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Iwaniec-Thompson, M., Sormanen, N., Thelwall, M. et al. (2026) “We do the best we can with the information we have” Science reporting referencing retracted papers in the UK and Finland. Journal of Documentation. ISSN: 0022-0418

https://doi.org/10.1108/JD-01-2026-0009

"We do the best we can with the information we have" Science reporting referencing retracted papers across UK and Finland

Journal:	*Journal of Documentation*
Manuscript ID	JD-01-2026-0009.R1
Manuscript Type:	Article
Keywords:	retractions, journalists, transparency, Science reporting, retracted research, Altmetric.com, blogs

"We do the best we can with the information we have" Science reporting referencing retracted papers in the UK and Finland

Abstract

Purpose: To investigate the practical difficulties for journalists reporting scientific research that is later retracted and to examine how retracted research is framed in online news.

Design/methodology/approach: This article reports two studies involving content analysis and interviews. It integrates macro-level quantitative insights (online news article framing and content) with micro-level qualitative data (journalists' professional constraints). The content analysis used a sample of 73 online news stories reporting on 21 high-attention retracted articles identified from the Retraction Watch database and Altmetric.com. The qualitative component involved semi-structured interviews with 10 UK and 10 Finnish journalists to explore their lived experiences and decision-making processes about the potential for research to be retracted.

Findings: While Factual neutral reporting was the most prevalent frame, it was closely followed by Sensationalism in descriptors and frames reflecting Distrust in science. Media narratives typically focused on individual wrongdoing and data fraud, often overlooking systemic causes of retraction. The interviews revealed a universal absence of a systematic monitoring process for retractions among journalists in both countries. This deficit is due to time pressures, a lack of financial incentives for retrospective checks, and a reliance on luck or informal networks to detect retractions. Consequently, updating news stories following a retraction is rare, and when updates occur, they often fail to explain in plain language how the retraction influences the original claims.

Research limitations/implications: The reliance on Altmetric.com introduced a potential bias toward English-language sources and countries, and the inclusion of blogs in the "news media" classification may overrepresent alternative narratives. The findings reveal a critical gap between the academic community's self-correction and the capacity for similar journalistic responsiveness, contributing to the persistent circulation of misleading scientific information.

Originality/value: This study is the first to systematically investigate the challenges of dealing with retractions from the perspective of science journalism. By comparing the UK and Finnish contexts, it shows that different structural pressures lead to the same practical outcome: a reliance on fortune to correct the public record.

Introduction

The relationship between science and the public is mediated by science journalism, which translates and disseminates scientific information and fosters perspectives about how science works (Barnett & Doblin, 2021). Unfortunately, the contemporary digital ecosystem is increasing pressure on reporters for fast and engaging publishing (Harro-Loit & Josephi, 2020), increasing reliance on press releases (C. Anderson, 2013) and

potentially leading to exaggeration and error (Barnett & Doblin, 2021; Sharpe et al., 2016; Wardle, 2017). Inaccuracies in science journalism risk distorting the public's scientific knowledge and reduce the credibility of academic research (Ashwell, 2016; Liskauskas et al., 2019; Tandoc, 2020). Moreover, time pressures may even lead journalists to inadvertently spread disinformation (Harro-Loit & Josephi, 2020; Liskauskas et al., 2019; Tandoc, 2020).

This inherent fragility in science communication is exacerbated by the "reproducibility crisis": an increasing number of retractions and failures to reproduce experiments (Hsiao & Schneider, 2021; Lei et al., 2024; Liskauskas et al., 2019). Whilst the retraction of peer reviewed work from journals and conferences when problems are discovered is a crucial tool to correct errors, this complicates media coverage. This is exacerbated by the fact that information regarding retractions is imperfectly shared across publisher websites and bibliographic databases, making it easy for journalists to overlook it (Fanelli et al., 2018).

Journalists frequently cover initial research findings but rarely follow up when these claims are later disconfirmed (Rada, 2007). High profile issues are not necessarily exceptions: for one article covered by 52% of the largest American newspapers, nearly half (46%) of these newspapers failed to cover its retraction (Barnett & Doblin, 2021). For more routine cases, making updates following a scientific retraction is rare for journalists (Camerer et al., 2018). For example, an analysis of news articles covering eventually retracted scientific COVID-19 papers found that only 8% of articles contained an update following the retraction, despite the critical and time-sensitive nature of pandemic health information. Updates tended to be concentrated among elite media outlets and those focused on specialty topics. Furthermore, when updates were issued, they rarely explained in plain language how the retraction influenced the original news article's content and claims (Valinciute & Halffman, 2025). It is not clear why news stories are rarely updated after retractions. Science journalists should have the necessary expertise to understand and interpret the evidence in scientific research, including by following the stories through by checking scientific progress (e.g. Dunwoody & Konieczna, 2013).

Journalists require expertise and the ability to interpret the evidence in scientific research, including following the stories through by checking scientific progress (Dunwoody & Konieczna, 2013). Hence, journalists should report and re-report changes in the scientific process. For example, the Council for Mass Media in Finland states in their Journalist's Guidelines regarding correction of errors and changes after publications the following: "35. An essential factual error must be corrected as soon as possible after it comes to the attention of the editorial staff and in such a way that it will reach the public as widely as possible" and "If necessary, in addition to corrections, the editor shall publish a new story identifying the errors" (*Journalist's Guidelines*, 2025).

Despite the above findings, no study has yet investigated the challenges of dealing with retractions of scientific articles from the perspective of science journalists. Moreover, it is also important to assess whether there are international differences in the public's trust in journalists and expectations that they will protect the public from misinformation. In the USA, for instance, online mis- and disinformation has lowered the public's trust towards scientific and journalistic institutions (Anderson & Dudo, 2023). Public trust also seems to be low in the UK. In contrast, Finland has one of the highest levels of public trust in the news (Newman et al., 2025) with science also highly trusted (Finnish Science Barometer, 2024). Thus, international differences can be expected.

Research Design

To address the goal of understanding the journalist's perspective on retracted research, this paper reports two separate studies. The first analyses media articles citing high-profile retracted papers to investigate whether and how journalists inform readers about retractions in online news. The reasons for a focus on high-profile retractions is that lower profile articles are likely to be less important to the audience and probably ignored by all media. The following research questions were addressed through a content analysis in study 1:

- RQ1: How do online news stories report on high profile retracted research papers?
- RQ2: What information about a retracted research paper (e.g. reason for retraction, original claims, date of publication) is typically included in online news stories?

The second study directly addresses the goal by exploring the factors impacting science reporting in the context of retractions through semi structured interviews with 10 UK and 10 Finnish journalists.

- RQ3: What are UK and Finnish journalists lived experiences and decision-making processes concerning the reporting of scientific retractions?

Content analysis and the exploration of online news articles

For study 1, we downloaded the Retraction Watch database of retracted and problematic articles in August 2024 from CrossRef to get a science-wide dataset of articles to investigate, merging it with articles flagged as retracted in Scopus. This gave 56,705 retracted articles and their unique DOIs (Digital Object Identifiers). The DOIs were used to compile a list of online news articles reporting on retracted articles or articles with expression of concern. **Altmetric.com** is an organisation that tracks online attention to scientific publications across various sources by identifying online mentions of DOIs. While the precision and recall of Altmetric.com has been tested (Yu et al., 2021) and it's widely used in research on scientific communication, including news media mentions (Maggio et al., 2019; Shamsi et al., 2022), the database has faced some criticism. The critique includes a bias toward English-language sources and countries, a very broad classification of "news media" (including mainstream media (news outlets), social media, blogs, public policy documents, Wikipedia), the presence of inaccessible links (Yu et al.,2021). A recent literature review evaluating the use of Altmetrics concludes that while altmetrics offer real-time insights into research engagement, their academic application is hindered by methodological inconsistencies and a lack of data standardisation across platforms. Thus, significant disciplinary bias persists, as altmetrics tend to favour fields with high digital visibility while underrepresenting others. To address these limitations, the authors advocate for integrated models that combine quantitative metrics with qualitative assessments to reduce bias and enhance validity (Gonzales et al., 2025). Furthermore, recent evidence from a recent study shows that although altmetric indicators can distinguish between study designs and partially reflect levels of evidence, their ability to capture true research quality remains limited. The visibility of high-quality studies is still shaped more by platform dynamics than methodological rigour, underscoring the challenge of interpreting online attention as a

reliable indicator of scientific impact (Valderrama et al., 2025). Nevertheless, despite these limitations, the database has been widely used to provide evidence of the attention, influence, and impact that academic research has gained (Kavic & Satava, 2021).

Of all the retracted articles we identified 250 with the highest Altmetric attention score, according to Altmetric.com. These 250 articles were searched for on Google News, resulting in 839 online news articles mentioning 206 of the retracted articles. By comparing the dates of the retraction notice of the retracted articles with online news publication dates, we retained 549 online news stories that had been written after the retraction occurred.

To further explore the reasons underlying post-retraction citation given the time frame and work feasibility we had had, we focused on 22 retracted articles that had gained the most attention, involving 100 stories. We removed stories with content no longer available (n=22) and repeated posts (5), leaving 73 online news stories about 21 high profile retracted articles.

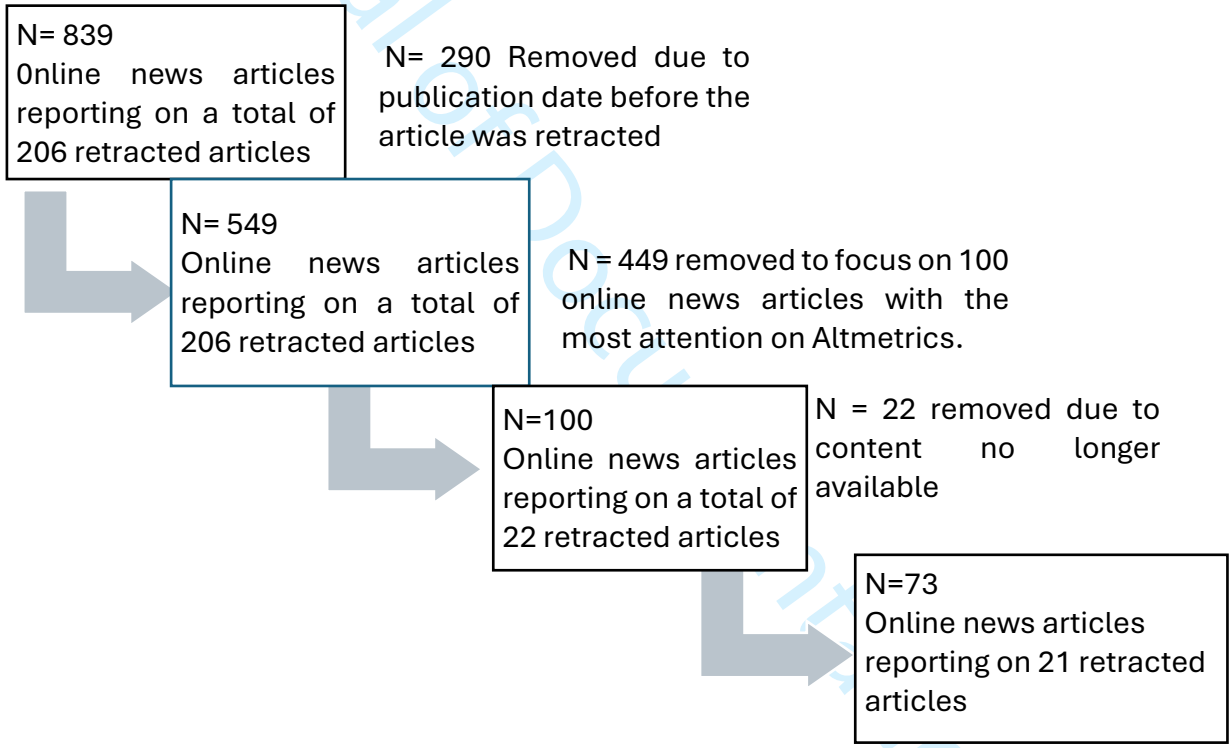

Figure 1. The data collection and data cleaning process. Source: Authors own work

To answer the first two research questions, the first author conducted an exploratory content analysis of the selected news stories.

All news articles were organised and managed using Microsoft Excel and NVivo to enable systematic comparison and coding. Each article was assigned a unique code linking it to its corresponding retracted article *(e.g. 1_1, 1_2, 2_1, 2_2)*. The first digit identifies the retracted paper, while the second digit denotes the individual online news article associated with it. In Excel, variables were recorded to capture descriptive and contextual information, including the retracted article title, journal, discipline, topic; the retraction date; the news publication date; and whether the news story was published

after the retraction. Information about the news source and article availability (e.g. whether the article had been deleted) was also recorded. In NVivo when possible, full online articles were pasted, allowing for the code's generation. This structured dataset supported both the qualitative content analysis and descriptive assessment of reporting patterns across news stories.

The sources in NVivo were coded into three broad areas*: 1: Retracted article proponent; 2: Media story overall framing,* and *3. The extent to which the retracted article is discussed in media stories*. The coding categories were developed through repeated close readings of the articles, guided by the research questions and aimed at identifying recurring patterns in how retracted papers were reported.
Three broad categories were identified and refined iteratively. Retracted article proponent captured information on reasons how the retracted papers were retracted, including whether they defend, accept, or contest the retraction. Media story overall framing referred to the narrative or tone of the article, such as neutral reporting, sensationalism, Distrust in Science. Extent and nature of discussion of the retracted article captured what information was provided about the retracted study, including references to the original claims, reasons for retraction. The codes were checked and discussed with the other authors, resulting in the merging and clarification of several codes for greater clarity. Examples of coding are presented in table 1 below.

Code	*Example from the data*
Distrust in science	*"But none of this is true. Science is amoral, judging nothing but the data, and an advanced degree in physics or sociology is not a patent of superior virtue. A Ph.D. does not sweep away the imperfections, faults, and blemishes of human nature. To put it bluntly, scientists are no less likely than the rest of us to lie, cheat, steal, twist the facts, etc. In short, we can never be one hundred percent sure that SCIENCE IS REAL. All too often, it's not."* *Source 11_6*
Factual neutral reporting	*"The authors of a controversial study published in The Lancet journal linking the use of malaria drug hydroxychloroquine with increased death risk in COVID-19 patients, have retracted their research paper, after they could no longer vouch for the veracity of the primary data sources used in their analysis"* *Source 1_2*
Insufficient peer review	*"The paper soon came under fire for the spuriousness of its results, and the authors have acknowledged that it would not have gotten through peer-review in that version. After all, this is the point of peer review: to challenge, clarify and pick holes in research before official publication."* *Source 12_14*

Table 1. Example of codes, Source: Authors own work.

Thematic analysis and the exploration of interviews

Study 2 attempted to capture rich, nuanced data about science journalists' practical responses to scientific retractions, the proliferation of digital misinformation in general (to set the issue of retractions in a wider context), and the factors affecting their practice.

Ad hoc web searching was used to identify science journalists and general journalists to contact for an interview. Journalists to contact were also identified from major news outlets, individual news stories, and recommendations of previous participants. This process resulted in ten interviews from each of the UK and Finland. The 10 UK interviewees were professional science journalists actively working in digital media, regularly covering science topics. The sample included journalists who were solely or partially working as freelancers writing for various media. All had been journalists for at least 15 years. From Finland, the 10 interviewees were professional journalists, who identified as either science journalists (both freelancers and working for a specific outlet) or general journalists (working for digital news outlets, newspapers or more specialized outlets) who had reported or continuously reported about science. All had been journalists for at least five years.

All journalists were interviewed individually with secure online video conferencing software. A pre-determined interview protocol was used to ensure coverage of a core set of questions (individual science reporting skills, reporting practices and routines, networks and sources of influences affecting science reporting), while retaining the flexibility to pursue emergent themes and allow participants to elaborate on their unique professional narratives.

All interviews were conducted by the first and second author, lasted approximately 40 to 60 minutes, and were audio-recorded and transcribed verbatim following informed consent. Transcripts were imported to NVivo for thematic coding and qualitative analysis. The interviews in Finland were conducted in Finnish by a native and transcripts analysed in Finnish, with quotes from the interviews translated into English. For clarity, the codes S_(number) refer to UK-based Journalists, while F_(number) refer to the Finnish journalists.

Interview data were analysed using reflexive thematic analysis (RTA) following Braun and Clarke (Braun et al., 2022; Braun & Clarke, 2012). The analysis aimed to identify how journalists understand, encounter, and respond to scientific retractions within everyday news work. An inductive, data-driven orientation was adopted, with codes and themes generated from participants' accounts rather than from a pre-defined theoretical framework. Given the study's focus on lived experience and professional judgement, the analysis prioritised latent themes, attending to the institutional, economic, and normative contexts underpinning journalists' descriptions of retraction-related practices.

The analysis followed Braun and Clarke's six recursive phases. First, the researchers familiarised themselves with the full data corpus through repeated reading of all interview transcripts and check against audio recordings. Initial analytic observations were recorded in memos. Second, transcripts were systematically coded across the entire dataset, capturing both semantic content and underlying assumptions. Coding was inclusive, and data extracts were coded multiple times where relevant to overlapping patterns. Third, codes were examined for relationships and collated into themes that captured shared meanings across participants. Fourth, these themes were

reviewed and refined in relation to both their constituent extracts and the dataset, ensuring internal coherence and clear conceptual boundaries. Some codes were worded in the same way as the journalists expressed their views for example, Time pressure. Fifth, final themes were agreed between the authors, defined and named by identifying their central organising concepts and their relevance to the research question. The subsequent thematic structure derived from this analysis resulted in several key themes briefly summarised and exemplified in Table 2 below.

Theme	Theme description and example
Affordances related to retrospective accuracy	Conflict between journalistic workflow demands e.g. being paid per story or working on daily deadlines vs time needed for story check
Trust and gatekeeping in quality control	Ways of finding the story, e.g. relying on established professional networks, social media rather than formal processes
The procedures and decision-making process in retraction discovery	The procedures and decision-making process in retraction discovery, e.g. preferring to write a new story rather than correcting the archived article
Impact of social media on journalistic practices	Ways in which social media impact the practice of reporting on science

Table 2. Themes across interview data, Source: Authors own work.

The final six step was to write up the findings, explicitly linking the themes back to RQ3, explaining how the identified patterns illuminate the 'lived experiences' and 'decision-making processes' concerning scientific retractions among UK and Finnish journalists. The findings are presented through an analytic narrative supported by illustrative interview extracts.

Study 1 Findings

Most of the high-profile retracted papers in our sample covered topics that often attract wide public and media interest — such as COVID-19, gender identity, and new physics claims (Table 1). The news coverage of these ranged from mainstream media (BBC, Reuters, Forbes) to blogs.

Of the 839 news stories analysed, 549 (65.4%) were published following the retraction of the Research Paper (RP). A targeted analysis of the 100 articles with the highest engagement revealed that 73 were post-retraction publications. Within this subset, 15 articles (20.5%) were no longer accessible, suggesting retrospective removal. Furthermore, two articles cited the RP only in the reference list without internal mention. Notably, 10 of these 73 articles failed to acknowledge the retraction; specifically, eight presented the RP as contemporary research despite its retracted status at the time of

publication. The table below summarises the disciplines and topics across the 73 news stories.

Discipline	Topic	News stories
Archaeology	Pyramids (based on 1 Retracted Paper)	6
Genetics	Human mutation (based on 2 RPs)	6
Health	Covid (based on 6 RPs)	31
	Hearing Aids (based on 1 RP)	2
	Human mutation (based on 1 RP)	1
	Reproductive biology (based on 1 RP)	2
Medicine	Herbal medicine (based on 1 RP)	1
	Regenerative medicine (based on 1 RP)	3
Paediatrics	Children's cognition (based on 1 RP)	1
Physics	Superconductivity (based on 1 RP)	3
Psychology	Behavioural Psychology (based on 1 RP)	7
Sociology	Gender studies (based on 1 RP)	8
	Political Science (based on 1 RP)	6
	Religion (based on 1 RP)	2
	Criminology (based on 1 RP)	1
	Total	**73**

Table 3. The disciplines and topics of 73 news stories citing high profile retracted research paper. Source: Authors own work

Frames in news stories reporting retracted articles

The most prevalent frames found in the news stories are *Factual neutral reporting* (n = 20), *Sensationalism in descriptors* (n = 18), *and Distrust in science* (n = 13) (Table2). Together, these highlight a dual pattern in media narratives: while a substantial number of stories maintain journalistic impartiality, others rely on emotionally charged or sensational language.

Theme	Frame	Frequency
Writers' techniques	Factual neutral reporting of flawed study	20
	Critiquing and questioning retracted RP	8
	Sensationalism in descriptors	18
Writers' positionality and focus	Distrust in science	13
	Reporting on the process of retraction	9
	Questioning the practice of the journal	7
	Authors of the retracted RP are quoted	7
	Alleged research misconduct	6
	Retraction as a positive scientific development	5
	Cronyism in academic publishing	3
	Criticism of media reporting practices	3
	Concerns over gender discrimination	3
	Questioning established understanding and offering alternative narrative	11

Conspiracy and alternative narrative	Claiming bias and flawed methodology in media reporting	11
	Sharing findings of retracted RP	9
	Mentioning of public figures supporting the findings of retracted RP	6
	Claiming validation of the retracted RP findings through their own research	3
	Quoting other studies negating retracted RP findings	4

Table 4. The main story frames of the 73 news stories reporting on the 21 high profile retracted RP. Some news stories had multiple topics frames. Source: Authors own work

Several additional high-frequency frames reflect sceptical narratives (e.g. Claiming bias and flawed methodology in media reporting (e.g. *So, here we have two major studies, orchestrated to fail, not testing the hypothesis at all, and followed by media headlines that fail to point out the clear malfeasance that took place - Extract 1_1)*, Questioning established understanding and offering alternative narrative (e.g. *The conscious awakening of man is disclosing forever deceptions, fraud and the war on man. Ruling entities know what time it is, so the SSCP 'Final' Report, in my opinion, may be an attempt to regain public trust b/c too many people know the truth -Extract 12_1*), Claiming validation of the retracted RP findings through their own research, Mentioning of public figures supporting the retracted findings, Questioning established understanding and offering alternative narrative).

These frames often present retraction as evidence of systemic failure, bias, or corruption in science and journalism (e.g. “it can be assumed that in many other cases corruption remains undetected” extract from 12_3), thereby aligning with broader conspiracy discourses circulating online. Thus, news stories can turn examples of *successful detection and correction* into a suggestion of widespread corruption and conspiracies.

Several retractions, especially those that were published in blogs were framed as being forced by activism or political pressure, rather than purely for legitimate scientific or ethical reasons. The framing often emphasizes that the work was controversial from the start and that critics mounted a campaign to “silence” it.

There were also instances where the retraction process was suggested to be biased, suggesting that the authors did not receive fair treatment (e.g. claims of “retrospective punishment,” extract from 2_3) lack of due process, or lack of transparency in how the retraction decision was made. Another example frames retraction not as error correction, but as *"ideological censorship"* used to enforce a *"Regime line"* and suppress "unconventional or dissenting work."

Two moderate-frequency themes, (Neutral) *Reporting on the process of retractions (n = 9) and Questioning the practice of the journal (n = 7),* point to attempts at contextualizing or scrutinizing institutional practices. These articles engage more deeply with the procedural and ethical aspects of retraction, reflecting a hybrid mode between investigative and critical reporting. In several articles, the practices of the journals were criticised, but some articles reported the retraction as a good example of effective self-correction in science.

Overall, the framing landscape highlights a tension between scientific accountability and public distrust. While factual neutrality remains the most common approach, sensational and conspiratorial framings still appear with notable frequency. This pattern suggests that retraction coverage often functions less as corrective science communication and more as a space where credibility, authority, and the legitimacy of expertise are actively contested. This pattern implies that the retraction, rather than being interpreted as a normal self-corrective feature of science, is frequently reframed as evidence of dysfunction or bias, potentially reinforcing scepticism toward the scientific academic publications.

Media coverage of reasons for retraction

From the perspective of the amount of information about the retraction, the media narrative was dominated by questions of data integrity and fraud, indicating that articles focused heavily on the trustworthiness of the underlying data as the main reason for the retraction (Figure 2). This variation is evident in the specific narrative strategies employed by reporters to explain the flawed nature of the retracted research, ranging from highly technical critiques to accounts of institutional misconduct and public misinformation. For instance, in describing a fabricated dataset in extract 11_5, the reporting moves beyond general accusation to cite precise statistical improbabilities and mechanisms of fraud: "For a sample as large as 13,488, this is statistically improbable $[p = 0.84] $." Crucially, the journalist details the presumed method of fabrication, advising the reader: "You can try this yourself on Excel with the RANDBETWEEN(0,50000) function." This level of granular detail elevates the report from simple accusation to demonstrable evidence.

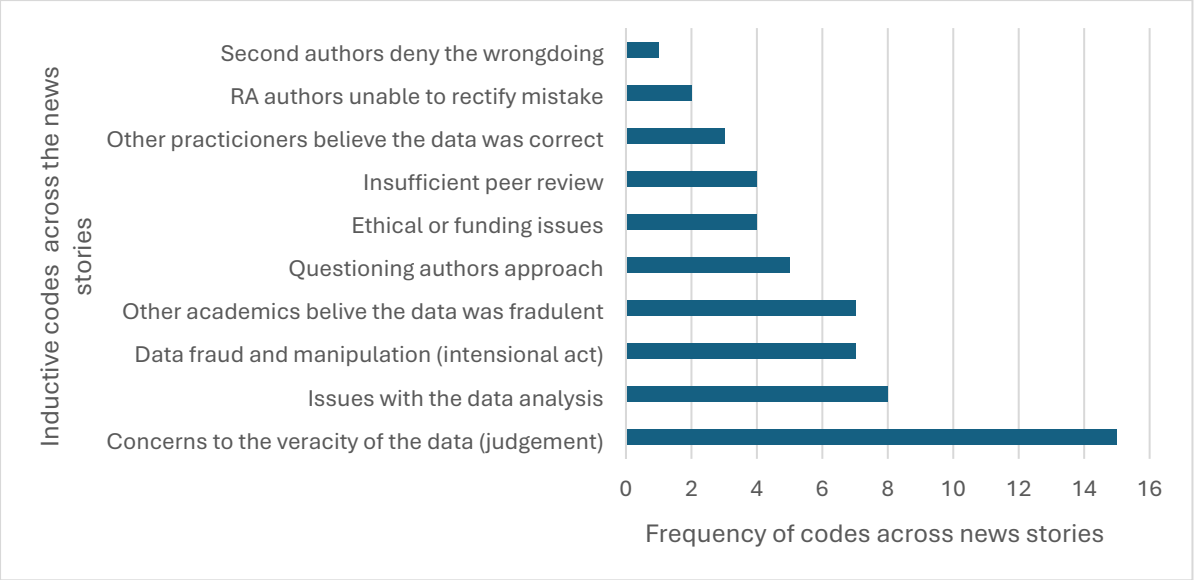

Figure 2. Retraction details in the 72 news stories reporting on the 22 high profile retracted articles. Source: Authors own work

Systemic failures, such as insufficient peer review or ethical or funding issues, received little media attention (4 stories each), aligning with the media's preference for simpler narratives and a focus on the actions of the researchers. The journalistic framing frequently highlights the detective work of the investigators, as exemplified by the

reference to "3 amazing researchers: Uri Simonsohn, Leif Nelson and Joe Simmons" and their insightful blog, "Data Colada" (Extract 11_4). This narrative structure positions the exposure of fraud as a triumph of rigorous digital research and scholarly diligence.

A recurrent theme was the dispersal of responsibility for data issues, such as claims that "others – such as research assistants – were involved in data entry and clean up" (Extract 11_2). Similarly, in another case, authors claimed they "were only responsible for the first two lab studies," disassociating themselves from a "problematic third study" (Extract 11_9). This practice attempts to introduce ambiguity regarding accountability, leveraging the complexities of collaborative, human-dependent data collection processes.

Study 2 Findings

The findings from the interviews in the UK and Finland are discussed from the perspective of the main themes that emerged.

Time pressures and science knowledge affect the ability to check facts

Both UK and Finnish interviewees repeatedly emphasized increasing pressures of time, attention, and resources. Most juggled multiple stories or freelance commissions, often under tight deadlines with little time for verification or follow-up. All interviewees in both Finland and the UK, stated that they mainly use press releases and information they get directly from researchers to write news stories about science. A senior reporter (S_06) commented:

> "I have to rely on what's in the paper, what's in the press release and, take it on face value. I don't really a lot of the time have time to, like I say, speak to the authors or...to cross reference it with anyone. Sometimes I'll send it to third parties like charities or other researchers that I know are interested in the field who can then tell me what they think of the paper, but again that often takes too long to do it every day. (S_06)"

The non-specialist journalists also mentioned that a lack of detailed scientific knowledge can make the checking process difficult and time consuming, sometimes trusting the checking procedures of other (international) media and just re-reporting their stories. One local news reporter stated that to publish fast short stories she relies mostly on the local university's press releases on new research findings because there is not much time to scan the wider research field, trusting on the researchers to give reliable information.

The Finnish science journalists were an exception: they usually had enough time to check the research, either through their own academic networks or through their access to scientific publication platforms. Those that had been general journalists before specialising reported that they had acquired the knowledge of academic procedures and science required to check stories after becoming science journalists.

In the UK, The Science Media Centre (SMC) functions as a crucial resource for real-time peer review, helping journalists assess quality and avoid inaccurate reporting before publication. "The most important thing it does is it provides academics... to produce quotes that are available for journalists on the day... so they suddenly have an immediate expert view on the quality or not of the research published" (S_07).

Lack of systematic processes to notify about retractions

The most significant constraint on journalists' ability to follow up on news stories citing retracted research was the complete lack of a systematic process for this. Instead, retractions were typically discovered incidentally through social media, colleagues, or outlets like Retraction Watch: "Unless it's a high-profile case, we don't know that a study we covered has been pulled." (S_09). Moreover, journalists are neither incentivized nor paid to perform retrospective checks on their work.

In the absence of a system, the practical challenges are immense for individual journalists because, "*it easily gets into like hundreds of studies every single year that I'm explicitly mentioning in stories. Checking all of those… it's just not feasible now.*" (F_01). Moreover, the nature of journalism means constantly moving on to the next hot topic, working against any desire to retrospectively check old news.

The journalists almost never received formal notifications about retractions, emphasising that they get no help with this task. Nevertheless, one journalist had received an email from a science journal platform warning that a research article that they had read while signed into the system had been retracted. This would not be a generic solution, however, as many articles can be read without signing into systems, such as on preprint servers, open access articles, and with institutional logons. Multiple journalists expressed a desire for technological solutions that would achieve a similar goal: "I would love, love an AI tool to [tell me] if there's an expression of concern or a retraction. " (S_01).

Lack of interest in reporting non-controversial retractions

The journalists believed that the public considers retractions to be boring, except for high-profile cases causing significant debate and controversy. Even writing about these can be difficult, as some topics, like vaccines, can result in "a bit of a pile-on in the comments". This can lead to professional shame or "guilt by association" even when they were reporting the "facts as they were presented to them at the time."

Several journalists also felt the professional difficulty of having to discredit a theory they had once covered factually, potentially undermining public trust in them. Thus, they rarely covered retractions. From another perspective, a freelance journalist would prefer to, "write a comment on a piece of work that's valid than write about why something that turned out to be wrong" (S_10). Many of the general journalists admitted that they have limited knowledge about the peer-review process and were not clear about what retraction means.

Declining public confidence in the media and the crisis of truth

Trust surfaced as a recurrent theme in the interviews: declining public confidence in science and growing scepticism towards the media. Several journalists responded by deliberately signalling uncertainty with phrases like *"early results suggest" (F_3; F_7, S_4)* without undermining engagement. Hedging may help maintain reader trust if an article is subsequently retracted. Others feared that too much hedging may alienate readers.

Several interviewees reflected on how scientific controversies have increased in frequency and visibility due to social media. The environment is polarized, giving people a "license to say that my knowledge is my truth," which can generate sensationalised stories that can out-compete impartial reporting in the online attention economy, where

nuance has little benefit. This has led to concerns about the overall effect on public knowledge about science:

> The problem is that everything is contested and institutions and experts are not valued – that all people are on the same level…meaning that anyone writing on social media with an anonymous nickname can contest opinions from very experienced scientists (F_2)

Differently from the UK, most of the Finnish journalists think that the general atmosphere and social media discussions have not significantly influenced their reporting about science. Many stated that it is their responsibility not to let it affect their reporting. The journalists still recognize the potential effects of social media audiences and heated discussion online, potentially leading up to some people verbally attacking journalists because of the issues they raise in their reporting.

Responses to post-publication retractions

Half of the participants mentioned their approach upon the post publication discovery of a retraction cited in their story, with all prioritizing transparency over hiding the error. Some journalists favoured writing follow-up pieces, "'we were wrong, here's what changed (S_10)'", while others opted for quiet online edits of the earlier stories. A few UK journalists feared that publishing corrections could erode credibility or attract unwanted scrutiny. This tension illustrates a professional ambivalence towards long term accuracy:

> "journalists tend not to see that past work. Um, as sort of part of an academic Library. Um, that people rely on, you know, if the journalists tend to see their past work, it's our best efforts at the time (S_07)"

While journalists acknowledged that scientific error and self-correction are normal aspects of the research process, they simultaneously recognized that the media ecosystem lacks equivalent structures of correction and accountability. There is also often no incentive to write a follow-on correcting piece.

Journalists in Finland had different beliefs. They expressed the responsibility for all media and journalists to "follow stories through" because the responsibility is stated in the journalistic code of conduct and instructions as discussed above in the literature review. This involves writing a new follow-up story about the retraction and that the science is not probably reliable or is contested. The information about the retraction should also be placed on the original story because that is circulating online, and people are still reading it.

Nevertheless, follow-up stories rarely occur in practice according to both UK and Finnish journalists, unless perhaps it was, "a very controversial or questionable issue" (F_04)" and that the most that would normally be done would be to add information about the retraction to the original story. This this might not reach the original readers, although major publications generally mandate notations for significant inaccuracies (S_07). One journalist considered independent disclosure, instead, for instance by blogging about the retraction (S_0). Very rarely a retraction might be seen as an opportunity for further, insightful reporting, possibly covering the story from a different angle: "*How did that happen?*."

Writing about retractions

Journalists occasionally cover interesting retractions as a newsworthy event, irrespective of whether their outlet discussed the original research. For example, this would include cases when a famous scholar was involved, and the research turned out to be fraudulent. Retractions become newsworthy to the public mainly through the human-interest aspect of the stories and when the retracted research could cause serious harm, such as to human health.

High-profile retractions

Two high profile cases were discussed by participants to illustrate the different challenges of dealing with them. For the MMR controversy, the original claims linking the MMR vaccine to autism were amplified by media coverage and, as a result, later attempts to correct the record, even with overwhelming scientific evidence, failed to undo the harm. This case demonstrates how inaccurate information became embedded in the public discourse and how subsequent corrections still, many years after the original claim, struggle to change people's minds over the matter. One journalist recounted being contacted by a parent about the MMR story:

> [the parent believed] that their child was harmed and [it is difficult to explain] that there will be occasional adverse reactions to things [but there is] a population benefit and as long as parents are informed then [with] their doctors [they can] make good decisions. (S_10).

During the COVID-19 pandemic, the public was hoping for some good news about successful treatments and thus, several pre-prints suggesting treatments were reported in the media and gained a lot of attention. Preprints are scientific manuscripts shared publicly before they have undergone the quality assessment of the peer-review process. Because they have not yet been evaluated by independent experts, they are not considered validated or accepted as scientific contributions. Many pre-prints may never be accepted as valid scientific contributions and thus, never published, as was the case with many suggesting COVID-19 treatments and that later research debunked. During the pandemic, journalists had to navigate rapidly changing information, including flawed studies (e.g. hydroxychloroquine) that were treated as "the evolution of scientific knowledge" (S_08), or seriously flawed findings that required immediate expert consultation to debunk (e.g. the "Arsenic Life" paper) (S_07).

Discussion

The findings must be interpreted in the context of methodological limitations, which concurrently define avenues for future research. The primary limitations derive from the data collection methodology. The reliance on Altmetric.com introduced a potential bias, as the platform favours English-language sources and countries. This constraint limits the generalizability of findings, particularly given that the challenges posed by scientific misinformation may differ significantly between different regions of the world (Kavic & Satava, 2021). Additionally, Altmetric employs a broad classification of "news media," including blogs, which were observed to be a prominent source in the online news sample, potentially overrepresenting alternative or ideological narratives compared to traditional mainstream media. Nevertheless, recent work highlights that AI-based text classification and credibility assessment systems can help reduce noise and systematic

bias in altmetric datasets by filtering unreliable sources and improving the consistency of mention categorisation, thereby strengthening the robustness of altmetric indicators that could mitigate such biases (Robinson-Garcia et al., 2025). Moreover, the predominance of blog-based material within the sample introduces a risk of skewing findings toward sources that disproportionately amplify sensationalist or conspiratorial framings, limiting the interpretive reliability of the dataset. Furthermore, the analysis of journalistic practice was limited to overt updates, thereby potentially underestimating the amount of correcting achieved through silent amendment.

The study addresses a critical gap in the existing literature by providing a systemic investigation into the practical difficulties faced by journalists when confronting scientific retractions. Previous research often examined this topic through the lens of individual high-profile case studies, such as the MDMA neurotoxicity retraction, or focused solely on media coverage *quantity* (Barnett & Doblin, 2021). This study integrates both macro-level quantitative insights regarding media output (online news framing and content) with micro-level qualitative data regarding professional constraints (interviews). By examining news articles referencing retracted research across various scientific fields (e.g. COVID-19, gender identity, physics claims), the study moves beyond field-specific analyses, revealing common cross-topic journalistic tendencies such as the prevalence of sensationalism and the focus on fraud narratives. This comparative approach illuminates the underlying causes for the persistent circulation of misleading scientific information. While academic literature has established that erroneous findings persist widely in the scientific record, with up to almost 95% of post retraction citations not acknowledging the retraction (Hsiao & Schneider, 2021), this study links this problem directly to institutional and economic deficiencies within news production, providing an explanatory mechanism for why media corrections are rare. Finally, the comparison between the UK and Finnish journalistic contexts adds nuance by identifying that different structural pressures (financial constraints in the UK versus a gap between ethical aspiration and practical execution in Finland) lead to the same practical outcome: a reliance on luck to correct the public record.

Recent trends in retraction patterns (Xia, 2025) increasingly stem from systemic failures within the publishing and peer-review infrastructure, such as fake peer review and procedural errors, rather than solely from individual scientific misconduct. Our findings demonstrate that media narratives largely overlook these systemic causes, continuing instead to highlight data fraud and individual wrongdoing as the dominant explanations for retraction. While the actual causes are shifting toward structural and editorial breakdowns, media coverage remains narrowly focused, reactive, obscuring the changing nature of research integrity challenges and limiting public understanding of systemic vulnerabilities in academic publishing. Although this could have resulted from the online media sources being in majority blogs.

Nevertheless, this imbalance indicates a media preference for narratives focusing on individual misconduct rather than the broader structural factors within the academic publishing system, which was also reflected by some of the interviews that suggested that it is the human stories that people are interested in, not structural peculiarities of the academic publishing. Furthermore, the study noted that news articles covering retractions were often sparse in detail, relying on technical and jargon-heavy language that mirrored formal retraction notices, thereby failing to provide sufficient context or meaning for lay readers. This finding aligns with wider research indicating that

coverage of retractions is often shorter and lacks important details (Valinciute & Halffman, 2025). It is possible that as science reporting increasingly relies on press releases, so do reports of the retractions rely on the formal retraction notices. In other words, our data provided essential explanatory context confirming that the journalistic correction mechanism is fundamentally reactive rather than proactive.

The capacity for rigorous follow-up reporting was noted to be severely restricted by time pressures and the dictates of a click-driven economy. Journalists identified retrospective checks for retractions as uncompensated tasks, making this diligence economically unfeasible, particularly for freelance science writers. This finding echoes the widely acknowledged structural barriers that journalists face, where time pressure and resource constraints impede their ability to verify facts and uphold their traditional role as watchdogs of the society. These external pressures, coupled with corporate interests motivated by ratings, are documented factors that impede the enactment of journalistic roles (Balod & Hameleers, 2021). Our findings, therefore, underscore the growing intensity and complexity of the pressures facing journalists today. They are expected to deliver fast-turnaround stories that remain clear, compelling, and accurate for audiences, yet they are simultaneously constrained by limited time to verify information, gather meaningful quotes, and ensure the final piece is both reliable and accessible. This tension not only highlights a critical vulnerability in the news production process but also suggests the need for structurally challenging—but essential—improvements, such as building in protected verification time, strengthening editorial support systems, and developing workflows that safeguard accuracy without sacrificing speed.

Conclusions

The data analysed here points to a significant disconnect between the internal self-correction mechanism of the academic community and the capacity for journalistic accountability in the digital news environment. Moreover, the quantitative content analysis of news stories demonstrated a tension in media framing of retracted research. Although *Factual neutral reporting* was the most prevalent narrative frame, it was closely followed by *Sensationalism in descriptors* and frames reflecting *Distrust in science*. This pattern suggested that while neutral reporting occurred, a substantial portion of coverage was structured to heighten controversy or scandal, possibly to gain more attention from the public. The topics generating the most frequent retraction coverage were those that already attracted intense public and media interest, particularly COVID-19, gender identity, and new physics claims.

Although there are specific codes of conduct and instructions for how to deal with retracted research, our study pointed out a universal absence of a systematic monitoring process for scientific retractions among interviewed journalists in both the UK and Finland. Consequently, journalists rely heavily on luck, high-profile scandals, or informal networks to prompt reporting on a retraction. This structural deficit is compounded by notification failures, where journalists rarely receive formal alerts regarding the retraction status of papers, they have previously covered.

Ultimately, our analysis demonstrated that updating news stories following a scientific retraction remains a rare journalistic practice. This finding is consistent with prior research indicating that media coverage of retractions is generally uncommon, with one study showing newspapers cover only 6% of retracted articles (Barnett & Doblin,

2021). Furthermore, our analysis aligns with Hsiao & Schneider (2021) findings suggesting that scientific publishers' failure to provide immediate and clear retraction information is a known issue, contributing to journalists' lack of awareness.

When updates did occur, they rarely achieved effective correction. Updates typically notified readers *that* a retraction occurred but seldom explained in plain language how the retraction influenced the original news article's content and claims. Also, the language used in news updates often discursively mirrored the technical and jargon-heavy phrasing of the original retraction notices issued by scientific journals. This finding corroborates external critiques that retraction stories generally tend to be shorter, often lacking historical context and detail necessary for readers to fully grasp the importance of the correction (Barnett & Doblin, 2021). The persistence of misleading and wrong scientific information in the public domain, therefore, appears to be mirrored by deficiencies in media accountability, underscoring the gap between the ethical imperative to "set the record straight" and the practical limitations of modern journalism. The most important practical step that can be taken is for publishers to adopt systems that automatically and proactively notify journalists, registered users, and researchers who previously accessed or downloaded a retracted article. At the same time, academic institutions should actively support the development and deployment of automated (AI) tools that monitor the retraction status of papers previously cited in news articles, addressing the clear desire expressed by journalists in this study. With this step, news organizations can recognize that addressing retractions is an integral part of maintaining the public record, rather than an optional administrative task. Journalistic codes of conduct must strictly enforce the principle to "gather, update and correct information throughout the life of a news story." Scientific retraction should be formalized as a continuation of the news story, mandating a timely update or correction to the original report.

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"We do the best we can with the information we have" Science reporting referencing retracted papers in the UK and Finland

Abstract

Purpose: To investigate the practical difficulties for journalists reporting scientific research that is later retracted and to examine how retracted research is framed in online news.

Design/methodology/approach: This article reports two studies involving content analysis and interviews. It integrates macro-level quantitative insights (online news article framing and content) with micro-level qualitative data (journalists' professional constraints). The content analysis used a sample of 73 online news stories reporting on 21 high-attention retracted articles identified from the Retraction Watch database and Altmetric.com. The qualitative component involved semi-structured interviews with 10 UK and 10 Finnish journalists to explore their lived experiences and decision-making processes about the potential for research to be retracted.

Findings: While Factual neutral reporting was the most prevalent frame, it was closely followed by Sensationalism in descriptors and frames reflecting Distrust in science. Media narratives typically focused on individual wrongdoing and data fraud, often overlooking systemic causes of retraction. The interviews revealed a universal absence of a systematic monitoring process for retractions among journalists in both countries. This deficit is due to time pressures, a lack of financial incentives for retrospective checks, and a reliance on luck or informal networks to detect retractions. Consequently, updating news stories following a retraction is rare, and when updates occur, they often fail to explain in plain language how the retraction influences the original claims.

Research limitations/implications: The reliance on Altmetric.com introduced a potential bias toward English-language sources and countries, and the inclusion of blogs in the "news media" classification may overrepresent alternative narratives. The findings reveal a critical gap between the academic community's self-correction and the capacity for similar journalistic responsiveness, contributing to the persistent circulation of misleading scientific information.

Originality/value: This study is the first to systematically investigate the challenges of dealing with retractions from the perspective of science journalism. By comparing the UK and Finnish contexts, it shows that different structural pressures lead to the same practical outcome: a reliance on fortune to correct the public record.

Introduction

The relationship between science and the public is mediated by science journalism, which translates and disseminates scientific information and fosters perspectives about how science works (Barnett & Doblin, 2021). Unfortunately, the contemporary digital ecosystem is increasing pressure on reporters for fast and engaging publishing (Harro-Loit & Josephi, 2020), increasing reliance on press releases (C. Anderson, 2013) and

potentially leading to exaggeration and error (Barnett & Doblin, 2021; Sharpe et al., 2016; Wardle, 2017). Inaccuracies in science journalism risk distorting the public's scientific knowledge and reduce the credibility of academic research (Ashwell, 2016; Liskauskas et al., 2019; Tandoc, 2020). Moreover, time pressures may even lead journalists to inadvertently spread disinformation (Harro-Loit & Josephi, 2020; Liskauskas et al., 2019; Tandoc, 2020).

This inherent fragility in science communication is exacerbated by the "reproducibility crisis": an increasing number of retractions and failures to reproduce experiments (Hsiao & Schneider, 2021; Lei et al., 2024; Liskauskas et al., 2019). Whilst the retraction of peer reviewed work from journals and conferences when problems are discovered is a crucial tool to correct errors, this complicates media coverage. This is exacerbated by the fact that information regarding retractions is imperfectly shared across publisher websites and bibliographic databases, making it easy for journalists to overlook it (Fanelli et al., 2018).

Journalists frequently cover initial research findings but rarely follow up when these claims are later disconfirmed (Rada, 2007). High profile issues are not necessarily exceptions: for one article covered by 52% of the largest American newspapers, nearly half (46%) of these newspapers failed to cover its retraction (Barnett & Doblin, 2021). For more routine cases, making updates following a scientific retraction is rare for journalists (Camerer et al., 2018). For example, an analysis of news articles covering eventually retracted scientific COVID-19 papers found that only 8% of articles contained an update following the retraction, despite the critical and time-sensitive nature of pandemic health information. Updates tended to be concentrated among elite media outlets and those focused on specialty topics. Furthermore, when updates were issued, they rarely explained in plain language how the retraction influenced the original news article's content and claims (Valinciute & Halffman, 2025). It is not clear why news stories are rarely updated after retractions. Science journalists should have the necessary expertise to understand and interpret the evidence in scientific research, including by following the stories through by checking scientific progress (e.g. Dunwoody, & Konieczna, 2013).

Journalists require expertise and the ability to interpret the evidence in scientific research, including following the stories through by checking scientific progress (Dunwoody & Konieczna, 2013.). Hence, journalists should report and re-report changes in the scientific process. For example, the Council for Mass Media in Finland states in their Journalist's Guidelines regarding correction of errors and changes after publications the following: "35. An essential factual error must be corrected as soon as possible after it comes to the attention of the editorial staff and in such a way that it will reach the public as widely as possible" and "If necessary, in addition to corrections, the editor shall publish a new story identifying the errors" (*Journalist's Guidelines*, 2025).

Despite the above findings, no study has yet investigated the challenges of dealing with retractions of scientific articles from the perspective of science journalists. Moreover, it is also important to assess whether there are international differences in the public's trust in journalists and expectations that they will protect the public from misinformation. In the USA, for instance, online mis- and disinformation has lowered the public's trust towards scientific and journalistic institutions (Anderson & Dudo, 2023). Public trust also seems to be low in the UK. In contrast, Finland has one of the highest levels of public trust in the news (Newman et al., 2025) with science also highly trusted (Finnish Science Barometer, 2024). Thus, international differences can be expected.

Research Design

To address the goal of understanding the journalist's perspective on retracted research, this paper reports two separate studies. The first analyses media articles citing high-profile retracted papers to investigate whether and how journalists inform readers about retractions in online news. The reasons for a focus on high-profile retractions is that lower profile articles are likely to be less important to the audience and probably ignored by all media. The following research questions were addressed through a content analysis in study 1:

- RQ1: How do online news stories report on high profile retracted research papers?
- RQ2: What information about a retracted research paper (e.g. reason for retraction, original claims, date of publication) is typically included in online news stories?

The second study directly addresses the goal by exploring the factors impacting science reporting in the context of retractions through semi structured interviews with 10 UK and 10 Finnish journalists.

- RQ3: What are UK and Finnish ~~journalists'~~journalists lived experiences and decision-making processes concerning the reporting of scientific retractions?

Content analysis and the exploration of online news articles

For study 1, we downloaded the Retraction Watch database of retracted and problematic articles in August 2024 from CrossRef to get a science-wide dataset of articles to investigate, merging it with articles flagged as retracted in Scopus. This gave 56,705 retracted articles and their unique DOIs (Digital Object Identifiers). The DOIs were used to compile a list of online news articles reporting on retracted articles or articles with expression of concern. **Altmetric.com** is an organisation that tracks online attention to scientific publications across various sources by identifying online mentions of DOIs. While the precision and recall of Altmetric.com has been tested (Yu et al., 2021) and it's widely used in research on scientific communication, including news media mentions (Maggio et al., 2019; Shamsi et al., 2022), the database has faced some criticism. The critique includes a bias toward English-language sources and countries, a very broad classification of "news media" (including mainstream media (news outlets), social media, blogs, public policy documents, Wikipedia), the presence of inaccessible links (Yu et al.,2021). ~~,A~~a recent literature review evaluating the use of Altmetrics concludes that while altmetrics offer real-time insights into research engagement, their academic application is hindered by methodological inconsistencies and a lack of data standardisation across platforms. Thus, significant disciplinary bias persists, as altmetrics tend to favour fields with high digital visibility while underrepresenting others. To address these limitations, the authors advocate for integrated models that combine quantitative metrics with qualitative assessments to reduce bias and enhance validity (Gonzales et al.,, 2025). Furthermore, recent evidence from a recent study shows that although altmetric indicators can distinguish between study designs and partially reflect levels of evidence, their ability to capture true research quality remains limited. The visibility of high-quality studies is still shaped more by platform dynamics than methodological rigour, underscoring the challenge of interpreting online attention as a

reliable indicator of scientific impact (Valderrama et al., 2025). Nevertheless, despite these limitations, the database has been widely used to provide evidence of the attention, influence, and impact that academic research has gained (Kavic & Satava, 2021).

Of all the retracted articles we identified 250 with the highest Altmetric attention score, according to Altmetric.com. These 250 articles were searched for on Google News, resulting in 839 online news articles mentioning 206 of the retracted articles. By comparing the dates of the retraction notice of the retracted articles with online news publication dates, we retained 549 online news stories that had been written after the retraction occurred.

To further explore the reasons underlying post-retraction citation given the time frame and work feasibility we had had, we focused on 22 retracted articles that had gained the most attention, involving 100 stories. We removed stories with content no longer available (n=22) and repeated posts (5), leaving 73 online news stories about 21 high profile retracted articles.

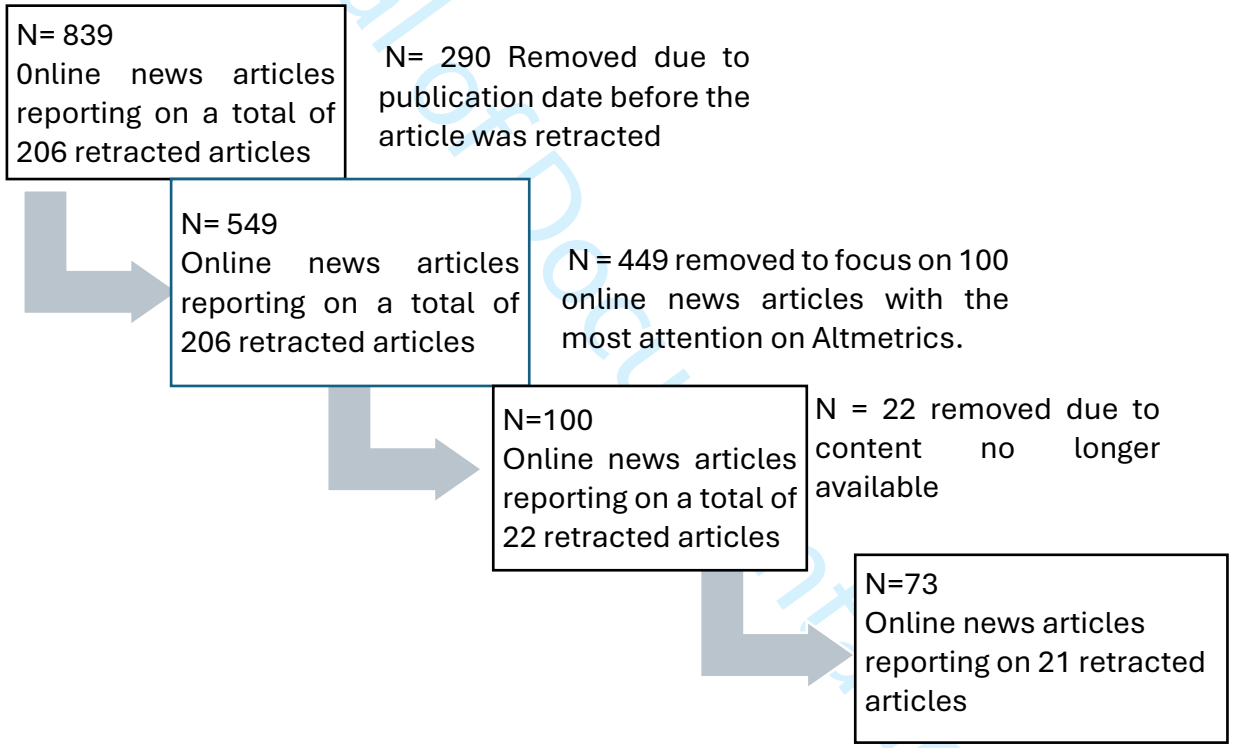

Figure 1. The data collection and data cleaning process. Source: Authors own work

To answer the first two research questions, the first author conducted an exploratory content analysis of the selected news stories.

All news articles were organised and managed using Microsoft Excel and NVivo to enable systematic comparison and coding. Each article was assigned a unique code linking it to its corresponding retracted article *(e.g. 1_1, 1_2, 2_1, 2_2)*. The first digit identifies the retracted paper, while the second digit denotes the individual online news article associated with it. In ~~the~~ Excel, variables were recorded to capture descriptive and contextual information, including the retracted article title, journal, discipline, topic; the retraction date; the news publication date; and whether the news story was published

after the retraction. Information about the news source and article availability (e.g. whether the article had been deleted) was also recorded. In NVivo when possible, full online articles were pasted, allowing for the code's generation. This structured dataset supported both the qualitative content analysis and descriptive assessment of reporting patterns across news stories.

The sources in ~~Nvivo~~ NVivo were coded into three broad areas*: 1: Retracted article proponent; 2: Media story overall framing,* and *3. The extent to which the retracted article is discussed in media stories*. The coding categories were developed through repeated close readings of the articles, guided by the research questions and aimed at identifying recurring patterns in how retracted papers were reported.
Three broad categories were identified and refined iteratively. Retracted article proponent captured information on reasons how the retracted papers were retracted, including whether they defend, accept, or contest the retraction. Media story overall framing referred to the narrative or tone of the article, such as neutral reporting, sensationalism, Distrust in Science~~—~~. Extent and nature of discussion of the retracted article captured what information was provided about the retracted study, including references to the original claims, reasons for retraction. The codes were checked and discussed with the other authors, resulting in the merging and clarification of several codes for greater clarity. Examples of coding are presented in table 1 below.

Code	*Example from the data*
Distrust in science	*"But none of this is true. Science is amoral, judging nothing but the data, and an advanced degree in physics or sociology is not a patent of superior virtue. A Ph.D. ~~doesn't~~does not sweep away the imperfections, faults, and blemishes of human nature. To put it bluntly, scientists are no less likely than the rest of us to lie, cheat, steal, twist the facts, etc. In short, we can never be one hundred percent sure that SCIENCE IS REAL. All too often, it's not."* *Source 11_6*
Factual neutral reporting	*"The authors of a controversial study published in The Lancet journal linking the use of malaria drug hydroxychloroquine with increased death risk in COVID-19 patients, have retracted their research paper, after they could no longer vouch for the veracity of the primary data sources used in their analysis"* *Source 1_2*
Insufficient peer review	*"The paper soon came under fire for the spuriousness of its results, and the authors have acknowledged that it would not have gotten through peer-review in that version. After all, this is the point of peer review: to challenge, clarify and pick holes in research before official publication."* *Source 12_14*

Table 1. Example of codes, Source: Authors own work.

Thematic analysis and the exploration of interviews

Study 2 attempted to capture rich, nuanced data about science journalists' practical responses to scientific retractions, the proliferation of digital misinformation in general (to set the issue of retractions in a wider context), and the factors affecting their practice.

Ad hoc web searching was used to identify science journalists and general journalists to contact for an interview~~.~~. Journalists to contact were also identified from major news outlets, individual news stories, and recommendations of previous participants. This process resulted in ten interviews from each of the UK and Finland. The 10 UK interviewees were professional science journalists actively working in digital media, regularly covering science topics. The sample included journalists who were solely or partially working as freelancers writing for various media~~.~~. All had been journalists for at least 15 years. From Finland, the 10 interviewees were professional journalists, who identified as either science journalists (both freelancers and working for a specific outlet) or general journalists (working for digital news outlets, newspapers or more specialized outlets) who had reported or continuously reported about science. All had been journalists for at least five years.

~~All journalists~~All journalists were interviewed individually with secure online video conferencing software. A pre-determined interview protocol was used to ensure coverage of a core set of questions (individual science reporting skills, reporting practices and routines, networks and sources of influences affecting science reporting), while retaining the flexibility to pursue emergent themes and allow participants to elaborate on their unique professional narratives.

All interviews were conducted by the first and second author, lasted approximately 40 to 60 minutes, and were audio-recorded and transcribed verbatim following informed consent. Transcripts were imported to ~~Nvivo~~ NVivo for thematic coding and qualitative analysis. The interviews in Finland were conducted in Finnish by a native and transcripts analysed in Finnish, with quotes from the interviews translated into English. For clarity, the codes S_(number) refer to ~~Uk~~ UK-based Journalists, while F_(number) refer to the Finnish journalists.

Interview data were analysed using reflexive thematic analysis (RTA) following Braun and Clarke (Braun et al., 2022; Braun & Clarke, 2012). The analysis aimed to identify how journalists understand, encounter, and respond to scientific retractions within everyday news work. An inductive, data-driven orientation was adopted, with codes and themes generated from participants' accounts rather than from a pre-defined theoretical framework. Given the study's focus on lived experience and professional judgement, the analysis prioritised latent themes, attending to the institutional, economic, and normative contexts underpinning journalists' descriptions of retraction-related practices.

The analysis followed Braun and Clarke's six recursive phases. First, the researchers familiarised themselves with the full data corpus through repeated reading of all interview transcripts and check against audio recordings. Initial analytic observations were recorded in memos. Second, transcripts were systematically coded across the entire dataset, capturing both semantic content and underlying assumptions. Coding was inclusive, and data extracts were coded multiple times where relevant to overlapping patterns. Third, codes were examined for relationships and collated into themes that captured shared meanings across participants. Fourth, these themes were

reviewed and refined in relation to both their constituent extracts and the ~~dataset as a whole, ensuring~~dataset, ensuring internal coherence and clear conceptual boundaries. Some codes were worded in the same way as the journalists expressed their views for example, Time pressure. Fifth, final themes were agreed between the authors, defined and named by identifying their central organising concepts and their relevance to the research question. The subsequent thematic structure derived from this analysis resulted in several key themes briefly summarised and exemplified in Table 2 below.

Theme	Theme description and example
Affordances related to retrospective accuracy	Conflict between journalistic workflow ~~demands:~~demands e.g. being paid per story or working on daily deadlines vs time needed for story check
Trust and gatekeeping in quality control	Ways of finding the story, e.g. relying on established professional networks, social media rather than formal processes
The procedures and decision-making process in retraction discovery	The procedures and decision-making process in retraction discovery, e.g. preferring to write a new story rather than correcting the archived article
Impact of social media on journalistic practices	Ways in which social media impact the practice of reporting on science

Table 2. Themes across interview data, Source: Authors own work.

The final six step was to write up the findings, explicitly linking the themes back to RQ3, explaining how the identified patterns illuminate the 'lived experiences' and 'decision-making processes' concerning scientific retractions among UK and Finnish journalists. The findings are presented through an analytic narrative supported by illustrative interview extracts.

Study 1 Findings

Most of the high-profile retracted papers in our sample covered topics that often attract wide public and media interest — such as COVID-19, gender identity, and new physics claims (Table 1). The news coverage of these ~~were~~ ranged from mainstream media (BBC, Reuters, Forbes) to blogs.

Of the 839 news stories analysed, 549 (65.4%) were published following the retraction of the Research Paper (RP). A targeted analysis of the 100 articles with the highest engagement revealed that 73 were post-retraction publications. Within this subset, 15 articles (20.5%) were no longer accessible, suggesting retrospective removal. Furthermore, two articles cited the RP only in the reference list without internal mention. Notably, 10 of these 73 articles failed to acknowledge the retraction; specifically, eight presented the RP as contemporary research despite its retracted status at the time of

publication. The table below summarises the disciplines and topics across the 73 news stories.

Discipline	Topic	News stories
Archaeology	Pyramids (based on 1 Retracted Paper)	6
Genetics	Human mutation (based on 2 RPs)	6
Health	Covid (based on 6 RPs)	31
	Hearing Aids (based on 1 RP)	2
	Human mutation (based on 1 RP)	1
	Reproductive biology (based on 1 RP)	2
Medicine	Herbal medicine (based on 1 RP)	1
	Regenerative medicine (based on 1 RP)	3
Paediatrics	Children's cognition (based on 1 RP)	1
Physics	Superconductivity (based on 1 RP)	3
Psychology	Behavioural Psychology (based on 1 RP)	7
Sociology	Gender studies (based on 1 RP)	8
	Political Science (based on 1 RP)	6
	Religion (based on 1 RP)	2
	Criminology (based on 1 RP)	1
	Total	**73**

Table 3. The disciplines and topics of 73 news stories citing high profile retracted research paper. Source: Authors own work

Frames in news stories reporting retracted articles

The most prevalent frames found in the news stories are *Factual neutral reporting* (n = 20), *Sensationalism in descriptors* (n = 18), *and Distrust in science* (n = 13) (Table2). Together, these highlight a dual pattern in media narratives: while a substantial number of stories maintain journalistic impartiality, others rely on emotionally charged or sensational language.

Theme	Frame	Frequency
Writers' techniques	Factual neutral reporting of flawed study	20
	Critiquing and questioning retracted RP	8
	Sensationalism in descriptors	18
Writers' positionality and focus	Distrust in science	13
	Reporting on the process of retraction	9
	Questioning the practice of the journal	7
	Authors of the retracted RP are quoted	7
	Alleged research misconduct	6
	Retraction as a positive scientific development	5
	Cronyism in academic publishing	3
	Criticism of media reporting practices	3
	Concerns over gender discrimination	3
	Questioning established understanding and offering alternative narrative	11

Conspiracy and alternative narrative	Claiming bias and flawed methodology in media reporting	11
	Sharing findings of retracted RP	9
	Mentioning of public figures supporting the findings of retracted RP	6
	Claiming validation of the retracted RP findings through their own research	3
	Quoting other studies negating retracted RP findings	4

Table 4. The main story frames of the 73 news stories reporting on the 21 high profile retracted RP. Some news stories had multiple topics frames. Source: Authors own work

Several additional high-frequency frames reflect sceptical narratives (e.g. Claiming bias and flawed methodology in media reporting (e.g. *So, here we have two major studies, orchestrated to fail, not testing the hypothesis at all, and followed by media headlines that fail to point out the clear malfeasance that took place - Extract 1_1)*, Questioning established understanding and offering alternative narrative (e.g. *The conscious awakening of man is disclosing forever deceptions, fraud and the war on man. Ruling entities know what time it is, so the SSCP 'Final' Report, in my opinion, may be an attempt to regain public trust b/c too many people know the truth -Extract 12_1*), Claiming validation of the retracted RP findings through their own research, Mentioning of public figures supporting the retracted findings, Questioning established understanding and offering alternative narrative).

These frames often present retraction as evidence of systemic failure, bias, or corruption in science and journalism (e.g. “it can be assumed that in many other cases corruption remains undetected” extract from 12_3), thereby aligning with broader conspiracy discourses circulating online. Thus, news stories can turn examples of *successful detection and correction* into a suggestion of widespread corruption and conspiracies.

Several retractions, especially those that were published in blogs were framed as being forced by activism or political pressure, rather than purely for legitimate scientific or ethical reasons. The framing often emphasizes that the work was controversial from the start and that critics mounted a campaign to “silence” it.

There were also instances where the retraction process was suggested to be biased, suggesting that the authors did not receive fair treatment (e.g. claims of “retrospective punishment,” extract from 2_3) lack of due process, or lack of transparency in how the retraction decision was made. Another example frames retraction not as error correction, but as *"ideological censorship"* used to enforce a *"Regime line"* and suppress "unconventional or dissenting work."

Two moderate-frequency themes, (Neutral) *Reporting on the process of retractions (n = 9) and Questioning the practice of the journal (n = 7),* point to attempts at contextualizing or scrutinizing institutional practices. These articles engage more deeply with the procedural and ethical aspects of retraction, reflecting a hybrid mode between investigative and critical reporting. In several articles, the practices of the journals were criticised, but some articles reported the retraction as a good example of effective self-correction in science.

Overall, the framing landscape highlights a tension between scientific accountability and public distrust. While factual neutrality remains the most common approach, sensational and conspiratorial framings still appear with notable frequency. This pattern suggests that retraction coverage often functions less as corrective science communication and more as a space where credibility, authority, and the legitimacy of expertise are actively contested~~While factual neutrality remains the most common approach, the significant occurrence of sensational and conspiratorial framings indicates that retraction coverage often functions less as corrective science communication and more as a site where credibility, authority, and the legitimacy of expertise are contested~~. This pattern implies that the retraction, rather than being interpreted as a normal self-corrective feature of science, is frequently reframed as evidence of dysfunction or bias, potentially reinforcing scepticism toward the scientific academic publications.

Media coverage of reasons for retraction

From the perspective of the amount of information about the retraction, the media narrative was dominated by questions of data integrity and fraud, indicating that articles focused heavily on the trustworthiness of the underlying data as the main reason for the retraction (Figure 2). This variation is evident in the specific narrative strategies employed by reporters to explain the flawed nature of the retracted research, ranging from highly technical critiques to accounts of institutional misconduct and public misinformation. For instance, in describing a fabricated dataset in extract 11_5, the reporting moves beyond general accusation to cite precise statistical improbabilities and mechanisms of fraud: "For a sample as large as 13,488, this is statistically improbable $[p = ~~0.84]$0.84] $." Crucially, the journalist details the presumed method of fabrication, advising the reader: "You can try this yourself on Excel with the RANDBETWEEN(0,50000) function." This level of granular detail elevates the report from simple accusation to demonstrable evidence.

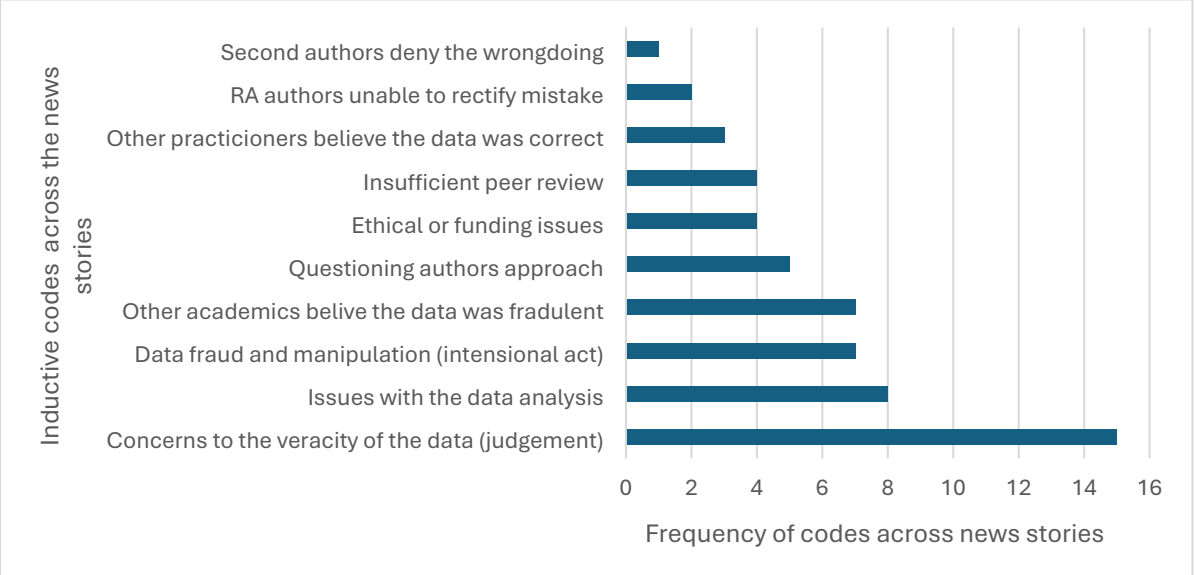

Figure 2. Retraction details in the 72 news stories reporting on the 22 high profile retracted articles. Source: Authors own work

Systemic failures, such as insufficient peer review or ethical or funding issues, received little media attention (4 stories each), aligning with the media's preference for simpler narratives and a focus on the actions of the researchers. The journalistic framing frequently highlights the detective work of the investigators, as exemplified by the reference to "3 amazing researchers: Uri Simonsohn, Leif Nelson and Joe Simmons" and their insightful blog, "Data Colada" (Extract 11_4). This narrative structure positions the exposure of fraud as a triumph of rigorous digital research and scholarly diligence.

A recurrent theme was the dispersal of responsibility for data issues, such as claims that "others – such as research assistants – were involved in data entry and clean up" (Extract 11_2). Similarly, in another case, authors claimed they "were only responsible for the first two lab studies," disassociating themselves from a "problematic third study" (Extract 11_9). This practice attempts to introduce ambiguity regarding accountability, leveraging the complexities of collaborative, human-dependent data collection processes.

Study 2 Findings

The findings from the interviews in the UK and Finland are discussed from the perspective of the main themes that emerged.

Time pressures and science knowledge affect the ability to check facts

Both UK and Finnish interviewees repeatedly emphasized increasing pressures of time, attention, and resources. Most juggled multiple stories or freelance commissions, often under tight deadlines with little time for verification or follow-up. All interviewees in both Finland and the UK, stated that they mainly use press releases and information they get directly from researchers to write news stories about science. A senior reporter (S_06) commented:

> "I ~~sort of have~~have to rely on what's in the paper, what's in the press release and, take it on face value. I don't really a lot of the time have time to, like I say, speak to the authors or...to cross reference it with anyone. Sometimes I'll send it to third parties like charities or other researchers that I know are interested in the field who can then tell me what they think of the paper, but again that often takes too long to do it every day. (S_06)"

The non-specialist journalists also mentioned that a lack of detailed scientific knowledge can make the checking process difficult and time consuming, sometimes trusting the checking procedures of other (international) media and just re-reporting their stories. One local news reporter stated that to publish fast short stories she relies mostly on the local university's press releases on new research findings because there is not much time to scan the wider research field, trusting on the researchers to give reliable information.

The Finnish science journalists were an exception: they usually had enough time to check the research, either through their own academic networks or through their access to scientific publication platforms. Those that had been general journalists before specialising reported that they had acquired the knowledge of academic procedures and science required to check stories after becoming science journalists.

In the ~~UK~~UK, The Science Media Centre (SMC) functions as a crucial resource for real-time peer review, helping journalists assess quality and avoid inaccurate reporting before publication. "The most important thing it does is it provides academics... to produce quotes that are available for journalists on the day... so they suddenly have an immediate expert view on the quality or not of the research published" (S_07)~~.~~.

Lack of systematic processes to notify about retractions

The most significant constraint on journalists' ability to follow up on news stories citing retracted research was the complete lack of a systematic process for this. Instead, retractions were typically discovered incidentally through social media, colleagues, or outlets like Retraction Watch: "Unless it's a high-profile case, we don't know that a study we covered has been pulled." (S_09). Moreover, journalists are neither incentivized nor paid to perform retrospective checks on their work.

In the absence of a system, the practical challenges are immense for individual journalists because, "*it easily gets into like hundreds of studies every single year that I'm explicitly mentioning in stories. Checking all of those... it's just not feasible now.*" (F_01). Moreover, the nature of journalism means constantly moving on to the next hot topic, working against any desire to retrospectively check old news.

The journalists almost never received formal notifications about retractions, emphasising that they get no help with this task. Nevertheless, one journalist had received an email from a science journal platform warning that a research article that they had read while signed into the system had been retracted. This would not be a generic solution, however, as many articles can be read without signing into systems, such as on preprint servers, open access articles, and with institutional logons. Multiple journalists expressed a desire for technological solutions that would achieve a similar goal: "I would love, love an AI tool to [tell me] if there's an expression of concern or a retraction. " (S_01).

Lack of interest in reporting non-controversial retractions

The journalists believed that the public considers retractions to be boring, except for high-profile cases causing significant debate and controversy. Even writing about these can be difficult, as some topics, like vaccines, can result in "a bit of a pile-on in the comments". This can lead to professional shame or "guilt by association" even when they were reporting the "facts as they were presented to them at the time~~.~~."

Several journalists also felt the professional difficulty of having to discredit a theory they had once covered factually, potentially undermining public trust in them. Thus, they rarely covered retractions. From another perspective, a freelance journalist would prefer to, "write a comment on a piece of work that's valid than write about why something that turned out to be wrong" (S_10)~~.~~. Many of the general journalists admitted that they have limited knowledge about the peer-review process and were not clear about what retraction means~~.~~.

Declining public confidence in the media and the crisis of truth

Trust surfaced as a recurrent theme in the interviews: declining public confidence in science and growing scepticism towards the media. Several journalists responded by deliberately signalling uncertainty with phrases like *"early results suggest" (F_3; F_7, S_4)* without undermining engagement. Hedging may help maintain reader trust if an

article is subsequently retracted. Others feared that too much hedging may alienate readers.

Several interviewees reflected on how scientific controversies have increased in frequency and visibility due to social media. The environment is polarized, giving people a "license to say that my knowledge is my truth," which can generate sensationalised stories that can out-compete impartial reporting in the online attention economy, where nuance has little benefit. This has led to concerns about the overall effect on public knowledge about science:

> The problem is that everything is contested and institutions and experts are not valued – that all people are on the same level...meaning that anyone writing on social media with an anonymous nickname can contest opinions from very experienced scientists (F_2)

Differently from the UK, most of the Finnish journalists think that the general atmosphere and social media discussions have not significantly influenced their reporting about science. Many stated that it is their responsibility not to let it affect their reporting. The journalists still recognize the potential effects of social media audiences and heated discussion online, potentially leading up to some people verbally attacking journalists because of the issues they raise in their reporting.

Responses to post-publication retractions

Half of the participants mentioned their approach upon the post publication discovery of a retraction cited in their story, with all prioritizing transparency over hiding the error. Some journalists favoured writing follow-up pieces, "'we were wrong, here's what changed (S_10)'", while others opted for quiet online edits of the earlier stories. A few UK journalists feared that publishing corrections could erode credibility or attract unwanted scrutiny. This tension illustrates a professional ambivalence towards long term accuracy:

> "journalists tend not to see that past work. Um, as sort of part of an academic Library. Um, ~~That~~that people rely on, you know, if the journalists tend to see their past work, it's our best efforts at the time (S_07)"

While journalists acknowledged that scientific error and self-correction are normal aspects of the research process, they simultaneously recognized that the media ecosystem lacks equivalent structures of correction and accountability. There is also often no incentive to write a follow-on correcting piece.

Journalists in Finland had different beliefs. They expressed the responsibility for all media and journalists to "follow stories through" because the responsibility is stated in the journalistic code of conduct and instructions as discussed above in the literature review. This involves writing a new follow-up story about the retraction and that the science is not probably reliable or is contested. The information about the retraction should also be placed on the original story because that is circulating online, and people are still reading it.

Nevertheless, follow-up stories rarely occur in practice according to both UK and Finnish journalists, unless perhaps it was, "a very controversial or questionable issue" (F_04)" and that the most that would normally be done would be to add information about the retraction to the original story. This this might not reach the original readers, although major publications generally mandate notations for significant inaccuracies (S_07). One journalist considered independent disclosure, instead, for instance by

blogging about the retraction (S_0). Very rarely a retraction might be seen as an opportunity for further, insightful reporting, possibly covering the story from a different angle: "*How did that happen?*"~~.~~."

Writing about retractions

Journalists occasionally cover interesting retractions as a newsworthy event, irrespective of whether their outlet discussed the original research. For example, this would include cases when a famous scholar was involved, and the research turned out to be fraudulent. Retractions become newsworthy to the public mainly through the human-interest aspect of the stories and when the retracted research could cause serious harm, such as to human health.

High-profile retractions

Two high profile cases were discussed by participants to illustrate the different challenges of dealing with them. For the MMR controversy, the original claims linking the MMR vaccine to autism were amplified by media coverage and, as a result, later attempts to correct the record, even with overwhelming scientific evidence, failed to undo the harm. This case demonstrates how inaccurate information became embedded in the public discourse and how subsequent corrections still, many years after the original claim, struggle to change people's minds over the matter. One journalist recounted being contacted by a parent about the MMR story:

> [the parent believed] that their child was harmed and [it is difficult to explain] that there will be occasional adverse reactions to things [but there is] a population benefit and as long as parents are informed then [with] their doctors [they can] make good decisions. (S_10).

During the COVID-19 pandemic, the public was hoping for some good news about successful treatments and thus, several pre-prints suggesting treatments were reported in the media and gained a lot of attention. Preprints are scientific manuscripts shared publicly before they have undergone the quality assessment of the peer-review process. Because they have not yet been evaluated by independent experts, they are not considered validated or accepted as scientific contributions. Many pre-prints may never be accepted as valid scientific contributions and thus, never published, as was the case with many suggesting COVID-19 treatments and that later research debunked. During the pandemic, journalists had to navigate rapidly changing information, including flawed studies (e.g. hydroxychloroquine) that were treated as "the evolution of scientific knowledge" (S_08), or seriously flawed findings that required immediate expert consultation to debunk (e.g. the "Arsenic Life" paper) (S_07~~].~~).

Discussion

The findings must be interpreted in the context of methodological limitations, which concurrently define avenues for future research. The primary limitations derive from the data collection methodology. The reliance on Altmetric.com introduced a potential bias, as the platform favours English-language sources and countries. This constraint limits the generalizability of findings, particularly given that the challenges posed by scientific misinformation may differ significantly between different regions of the world (Kavic & Satava, 2021). Additionally, Altmetric employs a broad classification of "news media," including blogs, which were observed to be a prominent source in the online news

sample, potentially overrepresenting alternative or ideological narratives compared to traditional mainstream media. Nevertheless, recent work highlights that AI-based text classification and credibility assessment systems can help reduce noise and systematic bias in altmetric datasets by filtering unreliable sources and improving the consistency of mention categorisation, thereby strengthening the robustness of altmetric indicators that could mitigate such biases (Robinson-Garcia et al., 2025). Moreover, the predominance of blog-based material within the sample introduces a risk of skewing findings toward sources that disproportionately amplify sensationalist or conspiratorial framings, ~~thereby~~ limiting the interpretive reliability of the dataset. Furthermore, the analysis of journalistic practice was limited to overt updates, thereby potentially underestimating the amount of correcting achieved through silent amendment.

The study addresses a critical gap in the existing literature by providing a systemic investigation into the practical difficulties faced by journalists when confronting scientific retractions. Previous research often examined this topic through the lens of individual high-profile case studies, such as the MDMA neurotoxicity retraction, or focused solely on media coverage *quantity* (Barnett & Doblin, 2021). This study integrates both macro-level quantitative insights regarding media output (online news framing and content) with micro-level qualitative data regarding professional constraints (interviews). By examining news articles referencing retracted research across various scientific fields (e.g. COVID-19, gender identity, physics claims), the study moves beyond field-specific analyses, revealing common cross-topic journalistic tendencies such as the prevalence of sensationalism and the focus on fraud narratives. This comparative approach illuminates the underlying causes for the persistent circulation of misleading scientific information. While academic literature has established that erroneous findings persist widely in the scientific record, with up to almost 95% of post retraction citations not acknowledging the retraction (Hsiao & Schneider, 2021), this study links this problem directly to institutional and economic deficiencies within news production, providing an explanatory mechanism for why media corrections are rare. Finally, the comparison between the UK and Finnish journalistic contexts adds nuance by identifying that different structural pressures (financial constraints in the UK versus a gap between ethical aspiration and practical execution in Finland) lead to the same practical outcome: a reliance on luck to correct the public record.

Recent trends in retraction patterns (Xia, 2025) increasingly stem from systemic failures within the publishing and peer-review infrastructure, such as fake peer review and procedural errors, rather than solely from individual scientific misconduct. Our findings demonstrate that media narratives largely overlook these systemic causes, continuing instead to highlight data fraud and individual wrongdoing as the dominant explanations for retraction. While the actual causes are shifting toward structural and editorial breakdowns, media coverage remains narrowly focused, reactive, obscuring the changing nature of research integrity challenges and limiting public understanding of systemic vulnerabilities in academic publishing. Although this could have ~~been resulting~~ resulted from the online media sources being in majority blogs.

Nevertheless, this imbalance indicates a media preference for narratives focusing on individual misconduct rather than the broader structural factors within the academic publishing system, which was also reflected by some of the interviews that suggested that it is the human stories that people are interested in, not structural peculiarities of the academic publishing. Furthermore, the study noted that news articles

covering retractions were often sparse in detail, relying on technical and jargon-heavy language that mirrored formal retraction notices, thereby failing to provide sufficient context or meaning for lay readers. This finding aligns with wider research indicating that coverage of retractions is often shorter and lacks important details (Valinciute & Halffman, 2025). It is possible that as science reporting increasingly relies on press releases, so do reports of the retractions rely on the formal retraction notices. In other words, our data provided essential explanatory context confirming that the journalistic correction mechanism is fundamentally reactive rather than proactive.

The capacity for rigorous follow-up reporting was noted to be severely restricted by time pressures and the dictates of a click-driven economy. Journalists identified retrospective checks for retractions as uncompensated tasks, making this diligence economically unfeasible, particularly for freelance science writers. This finding echoes the widely acknowledged structural barriers that journalists face, where time pressure and resource constraints impede their ability to verify facts and uphold their traditional role as watchdogs of the society. These external pressures, coupled with corporate interests motivated by ratings, are documented factors that impede the enactment of journalistic roles (Balod & Hameleers, 2021). Our ~~findings~~findings, therefore, underscore the growing intensity and complexity of the pressures facing journalists today. They are expected to deliver fast-turnaround stories that remain clear, compelling, and accurate for audiences, yet they are simultaneously constrained by limited time to verify information, gather meaningful quotes, and ensure the final piece is both reliable and accessible. This tension not only highlights a critical vulnerability in the news production process but also suggests the need for structurally challenging—but essential—improvements, such as building in protected verification time, strengthening editorial support systems, and developing workflows that safeguard accuracy without sacrificing speed.

Conclusions

The data analysed here points to a significant disconnect between the internal self-correction mechanism of the academic community and the capacity for journalistic accountability in the digital news environment. Moreover, the quantitative content analysis of news stories demonstrated a tension in media framing of retracted research. Although *Factual neutral reporting* was the most prevalent narrative frame, it was closely followed by *Sensationalism in descriptors* and frames reflecting *Distrust in science*. This pattern suggested that while neutral reporting occurred, a substantial portion of coverage was structured to heighten controversy or scandal, possibly to gain more attention from the public. The topics generating the most frequent retraction coverage were those that already attracted intense public and media interest, particularly COVID-19, gender identity, and new physics claims.

Although there are specific codes of conduct and instructions for how to deal with retracted research, our study pointed out a universal absence of a systematic monitoring process for scientific retractions among interviewed journalists in both the UK and Finland. Consequently, journalists rely heavily on luck, high-profile scandals, or informal networks to prompt reporting on a retraction. This structural deficit is compounded by notification failures, where journalists rarely receive formal alerts regarding the retraction status of ~~papers~~papers, they have previously covered.

Ultimately, our analysis demonstrated that updating news stories following a scientific retraction remains a rare journalistic practice. This finding is consistent with prior research indicating that media coverage of retractions is generally uncommon, with one study showing newspapers cover only 6% of retracted articles (Barnett & Doblin, 2021). Furthermore, our analysis aligns with Hsiao & Schneider (2021) findings suggesting that scientific publishers' failure to provide immediate and clear retraction information is a known issue, contributing to journalists' lack of awareness.

When updates did occur, they rarely achieved effective correction. Updates typically notified readers *that* a retraction occurred but seldom explained in plain language how the retraction influenced the original news article's content and claims. Also, the language used in news updates often discursively mirrored the technical and jargon-heavy phrasing of the original retraction notices issued by scientific journals. This finding corroborates external critiques that retraction stories generally tend to be shorter, often lacking historical context and detail necessary for readers to fully grasp the importance of the correction (Barnett & Doblin, 2021). The persistence of misleading and wrong scientific information in the public domain, therefore, appears to be mirrored by deficiencies in media accountability, underscoring the gap between the ethical imperative to "set the record straight" and the practical limitations of modern journalisms. The most important practical step that can be taken is for publishers to adopt systems that automatically and proactively notify journalists, registered users, and researchers who previously accessed or downloaded a retracted article. At the same time, academic institutions should actively support the development and deployment of automated (AI) tools that monitor the retraction status of papers previously cited in news articles, addressing the clear desire expressed by journalists in this study. With this step, news organizations can recognize that addressing retractions is an integral part of maintaining the public record, rather than an optional administrative task. Journalistic codes of conduct must strictly enforce the principle to "gather, update and correct information throughout the life of a news story". Scientific retraction should be formalized as a continuation of the news story, mandating a timely update or correction to the original report.

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Dear reviewers,

Thank you for your feedback and suggestions for minor revisions. Apart from the tracked changes copy of the manuscript, please find attached summary of the changes made:

Revision suggestion	How was it address in the manuscript
• A careful proofreading for typos is needed	Several typos were found and corrected, capital letters, punctation, etc. These are noted throughout the text on nearly every page.
Clarify any forward-dated references (e.g..., Newman et al., 2025) if they are pre-prints; ensure all are verifiable	This reference is not a pre print and it's available on the website provided
Consider whether any more recent criticisms of altmetrics could be added	The following section was added to the subheading Content analysis and the exploration of online news articles on page 3 . A recent literature review evaluating the use of Altmetrics concludes that while altmetrics offer real-time insights into research engagement, their academic application is hindered by methodological inconsistencies and a lack of data standardisation across platforms. Thus, significant disciplinary bias persists, as altmetrics tend to favour fields with high digital visibility while underrepresenting others. To address these limitations, the authors advocate for integrated models that combine quantitative metrics with qualitative assessments to reduce bias and enhance validity (Gonzales et al,, 2025). Furthermore, recent evidence from a recent study shows that although altmetric indicators can distinguish between study designs and partially reflect levels of evidence, their ability to capture true research quality remains limited. The visibility of high-quality studies is still shaped more by platform dynamics than methodological rigour, underscoring the challenge of interpreting online attention as a reliable indicator of scientific impact (Valderrama et al., 2025).
Expand slightly on limitations, e.g..., how blog-heavy samples might skew framing toward sensationalism.	The following section was added to subheading Discussion on page 15 Moreover, the predominance of blog-based material within the sample introduces a risk of skewing findings

	toward sources that disproportionately amplify sensationalist or conspiratorial framings, limiting the interpretive reliability of the dataset.
In the discussion, consider briefly noting how AI tools (as recommended) could mitigate biases in Altmetric data.	The following sentences were added to the subheading Discussion on page 14/15. Nevertheless, recent work highlights that AI-based text classification and credibility assessment systems can help reduce noise and systematic bias in altmetric datasets by filtering unreliable sources and improving the consistency of mention categorisation, thereby strengthening the robustness of altmetric indicators that could mitigate such biases (Robinson-Garcia et al.,, 2025).
occasional dense sentences	Broke down a few sentences when possible thorough the manuscript, for example a long sentence into two on page 10 From: While factual neutrality remains the most common approach, sensational and conspiratorial framings still appear with notable frequency. This pattern suggests that retraction coverage often functions less as corrective science communication and more as a space where credibility, authority, and the legitimacy of expertise are actively contested to While factual neutrality remains the most common approach, sensational and conspiratorial framings still appear with notable frequency. This pattern suggests that retraction coverage often functions less as corrective science communication and more as a space where credibility, authority, and the legitimacy of expertise are actively contested

Thank you for your review.