *model*, *training* and *neural* reflect the thematic focus of the ICLR conference.

Overall, the SMC differs from peer review in its use of quotes, titles, and affiliations, references to the local context (UK), and in the subject of analysis (*study* vs *paper*).

4 Qualitative analysis of popularization themes

4.1 Overview

Following the exploratory keyword analysis, which focused on the differences between SMC, science communication, and peer review discourse, this section looks at the similarities between these discourses. It presents the qualitative analysis of the five popularization themes and two evaluation relations (praise and criticism) in a sample of 23 texts from the SMC corpus. The frequency of the popularization themes in the sample is visualized in Figure 2. As expected, the most frequent theme is one of the small-scale themes as they often constitute single words. However, it is rather surprising that the most frequent theme is STANCE_BOOSTER, as boosters are uncommon in academic reviews (Paltridge, 2017). Even though the results can be explained by the many single-word boosters, there is a striking difference in frequency compared to the other predominantly single-word theme STANCE_HEDGE, which is the least frequent theme. This shows researchers' bold expression of stance when writing for the SMC. Another theme with a comparatively high frequency of occurrence is CREDIBILITY. Researchers often compare the discussed new study to the state of previous research by summarizing it (e.g., *From what we know already...*). In their role as experts, they need to provide evidence to support their assessment. SUBJECT MATTER and TAILORING INFORMATION have a similar intermediate frequency, which shows the need to both refer to the discussed study and to digest the information for the non-expert readers. Finally, ENGAGEMENT and STANCE_HEDGE have similarly low frequency, as researchers writing on the SMC rarely engage with the readers or tone down their statements. Rather, there seems to be a need to communicate evaluations clearly to science journalists.
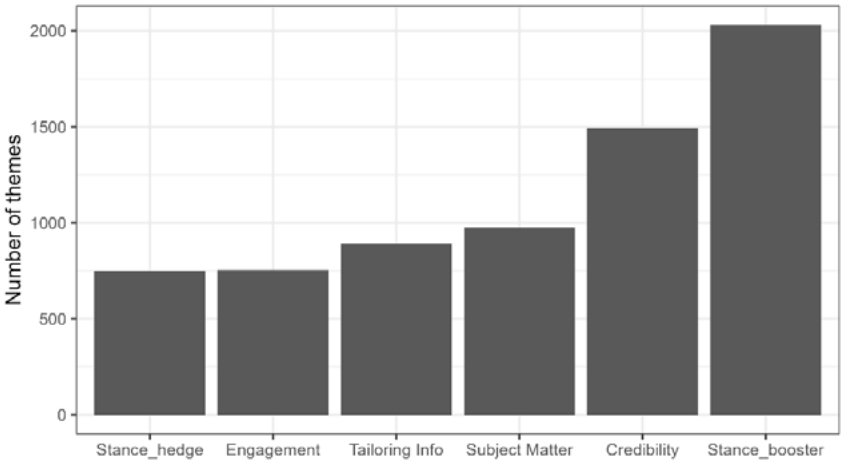
Figure 2: Frequency of the popularization themes in the analysed sample

Figure 3 presents the proportion of themes that form part of praise and criticism evaluations. Recall from Figure 1 that each evaluation relation (praise/ criticism) starts from one theme and points to another.
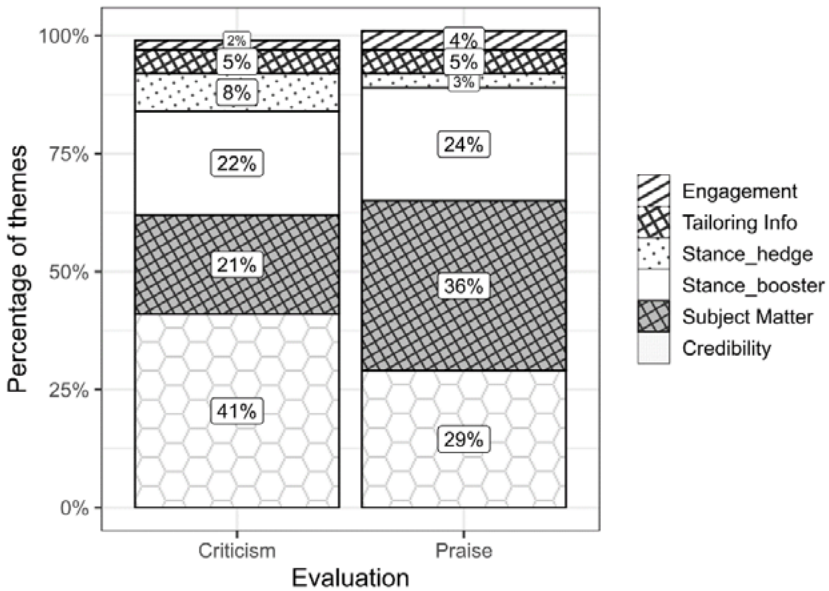
Figure 3: Distribution of popularization themes in evaluations expressing praise and criticism

The most frequent theme part of CRITICISM evaluations is CREDIBILITY (41%). Many of the criticisms relate to the credibility of the study design or results. In contrast, the most frequent theme part of PRAISE evaluations is SUBJECT MATTER (36%). One explanation for this result may lie in the sample, as the article dedicated to Lord Sainsbury contains many praise elements referring to the SUBJECT MATTER (i.e., his contributions as a minister). However, there are also many praise evaluations relating to the discussed studies. The rest of the themes are similarly distributed across praise and criticism.

Note that when comparing praise and criticism, STANCE_BOOSTER is not the most frequent theme. This is probably because expressing a strong stance is less likely to occur in the context of praise and criticism due to issues of face threat. Thus, in the SMC sample, boosters were often used to emphasise the importance of an issue, but less often to evaluate studies. Further analysis of metadiscourse markers across the corpus will provide interesting insights into the expression of stance and evaluation in this hybrid genre.

4.2 Discussion of the qualitative findings

Researchers evaluating new studies on the SMC use a wide range of popularization and evaluation strategies in order to review and explain these studies appropriately for journalists and the public.

The theme SUBJECT MATTER contains many references to the discussed study, which are mostly marked by demonstrative pronouns such as *this* (*this study* or *this kind of data*). Reference is also often made to *the researchers* or *the authors* (2) and in a few special cases the subject is addressed by name.

(2)   ***The authors*** *report an inverse correlation between BMI in middle age and dementia risk, contrary to previous suggestions.*

The theme TAILORING INFORMATION contains many strategies that are a form of recontextualization (Sterk & van Goch, 2023, p. 58). For example, the Covid variants were referred to by the regions which reported their first cases such as the *Indian variant*, *original Wuhan virus*, *South African variant*, and *Californian variant*. These terms were later abandoned to avoid stigmatising people who come from these regions. Other common strategies such as explicitation and explanation in brackets are also frequently used in the SMC (like in Mur-Dueñas, 2024), as evident from Example (3):

(3)   *To derive functional **oocytes (eggs)** from **pluripotent stem cells (embryonic stem (ES) or induced pluripotent stem (iPS) cells***) *entirely in vitro required several steps.*

In addition, some non-literal or ironic usages are signalled through quotation marks. As such, the authors assist the readers in interpreting the intended message.

(4)   *there is no evidence for any **'magic'** alteration of metabolism*

The theme CREDIBILITY often features comparisons with the state of the art (i.e., previous research or the *current evidence base*). The generalizability of the methods is also discussed:

(5)   *To replicate this work in humans poses further challenges…*

This issue has been thematized in a study by Boutron et al. (2019) on the perception of spins in news stories where premedical studies (e.g., on mice) were not reported with caution for the extension of the findings to humans. Considering the interpretation of the findings, the SMC often discusses issues like the difference between correlation and causation:

(6) *The researchers also give reasons for doubting that the relationship between technology use and adolescent well-being is one of **cause and effect***.

Overall, the CREDIBILITY theme clearly shows both aspects of popularization from science communication and aspects of critical review from peer review.

The theme STANCE was sub-divided into hedges and boosters. These often overlap with larger themes like CREDIBILITY or SUBJECT MATTER. Hedges are commonly used in academic discourse to tone down statements and figure similarly in the SMC's expert statements:

(7) *Instead, the studies show there are **potentially** large impacts **in some circumstances***

Despite the strong positive verb *show* (Pho, 2013), the authors use two hedges (*potentially* and *in some circumstances*) to stress that the findings only apply to these contexts and prevent their overgeneralization. In Paltridge (2017, pp. 125–129), hedges were relatively infrequent (second to last before boosters), and they are also infrequent in the current sample. This is likely because the experts who provide statements on the SMC are not discussing the interpretations of their own findings but aim to provide an evaluation that will put new studies in context for journalists. However, direct comparison of hedges and boosters with Paltridge (2017) is difficult, as there may be minor differences in our classifications and no list of markers is provided for comparison.

In terms of the boosters used, it is striking that they are the most frequently used theme in the SMC sample. Peer review would be expected to contain far fewer boosters – in Paltridge (2017, pp. 125–129), regardless of the acceptance status of the report, boosters were always the least frequent stance markers. The high number of boosters in the SMC is due to the twofold aim of the statements to not only review but also to explain and contextualise findings in light of the evidence base. In (8), obesity risks are emphasized by the *do* construction and by the adjective *many*:

(8) *We **do** know that obesity carries **many** other risks including high blood pressure...*

Some of the boosters also come from expressions of advocacy, such as Example (9). Some of the researchers thus emphasize their recommendations for policy and society.

(9) *Aiming to keep warming to 1.5 °C is **more important than ever**.*

Finally, the theme ENGAGEMENT showed that there are two different reader groups that are being addressed with the third person pronoun *we* – a general *we* can refer to society (Example 10) or to the research community (Example 11).

(10) *Pollinators are responsible for one in three mouthfuls of food **we** eat, so safeguarding their health is something we should all care deeply about.*

(11) *But **we** should be careful about the message that is now sent to doctors and to the public.*

While it is usually clear from the context who is being addressed, it is interesting to observe how the commenting researchers take on two different roles as the expert and the peer when addressing society and the research community. Another example of engagement are colloquial and over-exaggerated statements such as the following rhetorical question about a study on the relationship between body mass index and dementia:

(12) *Is it time to slump on the sofa, pile into the burgers and slurp the lager?*

Such statements draw attention to the problem by using an exaggerated everyday example to which the audience can relate. It will be interesting for future research to look at the use of pronouns and rhetorical questions for generating engagement in the whole corpus.

Regarding the expressed evaluation, the qualitative analysis considered praise and criticism. In terms of praise, the achievements of the discussed study (SUBJECT MATTER) were often highlighted, for example:

(13) *This is a well-designed study that contradicts previous smaller studies and demonstrates that the relationship between weight and dementia risk is not straightforward.*

In terms of criticism, again the discussed study (SUBJECT MATTER) is the main point of scrutiny, with many comments on the methodology and interpretation of the findings:

(14) *...this is not a very strong effect in humans and can only be unmasked with very careful studies of fairly large numbers.*

Moreover, criticism is sometimes mitigated through a combination with praise through concessive constructions like *while* and *although* (15), which is a common feature of peer review discourse (Ivanova, 2020; Johnson, 1992; Paltridge, 2017).

(15)   ***Although*** *the multi-national cooperation was the most effective response to preliminary reports on bee losses, evidence is mounting that country-specific legislation may be more effective at protecting pollinators.*

After the qualitative analysis, it has become clear that the experts on the SMC successfully bridge academic and media discourse. One aspect which can be added next to the five themes and two evaluation relations is advocacy. Authors on the SMC often voice recommendations or appeals, which usually have a general target:

(16)   *If people could be encouraged to use cleaner nicotine products rather than tobacco there would be substantial health benefits.*

In this way, expert statements on the SMC not only combine science communication and peer review, but also serve as a platform for expressing suggestions to the research community, policy makers, and society.

5   Conclusion

The publications on the SMC are clearly a hybrid genre (Mäntynen & Shore, 2014) with a hybrid discourse (Bizzell, 1999) as they combine the features of science communication genres such as the press release and academic review genres such as the peer review report. Respectively, the authors have a hybrid identity (Lorés, 2023, p. 80). On the one hand, they are domain experts who use their specialized knowledge to explain and review science news to journalists and laypeople. On the other hand, they often advocate for their views and provide recommendations for policy and society. The titles, affiliations and quotes that are common for the SMC can increase transparency and the attributed credibility to the expert statements (Hendriks & Kienhues, 2019, p. 63).

If peer review is the first stage of gatekeeping, review of published studies for the media as in the case of the SMC acts as a second filter. In academic peer review, both authors and reviewers interact through reviewer comments and authors' responses (Paltridge, 2017; Tardy, 2019). However, in the SMC, only the experts (who assume the role of reviewers) reacting to the studies are interviewed. This is due to the aim and purpose of the reactions to contextualize new scientific findings for journalists and not to fact-check them, which nevertheless takes place in the process of commenting on the studies. Moreover, peer review on the SMC is open and arguably more open than academic open peer review. Academic open peer review takes place on the platforms of journals and conferences and is likely to reach only academic audiences. However, the review on the SMC will reach science journalists and potentially the general public. As

such, it can be considered more face threatening and requires more caution in the balance between the straightforwardness required by media discourse and the tentativeness-politeness required by academic discourse.

The statements on the SMC also act as a mirror to research ethics and common research practices. Science communication should stimulate critical thinking and the understanding that uncertainty and ambiguity are an inevitable part of science and a necessary step towards consensus (Bertemes et al., 2024, pp. 20–21; Schmied, 2022). The SMC also promotes critical thinking by pointing out common drawbacks of methods and scientific controversies. At the same time, it employs many popularization and recontextualization strategies typical of science communication such as explicitation, the use of popular terms for scientific concepts, and the use of quotation marks to signal non-literal expressions.

Overall, the expert statements on the SMC have implications for researchers, journalists, and society. Researchers can act as advisors to the media on topics that match their expertise while explaining, popularizing, and critically reviewing the information. Meanwhile, journalists receive diverse expert opinions on complex scientific topics and transform them into news that ultimately reaches society. The fact that expert statements do not only explain new findings but also simplify and criticize them, poses potential threats to the relationship between science and society. In addition to potentially threatening the credibility of the researchers behind the reviewed studies, critical expert statements may lead to uncertainty and public mistrust in science. Therefore, future research should further explore the implications of the hybrid discourse for the reviewed studies in particular and for public trust in science in general.

The current study focused on one platform, and while the SMC is a popular outlet, it is difficult to classify its expert statements as a new genre. Still, the spread of SMCs to different countries shows that the genre of the expert statement is promising and a necessary response to issues of science communication such as sensationalism and spins. It should be noted that this paper does not directly endorse the SMC but the genre of the expert statement as it was popularized on the SMC. This form of outreach can be expected to maintain its useful synergy of media and academic writing, combining science communication and review discourses with elements of advocacy.

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