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Transitioning to Transparency: Footnote Journalism as a Novel Journalistic Practice

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ABSTRACT

Objectivity as *the* professional norm of Western journalism has—for quite some time—been under scrutiny. Questioning a norm inevitably leads to a search for other normative anchor points. One guiding principle that is currently attracting much attention is transparency. Despite extensive research on audience perceptions of journalistic transparency efforts, less is known about journalists' transparency practices and how they are embedded in journalistic content. This study investigates a novel practice of source transparency that we term *footnote journalism*: the visually-emphasized use of scholarly referencing practices that substantiate news content by listing sources in the form of footnotes. Using quantitative content analysis, we assessed $N = 2,588$ footnote references embedded in $N = 127$ journalistic news items across three outlets to explore what types of sources were used, what types of statements were substantiated, and whether sources were specific, traceable, and accessible. We find that footnote journalism cites sources of high scientific quality to a substantial extent, but it is rather narrow in its thematic focus. The type of sources used depends on several factors, including the author's profession, the nature of the statement, and the topic. The discussion addresses the theoretical and practical implications of footnote journalism.

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Introduction

Globally, our concept of journalism and our understanding of journalism as a professional field is transforming (Carlson and Lewis 2019, 123), becoming more diverse and pluralistic. Transformation is a constant in journalism's history, but with digitization, this process has accelerated and is affecting our understanding of journalistic functions and our evaluation of professional journalistic norms. Since the early twentieth century, the authority of journalism in the Global North has derived from the ideal of objectivity (Anderson and Schudson 2019; Carlson and Lewis 2019), which prescribes independent and impartial reporting.

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Notwithstanding earlier criticism (e.g., Glasser 1983), this ideal has recently come under great scrutiny (Anderson and Schudson 2019). For instance, objective journalism has been criticized for reinforcing the status quo and inadequately addressing complex issues, as highlighted by research on false balances in climate reporting (Boykoff and Boykoff 2004). Scrutinized professional norms can be reevaluated and renegotiated. One of the norms that is currently attracting much attention is transparency (see e.g., Curry and Stroud 2021; van der Wurff and Schönbach 2011); according to this norm, journalistic media are expected to open up to their audience and provide behind-the-scenes insights into their work (Karlsson 2022; Loosen, Reimer, and Hölig 2020; Meier and Reimer 2011).

Transparency practices are not entirely new, and with the rise of digitization, the logic of the internet found its way into journalistic work. Already in the 1990s, online newsrooms used internal and (where editorial guidelines allowed) external hyperlinks in their articles. Source transparency research builds on this, with its primary focus on in-text hyperlinks, which allow audience members to access online sources used in the reporting (Karlsson 2010). Transparency in general, and source transparency in particular, are credited with potential benefits vis-à-vis enhanced legitimacy, credibility, and ultimately trust in journalism (Curry and Stroud 2021; Karlsson 2010; Koliska 2022; Peifer and Meisinger 2021). Qualitative findings have demonstrated, for example, the relevance of (source) transparency for the audience's assessment of trust (Karlsson and Clerwall 2018; Wintterlin, Engelke, and Hase 2020).

Most existing empirical research on (source) transparency focuses on its effects on audiences. Experimental studies have found positive effects from using elements of source transparency (e.g., hyperlinks) on perceived news credibility (Borah, 2014; Curry and Stroud 2021; Karlsson, Clerwall, and Nord 2014). However, systematic (quantitative) content analyses of journalistic transparency practices themselves and their embedding in journalistic products remain rare (see Dubèl, Boukes, and Trilling 2025; Humprecht and Esser 2018; Karlsson 2010; Mor and Reich 2018 for notable exceptions). Expanding this area of research, we study a new, more advanced manifestation of a journalistic transparency practice that may be less subtle as well as easier for the audience to identify: the use of visually-emphasized source references that adhere to scientific citation standards. This practice has recently been introduced in several (mainly German) newsrooms. While there is some content-analytical (Dubèl, Boukes, and Trilling 2025; Humprecht and Esser 2018; Karlsson 2010) as well as experimental (e.g., Borah, 2014; Karlsson, Clerwall, and Nord 2014) research on the use of hyperlinks in journalistic reporting, this novel practice has not yet been extensively studied. Therefore, we introduce the concept of *footnote journalism*, which represents an advancement in journalistic source transparency practices. To explore how this novel application of the transparency norm appears in editorial content, we conducted a content analysis of journalistic outlets that implement footnote journalism in Germany, and we discuss its theoretical and practical implications.

Transparency in Journalism

Journalistic transparency efforts manifest in so-called “transparency elements” (Curry and Stroud 2021, 903; Karlsson 2022, 79). These elements, and journalistic transparency in general, take different forms. Analytically, Karlsson (2010) distinguishes between *participatory transparency*—which invites the audience to participate in news production as a

means of creating transparency—and *disclosure transparency*—which entails all forms of initiatives creating transparency about journalistic products and practices, such as disclosing errors and corrections in articles, explaining news selection, or communicating personal motifs. Meier and Reimer (2011) distinguish between product transparency and process transparency. *Process transparency* describes all insights journalists provide about their production processes, such as when they open up about what happens in the newsroom and explain their work (for example, by introducing an “explain-your-process” box next to their content, see Peifer and Meisinger 2021); further examples include invitations to newsrooms and editorial meetings, author bylines and profiles (see Henke, Holtrup, and Möhring 2023; Tandoc and Thomas 2017), and editorial blogs. *Product transparency* refers to more detailed information about journalistic products, such as corrections (see Dubèl, Boukes, and Trilling 2025), labeling of journalistic opinions (see Otis 2024), and the verification status of information. One important form of disclosure and product transparency is *source transparency*, or transparency about the source situation and the disclosure of the sources used in reporting (Dubèl, Boukes, and Trilling 2025; Uth 2024). The Trust Project (n.d.), an international consortium of news organizations committed to establishing transparency standards in professional journalism, lists source transparency among their eight trust indicators of journalism. Audience members also assign great importance to this form of transparency (Karlsson and Clerwall 2018).

Source transparency is often implemented through in-text hyperlinks (Dubèl, Boukes, and Trilling 2025; Humprecht and Esser 2018; Karlsson 2010), and in more specialized cases through online repositories where documents used as sources can be uploaded (Mor and Reich 2018). According to Karlsson (2020, 1808), these specific forms of transparency can be summarized under his later-introduced concept of *ambient transparency*, which he describes as “techniques or tools that are used/added by news producers in the vicinity of (news) content making it possible for news consumers to evaluate and form new meanings of news stories, through the association of content with the provided context.” Empirically, Karlsson (2010) explored how frequently three large newspapers used external hyperlinks or linked to original documents containing specific facts referenced in the news article; he found that *The New York Times* used hyperlinks quite frequently, while the two European outlets rarely did. Similarly, in a large-scale automated content analysis of Dutch news outlets, Dubèl, Boukes, and Trilling (2025) found that most articles contained some form of in-text source attribution, while internal and external hyperlinks were less common and references to original documents were almost non-existent.

Experimental studies have investigated the effects of adding transparency elements to journalistic texts on credibility ratings and news engagement, with mixed results (Uth 2024). Some studies show no significant effects of various transparency elements (e.g., Henke, Holtrup, and Möhring 2023; Karlsson, Clerwall, and Nord 2014 for most individual elements; Koliska 2022; in part: Meier and Reimer 2011 for a combination of elements), and Tandoc and Thomas (2017) even find a negative effect of disclosing author information on credibility. However, other studies indicate positive effects of individual transparency elements, such as when an “explain-your-process” box is provided (Peifer and Meisinger 2021; for one of two topics tested) or when information about opinionated news is disclosed (Otis 2024). Furthermore, some studies report positive effects when several transparency elements are combined. Curry and Stroud (2021) find that a

combination of elements (including hyperlinks embedded into footnotes) increases the perceived credibility of and the intended engagement with accompanying journalistic content. Meier and Reimer (2011) report similar effects for a combination of several methods of product transparency (including referencing to source documents in footnotes) which are most pronounced for print news.

With respect to source transparency in isolation, results from previous studies are also encouraging, but the types of sources referenced and the format of referencing seem to matter: for in-text (verbal) source attributions, one study finds no effects (Henke, Holtrup, and Möhring 2023), while another study shows that citing scientific sources in particular increases credibility without negatively influencing the news consumption experience (Henke, Leissner, and Möhring 2020). Both Karlsson, Clerwall, and Nord (2014) and Borah (2014) show positive effects of in-text hyperlinks on credibility ratings. However, if studies find positive effects (e.g., Borah 2014; Curry and Stroud 2021; Karlsson, Clerwall, and Nord 2014), these effects are oftentimes small. This may be due to rather subtle operationalizations of source transparency in these studies, as the assumed effects are dependent on the attention (general awareness of hyperlinks), media literacy (recognizing hyperlinks as source references), and further efforts (hyperlink clicking) of the audience. News consumers often struggle to recognize existing journalistic transparency efforts as such (Koliska 2022), meaning that evaluating the quality of referenced sources is associated with certain hurdles.

With transparency becoming increasingly vital as a guiding principle, new practices are emerging that refine established transparency elements, addressing limitations like low perceptibility. These developments may offer greater potential for journalistic practitioners (Karlsson 2022). This paper examines a novel journalistic transparency practice currently emerging in news products, which we term *footnote journalism*.

Footnote Journalism as a Novel Journalistic Practice

We define *footnote journalism* as the use of (1) visually-emphasized references, (2) akin to scientific citation practices, which are (3) used to provide either evidence for information or to back up interpretative arguments made in the journalistic product. As such, this practice resembles the transparency element of “footnotes” introduced by Curry and Stroud (2021, p. 909). However, due to its three specific characteristics—each of which exists on a continuum, which we explain below—we view footnote journalism as an advanced transparency practice.

First, footnote journalism is characterized by *visual emphasis*. The various sources are directly shown within the journalistic product—positioned next to or below the text in print or online articles, or in the corner of the video screen in audiovisual media. Accordingly, journalistic sources become an integral part of the presentation. Unlike hyperlinks (Karlsson, Clerwall, and Nord 2014), documents uploaded in a repository (Mor and Reich 2018), or footnotes with subscript numbers (Curry and Stroud 2021) that provide additional information only when clicked, sources referenced in footnote journalism are directly perceptible. As such, footnote journalism meets current calls for more visible transparency practices that are not dependent on further actions by the audience and thus are believed to have greater transparency effects (Karlsson 2022, 48).

Second, by using a *reference style akin to scientific citation practices* that includes the author, date, publication, and more, journalists provide important information to a

skilled audience for judging the quality and timeliness of the referenced sources even without further investigation of the original source documents, which might be especially appreciated when highly reputable scientific findings are cited (see Henke, Leissner, and Möhring, 2020). Consequently, audience members are provided with information that enables them to evaluate the news reporting in context, in line with what Karlsson (2020) describes as ambient transparency. Additionally, if done well, audience members are provided with sufficient information to explore the sources themselves. However, this necessarily depends on reference completeness and source traceability and accessibility: sources that cannot be identified or found, or are hidden behind paywalls, inevitably restrict the possibilities for further exploration by the audience.

Third, footnote journalism not only provides transparency about the sources used but also includes *evidence* supporting the arguments made in the journalistic product. Depending on the degree of precision in attributing sources to statements, footnote journalism enables journalists to clearly show the origin of their information, which might reduce the vulnerability of their claim-making and provides immediate proof of arguments.

Although we see all three characteristics as necessary prerequisites for a journalistic practice to be considered footnote journalism, the practice itself represents a continuum, as each of the elements can be implemented to various degrees. The visual emphasis can vary in its extent, such as by varying font size, using animations, or giving more prominent placement. The quality of the citation itself can vary depending on the adherence to well-established scientific standards, such as completeness of the information needed to identify and trace the original document (e.g., author, date); for instance, using widely recognized citation styles like that of the American Psychological Association (APA) displays a high scientific standard. Finally, the proof function of footnotes varies according to the degree to which sources are allocated to statements, ranging from a mere bibliography of all footnotes to specific footnotes being provided for specific data or sentences. This allows for substantial quality differences within the practice. For a classification of the real-world manifestations of footnote journalism included in our sample along the continua, see [Table 1](#).

As a new transparency practice, footnote journalism raises questions about journalists' use of sources, the quality of those displayed in the product, and the implications of the practice. By visibly displaying their sources, journalists ultimately disclose their quality standards regarding sources as well as their potential preferences, thus opening up new potential areas of attack (e.g., by media sceptics). Moreover, it sparks a debate over the function and the responsibility of journalists. While disclosing one's sources might provide transparency and demonstrate more authority than alternative providers of news-like content, it also operates as a content curation practice that is easy to imitate by non-journalistic actors. Moreover, this practice might to some extent redirect responsibility for verified information to the original sources: Reich (2010, 27) shows that journalists more often disclose their sources and attribute specific information to them when they perceive their sources to be less credible and feel the need to preserve some distance from the given information. In contrast, according to Haapanen (2022, 887), one might expect a higher tendency to only disclose socially acceptable sources, in an act of impression management. Relatedly, audience members expect journalists to reference credible and relevant sources, at least in the context of hyperlinks (Karlsson

and Clerwall 2018). Therefore, we explore the claims for which journalists make use of footnotes in footnote journalism, what kind of sources they use for which kind of claims, and the extent to which this opposes or aligns with current practices of source transparency.

Exploring Footnote Journalism

Research on novel transparency practices and how they are embedded in journalistic content has only just begun. Given the lack of research on footnote journalism, we aim to provide an initial exploration of its use. Specifically, we examine whether footnote journalism is an actual practice that was established from within the field (i.e., as a form of boundary work) or whether this practice stems from outside the field (i.e., as a logic imported to journalism from, e.g., scientific guest authors), in which case footnote journalism would also be a topic-specific practice. Therefore, we ask:

RQ1: What is the profession of authors of footnote journalistic news items?

RQ2: What topics are covered in footnote journalistic news items?

Next, our focus shifts from entire news items to the level of individual sources cited in the footnotes themselves. Here, the types of sources used are of particular interest: scientific papers, journalistic news articles, and statistics embedded in press releases of private companies are of varying scientific quality and reliability, and thus they differ in their suitability for substantiating interpretative statements made in news items (Colepicolo 2015). Furthermore, the literature identifies different reasons for source transparency practices in journalistic products, and the motivations and demands of journalists and audiences may not always align. While journalists are found to disclose sources to maintain critical distance from them (Reich 2010), audiences prefer encountering high-quality scientific sources to support interpretative statements (Karlsson and Clerwall 2018). Journalists reporting on scientific topics and facing media skeptics' backlash on their coverage may be especially guided by these preferences, which may also align with their own quality standards—or, potentially, with impression management motives (Haapanen 2022). Therefore, the types of sources used in footnote journalism and their (scientific) quality might vary. Consequently, we ask:

RQ3: To what extent are various types of sources used as references in footnote journalistic news items?

Sources in footnote journalistic news items are used to support interpretative journalistic statements as well as to empower the audience to further explore the sources themselves. This requires referencing specific, original documents (in contrast to, e.g., general web- or personal pages). Furthermore, those documents must be traceable, either through hyperlinking or through a brief web search. In addition, forms of access restriction such as subscription fees and paywalls may limit both the possibility of audiences retrieving the sources and the ability of journalists to use them as sources in the first place. Therefore, we ask:

RQ4: To what extent are sources in footnote journalistic news items specific (RQ4a), traceable (RQ4b), and accessible (RQ4c)?

In footnote journalistic news items, not only can the types of sources vary but also the types of statements substantiated by those sources. Types of statements made in news items can range from factual reports of real-world events or the presentation of (statistical) data to quotes from elites, experts, or ordinary people. For our content exploration of footnote journalism, we analyze whether specific types of statements are exceptionally often or rarely substantiated by source references. Therefore, we ask:

RQ5: To what extent are different types of statements substantiated by journalistic footnote practices?

In addition to descriptively exploring footnote news items in Germany, our objective is to conduct a bivariate exploration of relationships between selected types of sources and various content characteristics. This analysis will enhance our understanding of how specific sources relate to other elements in footnote journalism: Do authors select certain types of sources based on their profession? Does the topic of the news item matter? Are various types of statements predominantly substantiated by certain types of sources? Consequently, we ask:

RQ6: Does the selection of different types of sources in footnote journalism depend on the profession of the author (RQ6a), the types of statements substantiated (RQ6b), and/or the topic of the news item (RQ6c)?

Method

To answer our research questions and provide a first empirical exploration of the characteristics of footnote journalism, we conducted a quantitative content analysis. We sampled news items with footnote-style citations from a variety of media outlets located in Germany. The country makes an interesting research case, as it represents the fifth-largest media market worldwide and the largest in the EU (statista Market Insights 2023). Additionally, Germany has seen declining levels of media trust in recent years (Newman et al. 2023, 77). Although past research shows that traditional practices of source transparency (e.g., hyperlinks) have so far been less prevalent in Germany than elsewhere (Humprecht and Esser 2018), several interesting outlets—some of which stem from the traditionally strong Public Service Broadcasting sector—have started with footnote journalism as a new practice.

Sampling

To gain an initial exploratory impression of the footnote journalism landscape in Germany, we consulted a number of publicly accessible directories¹ of German-language magazines and newspapers (online and print). For reasons pertaining to reach and thus discursive power, only entries with a national focus or a national distribution area were examined in detail for whether they engaged in footnote journalism as they met all three definition criteria. To this end, we exploratorily screened five to ten recently published news items per outlet. Since footnote journalism is modelled on academic citation practices, its use seemed most likely for the science beat; therefore, our screening concentrated on this section or its equivalent. In addition, we used the search engine Google to search for additional journalistic outlets focusing on (science) news and popular science.

We also screened overviews of news shows and science magazines provided by four major German TV channels—two each in the public (ARD, ZDF) and the private sector (RTL, ProSieben). This extensive search resulted in a number of German outlets with varying reach that practice footnote journalism in all or in parts of their news items—mostly online (e.g., *Deutsche Welle*, *Deutschlandfunk Nova*, *Futurezone*, *Men's/Women's Health*, *t-online.de*), but also in print (e.g., *Psychologie Heute*, *Spektrum der Wissenschaft*), on TV (e.g., *Carolin Kebekus Show*), and in feed posts on social media (e.g., *Funk* on Instagram).²

We aimed to include outlets to our content analysis' sample that fulfill all three characteristics of our definition outlined above and that have substantial reach. In order to comprehensively explore German footnote journalism, we selected outlets across a variety of media genres: a TV show, a print news magazine, and a news website (for a classification of the selected outlets in our conceptualization of footnote journalism, see [Table 1](#)):

Table 1. Classification of selected cases on the footnote journalism continuum.

Outlet	Characteristic of Footnote Journalism		
	Visual Emphasis	(Scientific) Quality of Referencing Style	Allocation of Sources to Statements
<i>MaiThink X</i>	High	Low	High
<i>Katapult Magazin</i>	Medium to high	High	High
<i>Quarks.de</i>	Low	Medium	Low to medium

- The TV show *MaiThink X*, aired on public broadcaster *ZDFneo*, is hosted by science journalist Mai Thi Nguyen-Kim. Each of its 42 half-hour episodes³ covers a societal topic from a scientific angle in a fact-based but also emotional and entertaining way (ZDF n.d.). The show has been nominated for several media awards and regularly reaches several hundred thousand viewers (e.g., 350,000 with its first episode), both in linear TV and in online on-demand video (Mantel 2021). The show's Instagram channel has 325,000 followers as of December 2024 (ZDFneo n.d.).⁴ Abbreviated Harvard-style scientific citations (including author, year, publication outlet) are displayed as footnotes in the lower right corner of the video screen during the show, to substantiate specific statements. For each episode, a full reference list, including hyperlinks, is provided on an accompanying webpage.
- *Katapult Magazin* (KATAPULT Magazin n.d.a) is a popular science print magazine that is published quarterly. It covers current affairs from a social scientific angle, with a special emphasis on maps and informative graphics. The magazine's print circulation was 100,000 as of October 2024 (KATAPULT Magazin 2024, 96), and its Instagram channel has 530,000 followers as of December 2024 (KATAPULT Magazin n.d.b). Each print edition contains several longer articles accompanied by footnote-style scientific citations, which are displayed as full footnote references in a separate column next to the main article text; footnotes are tied to specific statements. Some of these articles are also posted on the magazine's website.
- *Quarks.de* (WDR n.d.), operated by the German public broadcaster *WDR*, is science journalism in online format. *Quarks.de* publishes text-based news articles with a focus on popular science topics.⁵ The website recorded 977,200 monthly visitors in December 2023 (similarweb 2023), and 1.5 million people follow *Quarks* on Instagram as of

December 2024 (Quarks n.d.). Articles on *Quarks.de* feature a scientific bibliography below the text, in which all sources are listed and linked. Sources on *Quarks.de* are not allocated to specific statements, although in some more recent articles, sources are assigned to paragraphs.

Our data collection period ran from 24 October 2021 (release of first *MaiThink X* episode) to 2 April 2023 (release of most recent *MaiThink X* episode by the time of data collection). We sampled every episode of *MaiThink X* ($n = 24$), every print article in *Katapult Magazin* that cited at least two different sources ($n = 47$), and every article on *Quarks.de* ($n = 56$) published within this time frame. Our final dataset thus contained $N = 127$ news items that featured a total of $N = 2,588$ footnote citations ($M = 20.4$; $SD = 10.9$). The number of unique sources per news item was somewhat lower ($M = 17.8$; $SD = 9.5$), since some news items referred to identical sources in several footnotes.

Measures

News item-level variables: We coded the *author's profession* as journalist, news agency author, scientist, government official, party politician, NGO employee, company member, or private person. The *topic* of the news item was chosen from a list of broad topical categories (e.g., economy, health; see Table 4 for full list), following Wehden (2023, 286).

Footnote-level variables: To code the *type of source* cited in a footnote, we went to the original source and applied a categorical variable to indicate the location where this material had been published:

- *Peer-reviewed scientific publications*: Publications with formal scientific peer review (e.g., journal papers, accepted conference papers). Peer review is regarded as the most important instrument for ensuring the quality of scientific knowledge production and dissemination (Colepiccolo 2015).
- *Scientific publications without peer review*: Sources that were authored by scientists and/or published in scientific outlets without formal peer review (e.g., preprints on *medRxiv.org*, scientific books, working papers).
- *Journalistic publications*: Newspaper and online news articles, podcasts, radio and TV reports that were authored by journalists working for news organizations.
- *Official publications*: Documents published by public institutions on the local, federal, or (supra-)national level; statistics or other publications by federal statistical offices and other public authorities.
- *Private/commercial publications*: Publications from private or commercial actors (e.g., individual party politicians who are not government officials, companies, professional associations/clubs, NGOs, commercial research institutions, private persons). Admittedly, this category was very broad, but this allowed us to ensure reliable coding for the exploratory analysis. This limitation must be taken into account when interpreting our results, and it is discussed in the limitations section of this study.
- *Unclear/other*.

The *specificity* of cited sources was dummy-coded. A source was classified as specific if it referred to a clearly labeled original document that was identifiable by a corresponding

document title; sources were categorized as unspecific if they referred to general websites, non-public interviews, or other material that was exclusively available to journalists.

We also dummy-coded the *traceability* of cited sources. If footnotes included hyperlinks (i.e., *Quarks.de*; *MaiThink X*), these links were followed, and the sources were considered traceable if the hyperlink actually led to the referenced original document. In cases where no hyperlinks were available (i.e., in the print magazine *Katapult*), a brief Google search was conducted, and the sources were categorized as traceable if the original source document was among the search results. If the hyperlinks did not work or if the original material could not be traced in this way, the sources were coded as non-traceable.

The *accessibility* of the cited sources was dummy-coded by recording whether traceable, original source documents were available in open-access format without the need for a subscription. If sources were hidden behind journalistic or academic paywalls, had to be purchased (e.g., books), or required the creation of a user account, they were coded as non-accessible.

When sources were directly provided for specific statements within the news items (i.e., *Katapult Magazin*; *MaiThink X*), we examined the *type of statement* supported by the referenced source using a categorical variable:

- *Numeric statements (specific)*: Statements including specific numerical statistics, figures, or numbers.
- *Numeric statements (unspecific)*: Statements that present (empirical) evidence from quantitative data analysis or numerical comparisons without explicitly providing numeric values (e.g., reporting unspecified growth/decline).
- *Theoretical statements/definitions*: Statements introducing theoretical claims, models, approaches, definitions.
- *Event-/case-based statements*:⁶ Exemplification and non-numerical statements/reports about real-life events.
- *Unspecific statements/quotes*: Unspecific statements of actors (including direct quotes).
- *Unclear/other*.

Coding Procedure

We started by identifying relevant news items and collected meta-data (i.e., publication dates, author names, headlines, hyperlinks). For each news item, coders first coded both item-level variables (i.e., author profession, topic) before moving on to identifying the number of footnotes and unique sources. Identical sources cited in multiple footnotes in the same news item were treated as separate cases. All remaining variables (i.e., type of source, specificity, traceability, accessibility, type of statement) were coded at the footnote level.

Prior to the coding, four coders (all among the authors of this article) were trained in the use of the codebook. Throughout this collaborative process, the coders discussed and iteratively refined the codebook. Intercoder reliability (Table 2) was determined in a pretest in which the coders coded news item-level variables and footnote-level variables separately. For the pretest, news item-level variables were coded for 30 identical news items; these items were randomly drawn from the most recent volume of *Katapult*

Table 2. Intercoder reliability scores.

Measure	Pretest <i>n</i>	Holsti's PAI	Krippendorff's α
News item-level			
Author's profession	30	.783	–
Topic	30	.789	.731
Footnote-level			
Identification of distinct sources	90	.934	.928
Type of source	90	.876	.837
Specificity	90	.958	–
Traceability	90	.964	–
Accessibility	90	.833	–
Type of statement	60	.761	.693

Magazin (before the begin of the data collection period), all articles on *Quarks.de* published within 1 year before the beginning of the data collection period, and all episodes of the by then most-recent season of *MaiThink X*.⁷ On the footnote-level, two news items per outlet were randomly drawn from the same pool; coders coded the first 15 footnotes per news item, resulting in a pretest sample of $n = 60$ codes for type of statements and $n = 90$ codes for all other variables. Following Früh's suggestion (2017, 187), we calculated Holsti's (1969) percent agreement index for all variables; in addition, Krippendorff's α (Hayes and Krippendorff 2007) was determined for all categorical variables. R version 4.2.3 and the *tidycmm* package (Unkel 2021) were used for computation. Holsti scores for all variables satisfied common pretest requirements of $> .75$ (Früh 2017, 184). Krippendorff's α resulted in slightly lower but still acceptable values (i.e., allowing at least tentative conclusions) above the threshold of $\alpha > .667$ (Krippendorff 2019, 356). Nevertheless, conclusions based on variables with α -values below .80 (i.e., topic, type of statement; see Table 2) should be interpreted with caution.

During actual coding, news items were randomly distributed among the coders, with each item processed by one coder. Coding took place in mid 2023.

Statistical Analysis

The statistical analysis was carried out using R version 4.2.3. For initial exploration, descriptive statistics (mainly percentage shares) were calculated (RQ1–RQ5). To assess the influence of news item-level (i.e., author, topic) and footnote-level (i.e., types of statements) characteristics on the types of sources selected and other variables, χ^2 -tests were calculated using cross tabulation (RQ6). Significant χ^2 -tests were broken down further with standardized residuals to determine the significance of individual cell contributions to the overall association (Field, Miles, and Field 2012, 825). Effect sizes (Cramer's V) are provided to qualify the strength of these associations.

Results

Most news items in our sample ($n = 97$; 76.4%) were authored by professional journalists (RQ1; see Table 3). Guest authors rarely contributed stories, and when guest authors were identified, they were exclusively scientists ($n = 17$ news items; 13.4%).⁸ In terms of the topics covered by footnote journalism (RQ2; see Table 4), the most frequent topics were health (33.1%), economy (15.7%), and nature/climate (14.2%).

Table 3. Type of source, type of statement, and accessibility by author classification.

	Journalist	Scientific Guest Author	Total
$n_{\text{news items}}^a$	$n = 97$ (76.4%)	$n = 17$ (13.4%)	$n = 127$
Type of Source^b	$n = 2052$	$n = 298$	$n = 2350$
$\chi^2(4) = 51.12^{***}$; Cramer's $V = .15$	%	%	%
Scientific (peer-reviewed)	25.2	35.9 ^{**e}	26.6
Scientific (other)	12.7	22.5 ^{***e}	14.0
Journalistic	14.7	5.7 ^{***f}	13.6
Official	22.7	17.8	22.0
Private/Commercial	24.7	18.1 ^{*f}	23.9
Type of Statement^c	$n = 1339$	$n = 101$	$n = 1440$
$\chi^2(4) = 16.78^{**}$; Cramer's $V = .11$	%	%	%
Numeric (specific)	24.9	11.8 ^{*f}	24.0
Numeric (unspecific)	14.6	8.9	14.2
Theoretical/Definition	5.4	6.9	5.5
Event-/Case-Based	39.4	45.5	39.8
Unspecific/Direct Quote	15.8	26.7 ^{*e}	16.6
Accessibility^d	$n = 1843$	$n = 262$	$n = 2105$
$\chi^2(1) = 11.25^{***}$; Cramer's $V = .07$	%	%	%
Yes	82.0	73.3	80.9
No	18.0	26.7 ^{**e}	19.1

Note: Results based on χ^2 -test. Significance of cell contribution to overall association estimated by breaking down χ^2 -tests with standardized residuals. * $p < .05$; ** $p < .01$; *** $p < .001$

^aValues do not add up to 100% due to news items with unclear author classification.

^bBase of proportional calculations: Footnotes with identifiable types of sources and authors.

^cBase of proportional calculations: Footnotes with identifiable types of statements and authors.

^dBase of proportional calculations: Footnotes with traceable sources in news items with identifiable author.

^eindicates proportions significantly larger than statistically expected.

^findicates proportions significantly smaller than statistically expected.

For RQ3, we looked at sources cited in the $N = 2588$ analyzed footnotes in our sample. Among the $n = 2,571$ footnotes for which types of sources were identifiable, peer-reviewed scientific articles were most prevalent ($n = 714$; 27.8%, see Table 4); other scientific sources (without peer review) were cited in 14.6% of footnotes ($n = 375$). This means that 42.4% of footnotes cited some form of scientific sources, which may be partly due to the fact that our sample geared toward popular-science news. However, two other types of sources were also very prominent: 560 footnotes (21.8%) referred to official sources and statistics, and references to private/commercial sources were even more frequent ($n = 593$; 23.1%). Journalistic sources were cited less frequently ($n = 329$; 12.8%).

For RQ4 (see Table 5), most referenced sources were specific (RQ4a; 94.1%) and traceable (RQ4b; 88.2%); furthermore, traceable sources were mostly available in open access (RQ4c; 80.8%). However, accessibility significantly depended on the type of source ($\chi^2(4) = 343.77$; $p < .001$; Cramer's $V = .39$). While almost all official sources (99.0%), most private/commercial sources (92.3%), and most journalistic sources (86.8%) were openly accessible, there were far more restrictions on access to scientific sources: 66.0% of peer-reviewed sources were published open access, and only 58.8% of other scientific sources were openly accessible (mainly because some books were exclusively sold as hard copies).⁹ Furthermore, we found a significant influence of author profession on accessibility (see Table 3), with scientific guest authors using more access-restricted sources (26.7%) than journalists (18.0%).

Journalists and scientific guest authors also differed significantly in terms of the type of sources they cited (RQ6a; see Table 3): guest authors used significantly more peer-

Table 4. Topic frequency and proportion of source classification by topic.

Topic	Frequency		Source Classification by Topic ^a (in %)							
	News Items		Footnotes		Scientific (peer-reviewed)	Scientific (other)	Journalistic	Official	Private/commercial	
	n	%	n	%						
Foreign Politics	5	3.9	96	3.7	13.7 ^{**c}	26.3 ^{**b}	28.4 ^{****b}	14.7	16.8	
Domestic Politics	8	6.3	169	6.5	32.0 ^{****c}	18.9	8.9	20.1	20.1	
Economy	20	15.7	422	16.3	9.5 ^{****c}	12.2	14.3	30.1 ^{****b}	33.9 ^{****b}	
Social Issues	12	9.4	296	11.4	33.9 ^{**b}	29.5 ^{****b}	9.2	10.8 ^{****c}	16.6 ^{**c}	
Law and Order	4	3.1	91	3.5	16.5 ^{**c}	4.4 ^{**c}	37.4 ^{****b}	24.2	17.6	
Infrastructure	4	3.1	102	3.9	7.2 ^{****c}	12.4	20.6 ^{**b}	30.9	28.9	
Tech/IT	3	2.4	55	2.1	38.2	5.5	14.5	21.8	20.0	
Nature/Climate	18	14.2	290	11.2	26.5	14.6 ^{****b}	5.6 ^{****c}	28.6 ^{**b}	24.7	
Culture	9	7.1	132	5.1	8.3 ^{****c}	5.3 ^{****c}	31.1 ^{****b}	9.1 ^{****c}	46.2 ^{****b}	
Accidents	1	0.8	23	0.9	39.1	17.4	4.3	21.7	17.4	
Health	42	33.1	898	34.7	41.1 ^{****b}	12.0 ^{**c}	8.9 ^{**c}	20.1	17.9 ^{**c}	
Education	1	0.8	14	0.5	7.1	7.1	0.0	78.6 ^{****b}	7.1	
All News Items	127	100.0	2588	100.0	27.8	14.6	12.8	21.8	23.1	

Note: Results based on χ^2 -test: $\chi^2(44) = 521.03, p < .001$, Cramer's $V = .23$; Significance of cell contribution to overall association estimated by breaking down χ^2 -test with standardized residuals.

^a $p < .05$; ^{**} $p < .01$; ^{***} $p < .001$

^bBase of proportional calculations: $n = 2571$ footnotes with identifiable types of sources.

^cindicates proportions significantly larger than statistically expected.

^dindicates proportions significantly smaller than statistically expected.

Table 5. Specificity, traceability, and accessibility of sources.

	Specificity		Traceability		Accessibility ^a	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Yes	2435	94.1	2283	88.2	1856	80.8
No	153	5.9	305	11.8	442	19.2
Σ	2588	100.0	2588	100.0	2298	100.0

^aBase: Footnotes with traceable sources (incl. 15 footnotes with malfunctioning hyperlinks identified via Google search).

reviewed (35.9%) and non-peer-reviewed scientific work (22.5%) and less frequently relied on journalistic (5.7%) and private/commercial sources (18.1%). Furthermore, the types of sources differed considerably by topic (*RQ6c*; see [Table 4](#)). Peer-reviewed scientific sources were predominantly used in news items covering social issues and health: more than half of all peer-reviewed sources in our sample were cited in news items on health-related topics, while such sources were statistically underrepresented in stories on foreign politics, economy, law and order, infrastructure, and culture. Scientific sources without peer review were disproportionately often used in news items on foreign politics and social issues, although they were far less often used in stories covering law and order, culture, and health. Items from traditional news beats (i.e., foreign politics, law and order, infrastructure, culture) relied heavily on journalistic sources, whereas for more science-related stories covering nature/climate and health, far fewer journalistic sources were used. Official sources were frequently cited in news items covering the economy, nature/climate, and education, while they were noticeably less relevant for stories on culture and social issues. Finally, private/commercial sources were disproportionately frequent in news items on economy and culture, while they were statistically underrepresented in stories on social issues and health.

In terms of statements substantiated by footnotes (*RQ5*; $n = 1,452$; see [Table 6](#)), the most frequent type of statement was event-/case-related ($n = 581$; 40.0%). Statements in which specific ($n = 347$; 23.9%) and unspecific ($n = 204$; 14.0%) numerical data were presented add up to 37.9%. The remaining statements in our sample were either coded as definitions and theoretical claims ($n = 79$; 5.4%) or as unspecific statements (including direct quotes) ($n = 241$; 16.6%). Here, too, we see significant differences between journalists' and guest authors' practices (see [Table 3](#)). Somewhat surprising is that scientific guest

Table 6. Frequency of statement classification and proportion of statement classification by source classification.

Type of Statement	Overall Frequency		Statement Classification by Source Classification (in %) ^a					
	<i>n</i>	%	<i>n</i>	Scientific (peer-reviewed)	Scientific (other)	Journalistic	Official	Private/commercial
Numeric (specific)	347	23.9	347	14.7*** ^c	6.1*** ^c	15.9	34.6*** ^b	28.8* ^b
Numeric (unspecific)	204	14.0	203	39.4*** ^b	9.9	13.3* ^c	15.3	22.2
Theoretical/Definition	79	5.4	77	29.9	14.3	10.4	26.0	19.5
Event-/Case-Based	581	40.0	577	25.3	13.0	25.1* ^b	17.2* ^c	19.4
Unspecific/Direct Quotes	241	16.6	234	15.8* ^c	18.4*** ^b	24.4	15.4	26.1
All Statements	1452	100.0	1438	23.4	11.8	20.3	21.3	23.2 Σ=100

Note: Results based on χ^2 -test: $\chi^2(16) = 133.19$, $p < .001$, Cramer's $V = .15$; Significance of cell contribution to overall association estimated by breaking down χ^2 -test with standardized residuals. * $p < .05$; ** $p < .01$; *** $p < .001$

^aBase of proportional calculations: $n = 1438$ footnotes assigned to specific statements with identifiable types of sources.

^bindicates proportions significantly larger than statistically expected.

^cindicates proportions significantly smaller than statistically expected.

authors supported their statements with numerical data less often than would be statistically expected (11.8%), and they used unspecific statements and quotes more often than expected (26.7%). In contrast, journalists seemed to be more versatile, exhibiting no specific pattern. Furthermore, we found that different types of sources were used to substantiate different types of statements (RQ6b; see Table 6). Specific numeric data was rarely taken from scientific sources, peer-reviewed or otherwise; instead, much of the specific numerical data came from official statistics and private/commercial sources, such as company reports. However, for the presentation of unspecific numeric data, a disproportionately large number of peer-reviewed scientific sources was used, while slightly fewer journalistic sources were used than what was statistically expected. Journalistic sources often contextualized event- and case-based statements (e.g., descriptions of real-life events), for which official statistics were used less often. Finally, unspecific statements/direct quotes were disproportionately often supported by non-peer-reviewed scientific sources (often in the form of direct correspondence with members of the scientific community), while peer-reviewed scientific sources were used far less frequently.

Discussion

Theoretical Implications

As a transparency practice, footnote journalism focuses heavily on the visible implementation of source transparency, which is believed to strengthen journalistic authority by increasing legitimacy and credibility, ultimately enhancing trust (Koliska 2022). In our sample, the sources in footnotes often met scientific standards and thus audience expectations in terms of credibility and reliability (Karlsson and Clerwall 2018). Moreover, they were mostly identifiable, traceable, and accessible, giving journalists the opportunity to demonstrate and defend the legitimacy and credibility of their claim-making. However, as with other transparency practices, it is unclear to what extent this emerging transparency practice might redirect legitimacy- and credibility-notions from the journalistic occupation and thus status of journalists to the practice of footnote journalism itself. While transparency practices might help journalists retain their authority within the news field, it might also enable other actors to gain authority by mimicking and adapting this new transparency practice—which could itself become a hallmark of journalistic professionalism.

In this regard, the quality of disclosed sources may be even more important for gaining or maintaining authority, but it may also be a function of impression management (Haapanen 2022). We do not yet know the extent to which audiences are able or willing to check the quality of the sources used when there is no need to further investigate them; furthermore, we do not yet know what they consider high-quality sources and how they reward the use of such sources—an aspect that gains importance if authors often use scientific sources (such as the guest authors in our sample). Qualitative insights suggest that the audience tends to evaluate journalistic transparency efforts: once noted, transparency elements are perceived as “quality mark[s]”, even if audience members have not actively engaged with them (Groenhart 2012, 196).

Finally, it is important to more closely examine journalists’ selection processes with regard to their transparency practices in footnote journalism. First, we must learn how they select their sources and how their selection criteria align with our general knowledge

about journalistic source selection, because the increased visibility of sources in footnote journalism could change source selection. Second, we need to understand what drives journalists to not back up a statement made in their product. With our analysis, we know what kind of claims are being accompanied by footnotes; however, we do not know what kind of claims are *not* substantiated, and why this is the case. For instance, in our sample, journalists using footnote practices seem to predominantly portray high-quality science as natural sciences and primarily support statements on health topics with high-quality scientific findings, while relying on other, non-scientific types of sources when covering other topics. Therefore, as of today, footnote journalism seems to be thematically rather confined. Certainly, our sampling strategy could have played a role in this, and we expect things to change as more general news sites adopt the practice of footnote journalism. Therefore, further and more comprehensive content analyses in the future are desirable.

Practical Implications

We conclude the discussion with practical recommendations for media organizations thinking about footnote journalism:

- (1) Footnote journalism is source work and consequently requires extra work. This is challenging for newsrooms suffering from time stress and high workloads, but experimental results on the use of hyperlinks indicate that the effort could be worthwhile (Borah 2014; Curry and Stroud 2021; Karlsson, Clerwall, and Nord 2014). Since footnote journalism must be done well in order to achieve this effect, media organizations with fewer resources can consider implementing this practice in selected stories, to make good use of their resources.
- (2) We recommend using publicly accessible sources that are both of high (scientific) quality and understandable to a broad public. For instance, our results show that high-quality scientific sources are seldom used to back up explicit numerical data but rather to substantiate unspecific numeric statements. This indicates either a problem of data literacy, challenges in presenting complex scientific results in a popular-scientific manner, or a problem of access restrictions. Journalists and the general public often only have access to abstracts or executive summaries, not to the actual data; for scientific guest authors, this is usually not a major problem, as they have access to many publications through their affiliation(s) with academic institutions or their scientific communities. Publications from science media centers at least partially fill this gap when direct collaboration between journalists and scientists is not possible. Such collaboration would be desirable and could also solve some of the problems we observed regarding the formal quality of the citation style used, thereby improving source accessibility. In addition, more intensive journalistic collaboration in this area would be desirable and does not always have to mean referencing a competing medium.
- (3) Patience is important. Standards change slowly, and it takes a long time to see the added value of a changed standard. If journalists initially react strangely to this novel practice (e.g., because they fear for their journalistic authority; Springer et al.

2023), this will fade once the practice has become established as an integral part of what we as a society understand as “good journalism”.

Notably, if footnote journalism becomes established and footnotes become a new standard for providing evidence or trustworthy information, this could raise questions about the reasonable handling and perception of classified or uncitable information, such as off-the-records observations by journalists or confidential information from whistleblowers.

Limitations

Our study was exploratory and therefore not without limitations, many of which relate to our sample.

First, we wanted to examine media with high reach and impact. Due to the practice’s novelty, the number of media practicing footnote journalism today is limited, which means that the available material was also limited. We were still able to identify a broad range of topics, and we believe that our sample is suitable for an initial exploratory analysis of the content and characteristics of footnote journalism. Nevertheless, future studies should include significantly greater samples of media. For example, some entertainment-oriented media, such as a German late-night comedy show (the *Carolin Kebekus Show*), have taken up this novel journalistic practice, and other media with high reach, such as a public-service channel for young adults (*Funk*), have implemented footnote journalism in their Instagram posts. Given the relevance of social media content for young and news-avoiding users, it is advisable for future studies to examine (the impact of) such posts.

Second, footnote journalism as a practice is borrowed from scientific work, and our sample is therefore inevitably science journalism-heavy. Some results, such as the relatively high number of scientific sources and the topical focus on health, must be understood against this backdrop. The latter could also be related to the start of our data collection, which was in the second year of the COVID-19 pandemic. Therefore, frequencies we found in our study must be interpreted with caution.

Third, our study was conducted exclusively in one country. To substantiate our results, replications in other geographical contexts are necessary.

A final restriction concerns our codebook. Some rather broad categories should be operationalized in more detail in future studies, in order to increase validity. This applies in particular to the category of private/commercial sources, which encompasses not only profit-oriented companies but also associations, interest groups, NGOs, and science-oriented commercial research institutes. The same applies to the category of event-/case-based statements, which includes descriptions of reality both in the form of qualitative study results and in the form of real-world case and event reports. However, dividing these variables into several categories might have led to reduced reliability; thus, after intensive discussion and test coding, we ultimately decided against it.

Conclusion and outlook

We have shed light on a novel journalistic practice that we term *footnote journalism*. By examining footnote journalism through content analysis, we were able to generate

insights into the types of sources used in footnote journalism and the types of statements substantiated by this practice. Our results show that footnote journalism appears to meet scientific standards but is quite narrow in scope in terms of subject matter.

The next step should involve further analysis of the perspectives of journalists and audiences using qualitative interviews, surveys, and experimental designs. Expert interviews could explore journalists' motivations to engage in this practice. In order to facilitate the acquisition and dissemination of knowledge, scientists need to learn how journalists deal with scientific publications: for example, is there time in the hectic editorial routine to read and understand a study in full? Additionally, influences on the selection, presentation, and impact of sources should be further investigated. Experimental studies similar to the one by Curry and Stroud (2021) could examine differences between footnote journalism and traditional hyperlinking in terms of credibility ratings, news engagement, or willingness to pay. Qualitative insights could also explore and explain such differences in more depth.

Notes

1. For reference, see the documentation provided online: <https://tinyurl.com/dyxusucr>
2. For reference, see a complete overview of the search results online: <https://tinyurl.com/dyxusucr>
3. As of December 2024.
4. For reference, *Süddeutsche Zeitung*, the national quality news outlet with the highest print circulation in Germany, has 846,000 Instagram followers (*Süddeutsche Zeitung* n.d.).
5. In addition, *WDR* produces a TV show, a radio show, and several podcasts under the *Quarks* branding.
6. This category was split in two sub-categories ("event reports" and "other statements about reality", such as qualitative study results) in a first version of the codebook, but the two were later combined for reliability reasons. For details, see the limitations section of the study.
7. For *MaiThink X*, we could not exclude the pretest material from the analysis, as this would have substantially reduced the final sample size for this outlet. During the actual coding, pretest cases were recoded by individual coders, without consulting the pretest coding.
8. For the remaining cases, the author profession was unclear.
9. Proportions differed significantly from statistical expectations ($p < .05$) for all types of sources except for freely accessible journalistic sources.

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