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Medienanalyse
By Prof. Dr. Werner C. Barg
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(Studienkurs Medien & Kommunikation)
In German

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FULL PAPER

Who dominates the discourse on text-generative artificial intelligence? The presence of performative, epistemic and evaluating experts in German newspaper coverage of an emerging technology

Wer bestimmt den öffentlichen Diskurs über textgenerative Künstliche Intelligenz? Die Präsenz performativer, epistemischer und evaluierender Expert:innen in der deutschen Berichterstattung über eine aufkommende Technologie

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Abstract: The public AI discourse is shaped by visions and interpretations that influence how this emerging technology is perceived, assessed, developed and applied in society. Generating acceptance for a particular vision has thus become a central objective for various societal actors engaging with the new technology. Recently, (tech) entrepreneurs appear to have been more successful than others in advancing their visions of AI. Assuming a powerful journalism in selecting actors and presenting their statements to the public, several scholars attribute this disproportionate influence to an economically biased media coverage of AI. We propose a conceptual framework that distinguishes actors according to their AI-related expertise and apply it in a semi-automated content analysis of the media coverage of text-generative AI tools such as ChatGPT in German print media. Within the articles published between November 2022 and April 2024 in ten newspapers, scientists and entrepreneurs were the most frequently represented groups. Business-related practical expertise regarding AI development dominated the debate compared to science-related epistemic knowledge about the technology's functionality or its professional impact assessment. Our findings nuance the presumed dominance of economic actors in the mediated AI discourse by revealing a nearly balanced appearance of scientists and entrepreneurs. The results point to a shortage of independent evaluations of the technology's functionality in the form of epistemic expertise.

Keywords: Artificial Intelligence, Large Language Models, ChatGPT, experts, technology journalism

Zusammenfassung: Visionen und Deutungen über KI im öffentlichen Diskurs beeinflussen nicht nur, wie die rasant aufkommende Technologie innerhalb einer Gesellschaft wahrgenommen und beurteilt wird, sondern auch deren Weiterentwicklung und Anwendung. Gesellschaftliche Akteur:innen, die sich mit KI befassen, versuchen deshalb, öffentliche Akzeptanz für ihre Visionen zu erzeugen. Besonders erfolgreich scheinen dabei in jüngerer Vergangenheit Vertreter:innen profitorientierter Unternehmen zu sein. Nicht selten wird dem Journalismus, der diese öffentlichen Stimmen auswählt und präsentiert, eine zuguns-

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ten wirtschaftlicher Akteur:innen verzerrte KI-Berichterstattung unterstellt. In unserer Studie sollte diese Annahme mithilfe eines hierfür entwickelten Modells zur Unterscheidung verschiedener medial sichtbarer Akteur:innen – unter anderem hinsichtlich ihrer KI-bezogenen Expertise – kontextualisiert werden. Dafür untersuchten wir die Akteur:innenstrukturen in der Berichterstattung über textgenerative KI wie ChatGPT in zehn ausgewählten deutschen Zeitungen im Zuge einer halb-automatisierten Inhaltsanalyse. In den zwischen November 2022 und April 2024 veröffentlichten Artikeln kamen vor allem Repräsentant:innen wissenschaftlicher Institutionen und profitorientierter Unternehmen zu Wort. Die meisten dieser Akteur:innen wiesen praxisbezogene, oft mit KI-Firmen assoziierte Expertise in der KI-Entwicklung auf. Vorwiegend wissenschaftliches, epistemisches Wissen und professionalisierte Evaluationskompetenz hinsichtlich der Technologie waren entsprechend zweitrangig. Die hier vorgebrachten Ergebnisse perspektivieren die vermutete Dominanz wirtschaftlicher Akteur:innen im öffentlichen KI-Diskurs, indem sie eine nahezu ausgeglichene Inklusion wissenschaftlicher Stimmen herausarbeiten, jedoch auch auf fehlende unabhängige Einschätzungen der Technologie in Form epistemischer Expertise hinweisen.

Schlagwörter: Künstliche Intelligenz, Large Language Models, ChatGPT, Expert:innen, Technologieberichterstattung

1. Introduction

There is no shortage of interpretations in the AI discourse: Like Google CEO Sundar Pichai, some believe that artificial intelligence will have an enormous positive impact on the lives of modern humans, comparable to the mastery of fire (Pichai quoted by Acemoglu & Johnson, 2023, p. 30). Others, such as OpenAI's Sam Altman, express concerns that the technology's development could "go quite wrong" and cause "significant harm to the world" (Altman quoted by Zorthian, 2023). Still others foresee AI "to be either the best or worst thing to happen to humanity" (Elon Musk quoted by Harroch & Harroch, 2025), combining techno-euphoric promises of a better future with warnings about underestimating technology's dangers.

Such visions put forward by prominent (tech) entrepreneurs are common in emerging technology debates (e.g., Sun et al., 2020, p. 13). When they prevail over competing interpretations and crystallise into publicly shared "sociotechnical imaginaries," they play a significant role in shaping "the design and fulfillment of […] scientific and/or technological projects" (Jasanoff & Kim, 2009, p. 120). Utopian or dystopian AI narratives are not necessarily viewed as destructive, but rather beneficial for social and technological progress in modern societies (Roßmann, 2021) – even when articulated by profit-driven tech CEOs. Such statements made by entrepreneurs may become problematic in socio-political decision-making on AI: Firstly, they tend to depict AI as monolithic technology without reflecting the technological specificities of different forms such as generators, Large Language Models (LLMs), medical AI, or AI associated with robotics. This can mislead public perception of specific AI technology (e.g., Mustaklem, 2024) and thereby bias or obstruct citizens' engagement in or legitimation of democratic decision-making. Secondly, these sociotechnical imaginaries established by profit-oriented actors often overstate, downplay, or obscure uncertainty

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and risk inherently entangled with modern scientific and technological progress to serve self-interest purposes. Many believe that in modern risk-weighted societies, "there can only be one authority left, and that is science" (Beck 2003, p. 259), leading to calls for improved communication of scientific AI research (e.g., Hoos quoted by Henschel, 2023).

As Beck (2003, p. 259) contends, this view represents "a complete misunderstanding" of science and risk. Our study does not draw on those calls for better science communication or more frequent inclusion of scientists to the debate to drown out the voices of tech entrepreneurs. We interpret the demand for increased scientific presence in the public AI discourse as indicator of the various values at stake under post-normal conditions (Funtowicz & Ravetz, 1994, p. 1882), closely tied to emerging technology development. Assessments of AI and its application should be debated in a deliberative, hence inclusive and balanced, manner (cf., Habermas, 1998). Journalistic media organising and representing the respective public debate are urged to bring actors to the front who can provide the range of information and perspectives necessary for the (lay) public and other stakeholders to participate in societal decision-making around AI. Invited actors – particularly those introduced explicitly as experts – are expected not only to prioritise the public good over the pursuit of their partial interests, but also to possess relevant expertise.

Journalistic media "can wield considerable power in shaping the discursive expectations of AI" (Brennen et al., 2022, p. 29) by determining not only "who gets to speak in the news" (Beckers & Van Aelst, 2019, p. 886), but also making recognisable the publicly demanded and/or needed expertise(s) of the included actors. According to some scholars' reports of biased media coverage in favour of economic subjects and sources (e.g., Fischer & Puschmann, 2021, pp. 8, 22; Kieslich et al., 2022, p. 6), journalists have not lived up to this responsibility in their coverage of AI.

There is a lack of systematic analyses that could substantiate this criticism. Among the many studies on media coverage of AI (e.g., Köstler & Ossewaarde, 2022; Vergeer, 2020), most focus on technology's representation. A variety of studies describe frames and narratives surrounding AI in the media (e.g., Cools et al., 2024; Vrabič Dežman, 2024). These studies have generally found an optimistic depiction of AI in the news, emphasizing potentials in supporting human evaluations, for example, in medical contexts, or more prominently focusing on promises associated with the technology's industrial application (e.g., increase in labour efficiency & economic growth). These frame analyses predominantly extrapolate topics and evaluations (e.g., tone of the articles, risks/benefits, depiction of AI as threatening) from the news coverage, while only a few studies examine actors or sources (e.g., Brennen et al., 2018, p. 3). The few studies that have analysed actor constellations solely focus on manifest features like gender, national localisation, or institutional affiliation (e.g., Sun et al., 2020, p. 11), rather than on expertise directly.

We aim to provide a systematic description of the participants in this mediated public debate by using the German media discourse on text-generative AI as a case study for the broader discussions surrounding AI and emerging technolo-

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gies[1]. We analysed the constellation of active speakers focusing on who they are and how they are engaged with AI. The empirical basis for this description is a semi-automated analysis of articles about text-generative AI published in ten German newspapers between November 2022 and April 2024. We propose a new approach to categorise cited actors in technology debates by considering their AI-related expertise (referred to as (LLM/AI) expertise). After outlining the role of experts in the journalistic construction of public AI discourse and introducing the concept of expertise alongside a typology of experts as well as our methodological approach, we present the findings of our analysis. The paper concludes with a discussion of the limitations underlying our findings and their implications for future research, as well as the journalistic representation of AI discourses.

2. Theoretical framework: Experts and expertise in public discourses

Experts are actors who not only possess special knowledge in a well-defined domain, but who are also able to relate this knowledge to problems outside of the respective domain and thus serve as consultants in decision-making processes tangential to their expertise (Peters, 1994, p. 166; 2014, p. 72). Being (called) an expert usually goes hand in hand with a social responsibility that becomes particularly relevant when other societal actors (e.g., politicians, citizens, journalists) must decide on issues they cannot experience by themselves due to continual differentiation of modern societies (Schimank, 2005, pp. 79–82). Experts become highly socially relevant and powerful (Giddens, 1991, p. 27; Reed, 1996, p. 574), even though they are commonly vaguely described as "source[s] of special knowledge" (Gläser & Laudel, 2010, p. 12) representing theoretical and factual understanding ("knowing *that*") and/or practical proficiencies ("knowing *how*") (Weinstein, 1993, p. 58). While this definition seems appropriate in a macroscopic perspective, it provides some inconsistencies in terms of content and practical implementation in particular societal contexts (Bogner et al., 2014, pp. 10–11), including mediated technological debates such as the public discussion on generative AI (genAI).

2.1 Role of expertise in the journalistic construction of public discourse

Applying a broad definition of expertise, journalists covering AI topics primarily view experts as providers of information, like accurate factual explanation or contextualisation (Huber, 2014, p. 69). Given a lack of professional training or restricted resources for investigation (Brennen et al., 2018, p. 2), most of these "authors with insufficient knowledge of AI technology" (Ouchchy et al., 2020, p. 934) are reliant on their translations of knowledge to accurately report on the

1 The constraint to the discourse of text-generative AI/LLMs was necessary to examine different expert types due to the contradictoriness of the domain-specificity of expertise(s) and the variety of AI technologies featuring different characteristics, functionalities, operating modes, etc. that might be interrelated with diverse skills, experiences and knowledge, e.g., an expert on robotics might as well be an expert on AI-based robots, but not on AI-based text-generators.

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associated issues (Banholzer, 2015, p. 20) and serve as "knowledge brokers" (e.g., Meyer, 2010) for the public.

AI experts – like all members of society – hold views on different aspects of AI and are not merely neutral information sources to be passively consulted by journalists. They actively contribute to the public AI discourse (Huber, 2014, pp. 43–61). As such "public experts" (Peters, 2014, p. 70) who try to attract public attention and secure acceptance for their messages, they are evaluated by journalistic gatekeepers concerning different selection criteria, which Nölleke (2013, p. 348), drawing on the theory of news values (Galtung & Ruge, 1965), refers to as "expert factors".

For Nölleke (2009, p. 107), the so-called "expert value" is mainly derived from assigned practical (e.g., accountability, reliability) or superficial characteristics (e.g., prominence, attractiveness, linguistic conciseness). Other scholars consider their strategic usefulness to be a relevant selection criterion, for example as sources of authority (Albæk, 2011, pp. 337–338), credibility (Boyce, 2006, p. 890), and objectivity (Steele, 1995, pp. 800–801), or as "opportune witnesses" (Hagen, 1993) who help to reinforce a journalist's argumentation. In both approaches, the substance of expertise is only briefly addressed. We consider this a shortcoming, as we assume in debates surrounding the assessment of emerging technologies – where at least a basic understanding of the technology and its risks and benefits is required – factual expertise serves as an important selection criterion. This especially applies to actors lacking direct political power, whose expertise is a main source of "communicative power" (e.g., Flynn, 2014, p. 210) and therefore constitutes legitimacy for the inclusion in public debates (Gerhards & Neidhardt, 1990, p. 11).

2.2 Scientific experts in the media and newspaper coverage of AI

As it is difficult (or even impossible) to measure expertise in content analysis of media texts, many examinations of expert voices in the news (e.g., Laursen & Trapp, 2021; Peters, 1994; 2014) use a simplified operationalization of expertise. Following a narrow definition, these studies equate experts with scientific representatives and count references to scientists to quantify public presence of experts in mediated science discourses (e.g., Albæk et al., 2003; Lehmkuhl & Leidecker-Sandmann, 2019; Peters, 1994; 2014).

While there have been, to our knowledge, no attempts to explore experts' role in media coverage of AI, some scholars have distinguished sources or actors in media discourse according to societal groups commonly derived from systems theory or Habermas' centrality-periphery model (e.g., politics, economy, science). According to these studies, AI discourse is dominated by entrepreneurs, followed by scientists (e.g., Brennen et al., 2018, p. 4; Fischer & Puschmann, 2021, p. 24). Based on the narrow definition of experts as scientists, these observations might lead to an impression of lacking expertise in the mediated AI debate.

For an initial assessment of the presence of expertise in the media discourse on text-genAI, we will follow this operationalization and compare the presence of actors from different societal areas:

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RQ1: How often do scientists get to speak in German news media articles about text-generative AI compared to other societal actor groups (e.g., politicians, stakeholders of non- or for-profit organisations, cultural actors, education representatives)?

This concept of expertise has at least two weaknesses: First, it ignores the potential of actors from other societal groups to contribute substantial expertise to public discourses (e.g., Laursen & Trapp 2021). Second, it is unable to distinguish different forms or roles of expertise discussed in the literature on expertise (e.g., Collins & Evans, 2018; Priaulx et al., 2016). Analyses that use a more nuanced definition of expertise arrive at different assessments of experts' public presence. For example, Chuan et al. (2019, p. 3), who contrasted researchers (n = 116, 29.1%) and "non-science experts (e.g., scholars in ethics)" (n = 94, 23.6%) with individuals associated with companies or businesses (N = 258, 64.7%)[2] in US newspaper coverage of AI, found a nearly balanced inclusion of expert (scientists + non-science experts) and business sources.

Building on that yet (at least analytically) exceptional thought of another form of expertise complementing, counteracting or accompanying the scientific expert perspective on AI, we reconsider the concept of expertise and the role of experts in mediated public discourses to provide a more sophisticated picture of the forms of expertise present in the public discourse on LLMs. We attempt to combine different perspectives of expertise in a multi-level model of (LLM) expertise beyond the narrow attribution of expertise to scientific actors. It restricts the application of the concept to actors that either need some expertise to be invited to the public discourse or to justify their active role in the public arena[3].

2.3 Types of experts on LLMs

Following Weinstein (1993, p. 58) and Collins and Evans (2007, 2018, pp. 23–28), we understand expertise as a "social fluency" eliciting different social roles assigned to different actors within a given domain. It is generated through socialisation (expertise in the narrow sense) and externally realised through consultation by third parties (expertise in the broad sense). In the context of genAI, socialisation refers particularly to the acquisition of special knowledge and/or skills related to genAI – like understanding for scientific and technological processes, development or evaluation skills – through experience within social groups (Collins & Evans, 2018, p. 23). Third-party consultation relates to the external recognisability of acquired or presumed AI knowledge. It is linked to the aforementioned "expert factors" and their allocation to "expert values", central to the journalistic const-

2 Sum of percentages is greater than 100% because some of the 399 analysed articles included several sources, separately counted without mentioning the total number of sources identified.

3 At this state, we only want to examine expertise as an actor characteristic enabling active shaping of the discourse and not (the justification of) the shaping of the discourse by various experts, e.g., by giving specific statements, framing the subject-matter in a certain way, itself. Our approach to distinguish public actors by their expertise(s) is therefore, pending follow-up studies testing our attempt of systematisation in other contexts, e.g., by relating expertise to contents of statements, mainly to be interpreted with respect to that premise and/or limitation at the same time.

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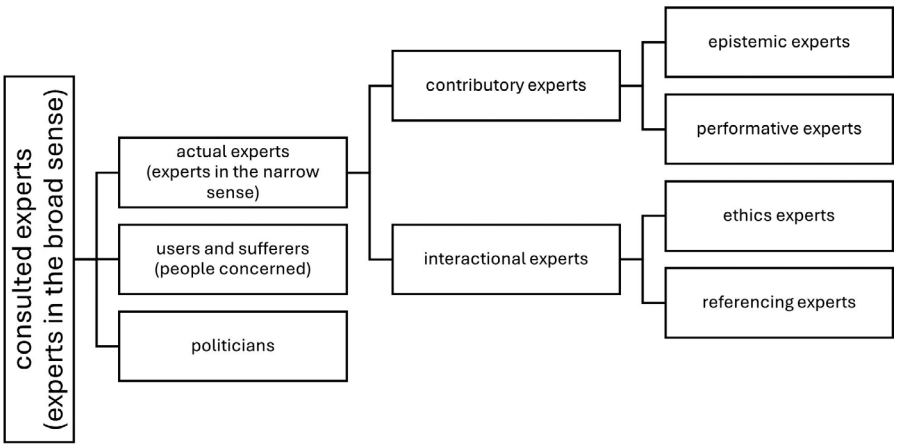
ruction of expertise in public discourse. These factors are often associated with the acquisition of expertise through socialisation, but not limited to it.

This implies subject-specific knowledge and skills of experts in public discourses are at least complemented, in some cases even replaced or predominated by other, more superficial or quantifiable traits[4] unrelated to the actual discourse subject of AI. Actors lacking AI expertise in the narrower sense may still be presented to the public as experts if they possess otherwise inaccessible or intangible information of interest to journalists. Our proposed model starts on a superordinate level (Fig. 1): Experts by designation (or experts in a broad sense) are all actors consulted by a third party (in this case, journalists) to provide information on a specific topic (e.g., LLMs).

Figure 1. Public actors in the discourse of genAI regarding their LLM expertise



Taking up Bogner et al.'s (2014, p. 10) critique of this constructivist concept of expertise ("is not then everyone an expert?"[5]), we further differentiate this broad group in the second level of our model based on the subject-related knowledge that actors can contribute to a specific debate. We distinguish distributors of certain AI-related opinions, decisions or political processes and/or first-hand experiences (politicians or people who are confronted with AI in their everyday life, e.g., through usage, by experiencing negative consequences) from subject-specific or professionalised LLM experts. Sometimes, the first form of contributions is conceptualised as subject-detached expertise such as political expertise (Weinstein, 1993, p. 57) or "anecdotal evidence" (Moore & Stilgoe, 2009, p. 654) which can be found across all sectors of society, treating a scientist not conducting AI research but using LLM-based technologies, for example, to write papers equally to a pupil using AI for homework, or a musician generating song lyrics with its help.

4 For example, reputation (Leidecker-Sandmann et al., 2022; Peters, 1994, p. 180), authenticity (Collins & Weinel, 2011, p. 404; Nölleke, 2009, p. 107), or innate characteristics like gender (Niemi & Pitkänen, 2017) and nationality (Nölleke, 2013, pp. 311–312).

5 Translation of the German original quote "sind dann nicht alle Menschen Experten?"

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Here, the differentiated approaches to expertise(s) by Weinstein (1993) and Collins and Evans (2007, 2018), as well as the still controversial concept of moral expertise (e.g., Priaulx et al., 2016) are not applicable, as they presuppose the property of subject-specific expertise through socialisation within eligible collectives (Collins & Evans, 2018, p. 23). In the third and fourth levels of our model, we focus on professionalised LLM expert types (here called *expert status*).

2.3.1 Experts in a narrow sense – Experts with professionalised and subject-specific expertise

Experts in a narrow sense have acquired domain-specific knowledge and skills through education and professional training within social groups already possessing these competencies. They can provide specialised information to the public, which can be assigned specific functionalities, particularly the promotion of techno-scientific rationality to protect the dominant knowledge order (Neuberger et al., 2019).

Following Collins and Evans (2007, p. 24, 2015, p. 119), we propose to differentiate this group into "contributory experts" and "interactional experts". "Contributory experts" are people whose knowledge enables them to actively contribute to a specific domain, promoting progress. This "ability to *do* things within the domain of expertise" (Collins & Evans, 2007, p. 24) can be realised in an epistemic or performative sense (Weinstein, 1993, p. 58). While epistemic expertise is based on theoretical knowledge, including factual understanding and the capacity to apply it to explain, justify and produce further knowledge, performative expertise is related to the mastery of a concrete skill in the respective domain without necessarily knowing how to explain it. Epistemic AI experts are actors who, while committed to scientific methods and standards, produce new knowledge or investigate, discuss, and contextualise existing knowledge about genAI technologies (e.g., how they work, effects, limitations). They can be found in university and non-academic AI research, not focussed on programming and invention of concrete technologies/applications but on the LLM/AI phenomenon and its further development as such, irrespective of whether their work is connected to pure science or company-bound. A prime example would be Kristian Kersting, who is Professor of Artificial Intelligence and Machine Learning at the Technische Universität (TU) Darmstadt.

By contrast, performative AI experts are actors with technical skills to develop concrete AI applications, not necessarily able to explain how these systems function or have evolved in detail. These are usually developers, IT specialists or similar in tech companies, but also hobby developers and "tinkerers", such as Blake Lemoine, a now freelance software engineer and former part of the Google team that developed LaMDA.

"Interactional experts" are people who act as mediators in interdisciplinary settings. In the context of AI, these experts do not contribute directly to the development or study of AI technologies, but otherwise intensively engage with it, for example, through non-scientific research, artistic examination or moral/legal as-

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sessments. This engagement enables them to understand the outputs of contributory experts in detail and communicate with them competently (Collins & Evans, 2015, p. 119). Such protracted "enculturation" (Collins & Evans, 2007, p. 30) underlies the "referencing expertise" (e.g., John Thornhill, a tech columnist and "Innovation Editor" for the Financial Times or German blogger Andre Wolf, who works for the Austrian initiative "Mimikama", specialised in the field of detecting fakes and scams on the internet) originally described by Collins and Evans (2015), and the still controversial "ethical expertise" (Weinstein, 1994, p. 61).

The latter is represented by actors with publicly accepted moral sovereignty (Priaulx et al., 2016, p. 403) who have accumulated a state of knowledge about genAI through research and discussion, which allows them to evaluate the technology and make informed moral judgements.[6] As we assume to find other non-technical evaluations of the technology and its societal consequences not exclusively linked to moral aspects, we propose broadening this concept and speaking of actors with "evaluating expertise". In this group, ethical experts are joined by other experts in technological impact assessment, including law scientists and ethicists as Sandra Wachter, a Professor of Technology and Regulation specialised on ethics of AI at the Oxford Internet Institute, Alena Buyx, a member of the German Ethics Council, or social scientists and psychologists like Peter Gerjets, a German education researcher and cognition scientist at the Leibniz-Institut für Wissensmedien who researches on the co-creation of narrative texts with LLMs and its impact on producers and recipients.

Given the absence of formal training pathways and standardised qualifications, evaluating and referencing expertise are more fluent concepts than epistemic and performative expertise. They can be acquired in greater variety of social groups depending on the final configurations of these expertises (e.g., among artists, ethicists, or journalists, within advisory boards). This type of expert status cannot be derived from an actor's societal localisation. The description of their engagement with the subject matter and the statements given by these actors usually indicate these interactional forms of expertise. For example, a comedian using ChatGPT to create jokes is no subject-specific LLM expert, whereas the German theatre writers Ulrich Greb and Sandra Höhne, who have artistically looked into the subject of LLM-based androids imitating family members and keeping them alive after death in a play for the Schlosstheater Moers, may be assigned such expertise.

6 Ethical or moral expertise refers to "the ability and capacity to exercise moral judgement" (Priaulx et al., 2016, p. 395). It is mostly debated regarding expertise of philosophers and ethicists questioning whether and how their moral considerations differ from ubiquitous moral assessments to be made by laypeople to advance in everyday life or if it is possible/justifiable to ascribe authority in moral decision-making to these (or other) actors. Since normative values are central to this debate, this concept is highly controversial in the scientific community and cannot be sufficiently addressed in this paper. The here given definition of "ethical experts" is to be considered as preliminary and shall not ultimately answer the question if moral expertise is possible. Neither shall it contribute to the normative debate on whether ethical experts are desirable in a democratic society. For further information we recommend amongst others the publications of Singer (2006) or Weinstein (1994).

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2.3.2 Proposed systematisation of public LLM experts

Our proposed systematisation to capture and distinguish public LLM experts consists of four levels that can be assessed stepwise. At first, all actors consulted by journalists to provide information on LLMs are called experts in the broad sense. These can be distinguished into "politicians", "people concerned" and "subject-specific experts (experts in a narrow sense)". The latter are then further divided, based on their ability to contribute to the domain, into contributory and interactional experts. These two types of experts are classified according to the form of their expertise (knowledge vs. skill, assessment vs. systematic reprocessing) into epistemic, performative, evaluating, and referencing experts.

As we consider this integrative model to capture the speaker constellation in the public LLM debate rather than the isolated examination of their societal origins (e.g., politics, civil society, science), we apply this model by examining the following question:

> *RQ2: In which AI-related (expert) roles do the different actors become visible in the German media coverage of LLMs?*

Given the rapid development and spread of the AI technologies (Rotolo et al., 2015) under discussion, we expect the aspects requiring societal evaluation and bringing actors not directly devoted to technology development to the fore (e.g., "non-science experts" according to Chuan et al., 2019, p. 3) will evolve (Solomonoff, 1985). There may be observable changes in the composition of the speakers invited to the public arena, motivating our final research question:

> *RQ3: (How) Does the composition of speakers regarding their societal origin and contributed LLM expertise in the public discourse of LLMs change over time?*

3. Methods

We conducted a semi-automated quantitative content analysis of articles about text-genAI published in ten German newspapers from November 1, 2022–April 1, 2024. As a starting point of our inquiry period served the publication of the chatbot ChatGPT. We deliberately selected different German print media titles included in the database LexisNexis that can be regarded as a small extract of the German print media landscape. Namely, we analysed coverage in the national quality and tabloid newspapers and press magazines *BILD*, *Die Welt*, *Die Zeit*, *Der Spiegel*, *Stern* and *taz, die tageszeitung* which are considered as leading me-

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dia[7], as well as in the regional newspapers *Nürnberger Nachrichten*, *Stuttgarter Zeitung*, *Rheinische Post*[8] and *Der Tagesspiegel*. As we could not include regional newspapers representing all geographical regions of Germany due to resource restrictions, we chose these four high-circulation regional newspapers from the three most populated federal states and the German capital indicating a high importance of these media outlets in the regional representation of public discourses. Within this media sample, we considered every article as relevant that dealt with the topic of text-genAI. Conversely, articles exclusively reporting on other types of AI (e.g., robotics, industrial AI, medical AI), AI in general without mentioning LLMs or other genAI such as image, voice or video generators like Midjourney or DALL-E were excluded from the sample since their different or additional characteristics (e.g., different central aspects like deep fakes, purposes and potentials) might lead to other debates. We developed several search strings through systematic reviews of previous content analyses and recent media coverage on the topic and double-checked this manual identification of keywords with a computational topic modelling approach to assure that no central keywords were overlooked. This resulted in 20 different strings that were systematically compared by using evaluation criteria for automated classifications (Scharkow, 2012, pp. 133–136)[9]. As a result of this, we chose the string "LLM OR "Large Language Model" OR (Text* AND ("KI" OR "künstlich* Intelligenz") AND NOT Textil) OR ChatGPT OR (generativ* AND ("KI" OR "künstlich* Intelligenz") AND Text)"[10] (Recall = 1; F-Score = 0.78) to search for relevant articles.

3.1 Sample

After manually removing irrelevant documents and duplicates, the final article sample comprised 905 articles published between November 1, 2022, and April 1, 2024, accounting for 0.11% of the news by the ten selected German media titles. While most of the articles were published at the beginning of 2023, only a few articles (n = 19) were released before or shortly after the launch of ChatGPT in November and December 2022 (Fig. 2).

7 Due to database restrictions and limited time and personal resources (data collection in the course of a master's thesis) affecting the presented research, we could not include the national newspapers *Süddeutsche Zeitung* and *Frankfurter Allgemeine Zeitung*. As they are influential leading media, this is a limitation to our study that needs to be considered when interpretating the presented results. Nevertheless, through the inclusion of various national and regional media outlets representing different localisations within the political spectrum (e.g., Scheufele & Engelmann, 2013, p. 538), we hope to have minimised the impact of the deficiency of these two sources.

8 Including the locally available *Solinger Morgenpost*, *Bergische Morgenpost* and *Neuss Grevenbroicher Zeitung*.

9 A detailed documentation of this procedure is provided as supplementary material.

10 English translation: "LLM" OR "Large Language Model" OR (text* AND ("AI" OR "artificial intelligence") AND NOT textile) OR ChatGPT OR (generative AND ("AI" OR "artificial intelligence") AND text)

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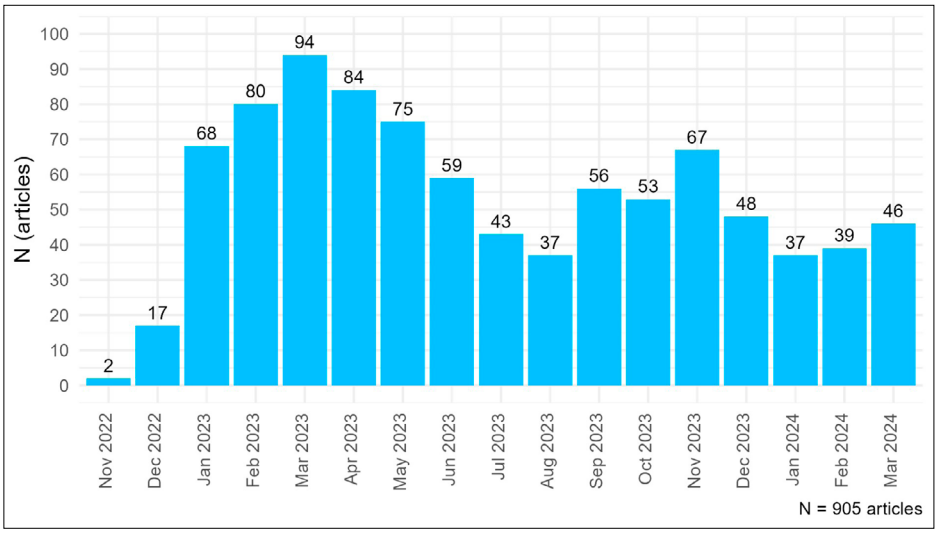
Figure 2. LLM-centred articles published between November 1, 2022, and April 1, 2024, in ten German newspapers by month of publication



3.2 Semi-automated content analysis

To identify all individual actors within the observed media coverage, we applied a Named Entity Recognition (NER) model named flair/ner-german from the Python package 'flair' (version 0.13.1; Akbik et al. 2018) to extract all personal names in the analysed news coverage validated in an earlier study (F-Score = 0.89–0.90) by Buz et al. (2021, p. 611). We automatically identified 10.422 entities in 851 articles.

After excluding identified non-human entities (e.g., companies or AI models) and persons not directly or indirectly quoted at least once, we characterised each quoted actor by manually coding nine different variables. Beneath the actors' names and institutions/organisations, we recorded gender and national localisation as established potential expert factors by Nölleke (2013, pp. 307–312) and Huber (2014, pp. 113 & 120–122).

We also captured the societal origin of the speakers (RQ1). Following the classification of social domains prevalent in systems theory (e.g., Luhmann, 1987) and the centrality-periphery model (Habermas, 1998), we distinguished different political areas (executive, administration, legislative) from peripheral domains, namely science, scientific administration, medicine, stakeholder organisations (non- and for-profit organisations) and other areas like culture, journalism, and education. For scientists, we coded whether their research was associated with organisations with partial interests (dependent research) or conducted independently (e.g., universities or independent research institutes, scientific discipline).[11]

11 Classification was adopted from the Deutsche Forschungsgemeinschaft (DFG): https://www.dfg.de/resource/blob/172316/5863ef132d178054609f74940f6a27c9/fachsystematik-2016-2019-degrafik-data.pdf.

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To evaluate the LLM expertise (RQ2), we developed four variables indirectly indicating the expert status of an actor. The first of these variables indicated whether a speaker voiced at least one statement about LLMs, as this is necessary to be regarded a public LLM expert, due to the domain specificity of expertise. In a second step, we measured whether an actor was explicitly labelled "expert" in the article and, if not, whether they contributed information not only accessible for insiders (e.g., corporate processes/secrets, whistleblowers[12]). If one of these requirements was fulfilled, the type of expertise provided by the regarded actor was coded. Based on the content of the expressed LLM statements[13], we differentiated between contributions to LLM development and/or research, descriptions of applications and usage experiences with genAI, or reflection of LLM contexts (e.g., ontological localisation of AI) and societal/ethical consequences. To code this indicator variable, not every single statement of an actor was analysed, but the content-related "tendency" (or majority in a non-quantitative way) of the statements served as basis for the coding decision. If actors mainly describe how they use ChatGPT to formulate answers to e-mails, the code "LLM application/usage" is chosen; if they speak mostly about the steps they took to train or program a new LLM, the code "LLM development/research" is applied, and so on. These conditional and descriptive variables were automatically aggregated with the actor's societal area to define the final expert status (performative expert, epistemic expert, evaluating expert, other expert, politician, person concerned) via a Shiny app used for the coding procedure. The codebook, including a further description of this automatic derivation of the expert status, is provided as supplementary material.

We attempt to illustrate our coding procedure with the following example from a text in our sample: "Even before Christmas, the hype was so great that the founder of OpenAI, Sam Altman, issued a warning on Twitter: 'ChatGPT is incredibly limited, but good enough at some things to create a misleading impression of greatness.'"[14]

1) As the given quote of Sam Altman clearly addresses Large Language Models (a specific application of LLMs in ChatGPT), he is recognised as an actor with an LLM statement, which makes it possible that he contributes LLM expertise to the debate.

12 Actors who only provide insider information (e.g., trade secrets) becoming public solely through their appearances (e.g., whistleblowers) are not to be considered as experts in the narrow sense as their "special knowledge" cannot be consulted by third parties because they usually do not know "how to ask for that information" or that this information exists without being tipped off by the insiders.

13 We did not further analyse the content of the statements. They served only as an indicator to assess the "expert characteristic" of an actor. What distinguishes expert from non-expert contributions on a content-level therefore remains unanswered but serves as an starting point for future studies.

14 Original quote: „Schon vor Weihnachten war der Hype so groß, dass der Gründer von OpenAI, Sam Altman, sich warnend auf Twitter zu Wort meldete: ‚ChatGPT ist noch unglaublich beschränkt, aber gut genug, um den missverständlichen Eindruck von Großartigkeit zu erwecken.'" (Tagesspiegel (25.01.2023). Wenn der Computer die Feder führt. [When the computer puts pen to paper.] *Der Tagesspiegel*, p. 26)

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2) The article is scanned for any explicit expert designations referring to Altman. If there is at least one (e.g., "AI expert Altman"), the following variable is skipped.
3) If no expert designation is identified, it is checked whether Altman provides insider information excluding him from being considered an expert by considering all his statements within the article. The presented quote does not distribute insider information, as the content expressed is (theoretically) available to other persons who have used ChatGPT. Altman is therefore still regarded as a potential expert and the coding continues.
4) Since Altman is associated with OpenAI, an AI developing company, his expert status can be derived from his societal position. He is coded as an actor with expertise in LLM research/development. If his position had not been this clear, for example, if he was a cultural actor, the content of his statement(s) would have been consulted to decide on the expertise provided. For this statement, one would probably code "other" as no other value provided seems suitable[15].

This stepwise and conditional identification of the various expert types might seem more complex than a direct coding of the expertise that an actor provides. However, it proved to be better applicable and more accurately reflecting the theory-bound model than a more straightforward option, where the coders had to directly decide on whether an actor is an expert and their domain of expertise.

Two pretests with two coders based on 200 actors each were used to refine the newly added expert variables (Krippendorff's α for expert status of 0.673 in pretest 1 and 0.897 in pretest 2). After satisfactory reliability values were achieved, manual coding was conducted by one coder from June 10–21, 2024. We checked the reliability of the codebook via tests of intercoder (same second coder as in the pretests) and intracoder reliability (second coding on June 24, 2024). Krippendorff's α ranged from 0.64 to perfect agreement for intercoder reliability[16] and 0.78 to perfect agreement for intracoder reliability. Even though the intercoder reliability for the newly developed variable "expert status" below 0.8 only allows tentative conclusions (Krippendorff, 2004, p. 429), the overall good reliability measures of the expertise indicator variables indicate our suggested systematisation and its operationalisation are practicable and provide reliable data (Tab. 1).

15 The coders were two of the authors, having basic knowledge of LLMs and being well acquainted with the public discourse on text-generative AI, but do not have in-depth technical knowledge. If actors appeared without affiliation with whom they weren't familiar, they searched the person via Google and attempted to code them accordingly.

16 We are aware that the coefficient of 0.64 lies below the generally accepted threshold for Krippendorff's α, which is why we do not analyse the variable LLM quote beneath its inclusion in the expert status. As the distribution in this variable was skewed and bound to a relatively small number of cases (n = 81), Krippendorff's coefficient might (slightly) underrate the reliability for this category (Vogelgesang & Scharkow, 2012, p. 338).

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Table 1. Overview of inter- and intracoder reliability for each variable

	intercoder reliability (2 coders)		intracoder reliability (06/10-06/21/2024 & 06/24/2024)	
	Krippendorffs alpha	Holsti	Krippendorffs alpha	Holsti
filter				
no person[1]	0.846	0.952	0.982	0.994
already coded[1]	0.992	0.996	1.000	1.000
author[1]	0.941	0.991	1.000	1.000
passive actor[1]	0.817	0.931	0.947	0.982
gender[2]	1.000	1.000	1.000	1.000
national localization[2]	0.745	0.840	0.917	0.945
societal area[2]	0.938	0.951	0.930	0.945
scientists				
scientific dependence[3]	1.000	1.000	0.778	0.952
scientific discipline[4]	0.943	0.957	0.884	0.917
LLM expertise				
LLM quote[2]	0.638	0.852	0.789	0.901
expert designation[5]	0.791	0.942	0.931	0.981
no insider[6]	1.000	1.000	1.000	1.000
LLM expert[7]	0.678	0.773	0.883	0.920
expert status[2]	0.783	0.826	0.936	0.951

coded actors per variable (intercoder | intracoder):
[1] N = 503 | 564 [2] N = 81 | 91 [3] N = 23 | 21 [4] N = 23 | 24 [5] N = 52 | 53 [6] N = 37 | 42 [7] N = 47 | 51

For data analysis and visualisation, the R (version 4.3.2; R Core Team, 2023) packages tidyverse (Wickham et al., 2019), DescTools (version 0.99.54; Signorell, 2024), patchwork (version 1.2.0; Pedersen, 2024), irr (Gamer et al., 2019), and kableExtra (version 1.3.4; Zhu, 2021) were used.

4. Results

In 689 articles, 1247 actors were identified as potential experts, having made at least one statement on LLMs. This corresponds to an average of about two actors with LLM quote (LLM actors) within an article (*SD* = 1.56). Only a few individuals (*n* = 145, 17%), such as Elon Musk (*n* = 33, 2.65%) or Sam Altman (*n* = 32, 2.57%), appeared multiple times in different articles. As these repeatedly quoted actors are outnumbered by actors appearing once (*n* = 715, 83%), this indicates a dispersed actor structure regarding individual persons quoted in LLM articles.

Taking up the assumption of an economically biased public LLM discourse (RQ1), we investigate the distribution of social domains associated with all quoted actors (*N* = 1247) in the LLM discourse. We find a dominance of actors associated with for-profit (*n* = 375, 30.07%) and science organisations (*n* = 372, 29.83%) over contributors from other sectors like education (*n* = 72, 5.77%), culture (*n* = 69, 5.53%) or politics (*n* = 149, 11.95%) (Fig. 3). This difference between scientists and for-profit actors and other groups is significant following a

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Chi² test against the null hypothesis of equal probabilities between scientists/for-profit actors and other groups ($Chi^2(1) = 48.93$, $p < 0.001$). There is no significant difference between scientists and for-profit actors ($Chi^2(1) = 0.01$, $p = 0.913$). If we further distinguish the group of scientists by their research depending on tech companies (e.g., research in company-associated AI labs like Google DeepMind), we see that the share of scientists independent of partial interest organisations is lowered ($n = 318$, 25.50%). If we assume the remaining 4% of scientists bound to for-profit organisations in their research, we see a bigger, significant difference between the share of for-profit ($n = 429$, 34.40%) and scientific actors ($Chi^2(1) = 16.49$, $p < 0.001$) (Fig. 4). While our initial results do not point towards an economically dominated LLM debate as entrepreneurs are nearly equally joined by researchers in the German discourse, we still see a potential overweight of economy-associated actors when we control for scientists bound to partial interests while conducting their research. This result must be interpreted with caution, as we cannot guarantee all the dependent scientists are affiliated with for-profit organisations.

Figure 3. Distribution of all quoted LLM actors according to their social domains (in %)

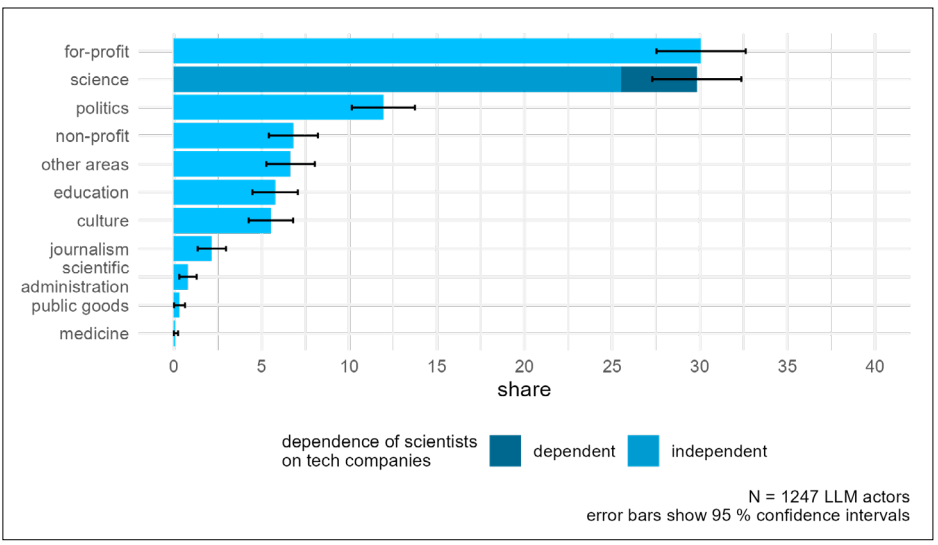

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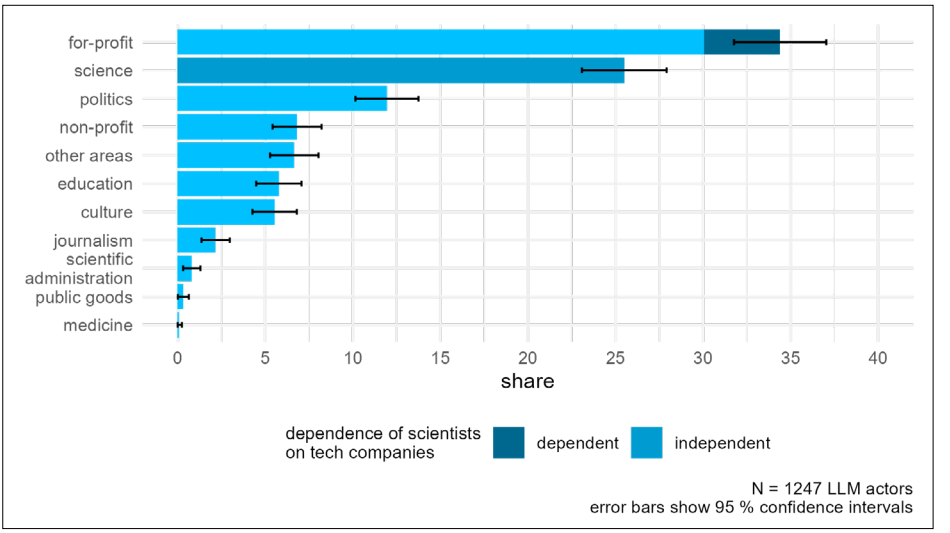
Figure 4. Distribution of all quoted LLM actors according to their social domains with respect to the (assumed) dependence on tech companies of scientific actors (in %)



In the next step, we analyse the actors' expertise based on their societal position and the content of their statements (RQ2).

Focussing on actors that can be assigned an expert status through their societal position or the content of their statements (n = 730, 58.54%), actors acquiring performative expertise, oftentimes associated with AI or software companies (n = 241, 80.97%), are the most frequently selected type of LLM expert (n = 301, 40.95%) ($Chi^2(3) = 122.79$, $p < 0.001$). Contrary to the distribution of the social domains, the commonly science-related actors (n = 147, 98%) with epistemic expertise (n = 150, 20.41%) appear less often in the public arena than speakers expressing evaluating expertise (n = 182, 24.76%) (Fig. 5), however, this difference is not significant ($Chi^2(1) = 3.08$, $p = 0.080$). As the distribution of social domains within these actors shows, the status of evaluating expert can be assigned to various societal actors (Fig. 6). While only about half of them were scientists (n = 92), cultural actors (n = 25, 13.74%; e.g., novelist John Grisham (n = 3, 1.65%)) and non-profit representatives (n = 21, 11.54%; e.g., Ramona Pop of the German consumer organisation VZBV (n = 4, 2.2%)) also played a notable role in terms of this form of expertise.

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Figure 5. Distribution of experts on LLMs according to their type of LLM-related expertise provided (in %)

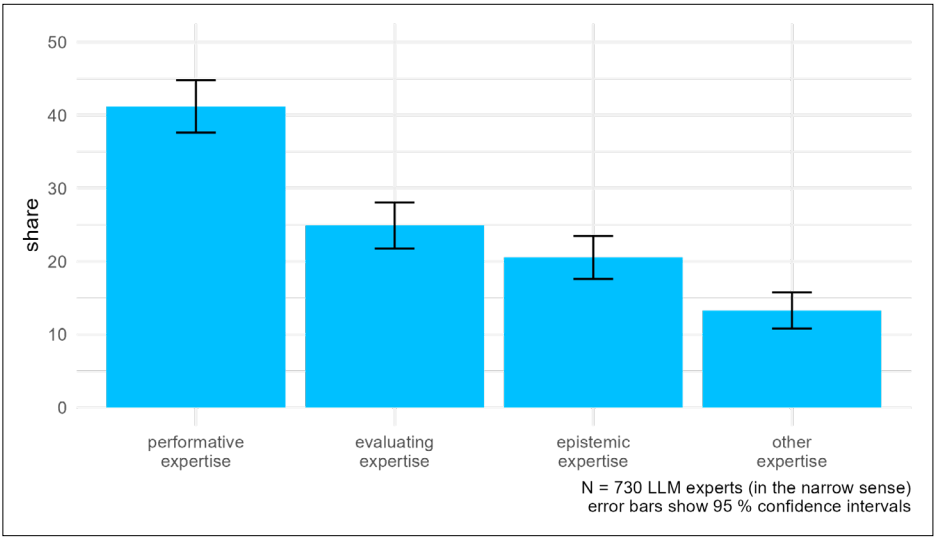
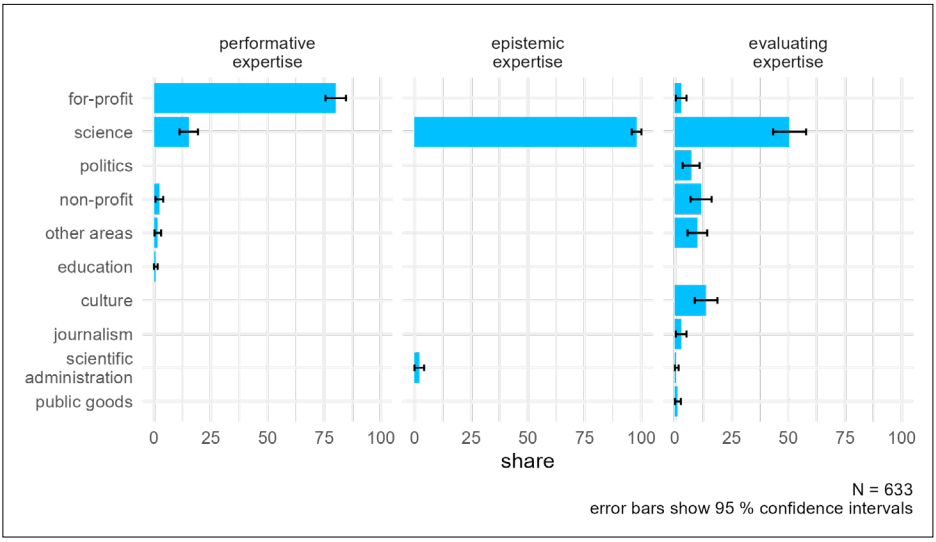


Figure 6. Distribution of social domains of experts providing different types of LLM-related expertise (in %)



Looking at the development of the debate over time (RQ3), we find most media coverage of LLMs and related actor citations in spring 2023, and a decline in included LLM actors per article over time (Fig. 7). There are notable shifts in the actor constellations. At the beginning of the debate, LLMs are predominantly

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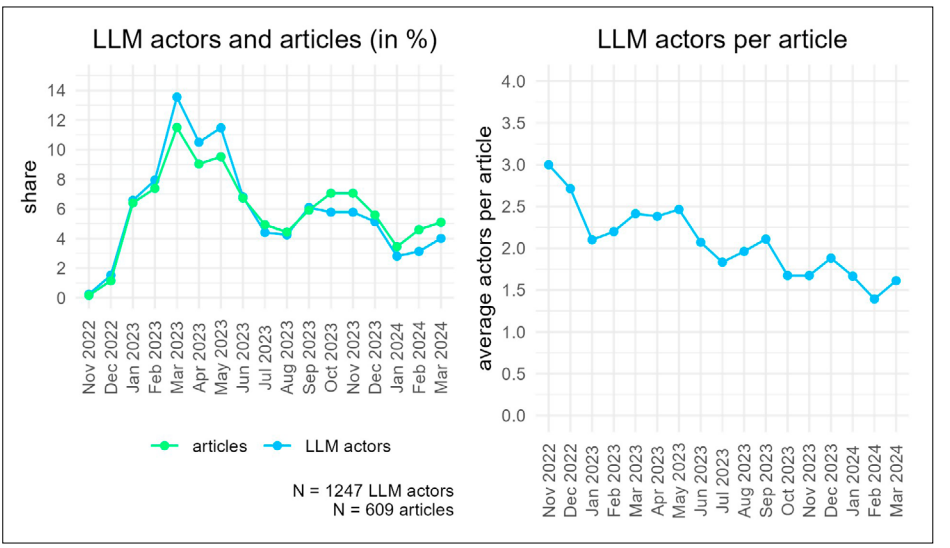
discussed by people directly concerned with the application of the technology but have not acquired any type of related expertise (people concerned). This changes in April 2023, as actors with performative (n = 46, 35.1%) or evaluating expertise (n = 24, 18.3%) become slightly more often visible than these people concerned (n = 20, 15.3%) (Fig. 8). As the peak in media coverage and the short-term shift in expert constellation go along with the publication of the so-called AI moratorium in March 2023, this might point to a more sophisticated public debate on the assessment of the technology.

Figure 7. Distributions of identified LLM actors and articles per month



In most months, performative experts were the most frequently quoted expert group, ranging only behind people concerned without domain-specific expertise. In contrast to other expert groups and people concerned, they did not enter the debate until the beginning of 2023 and were overtaken as most dominant expert group only by experts displaying evaluating expertise from July until September in that year (Fig. 8).

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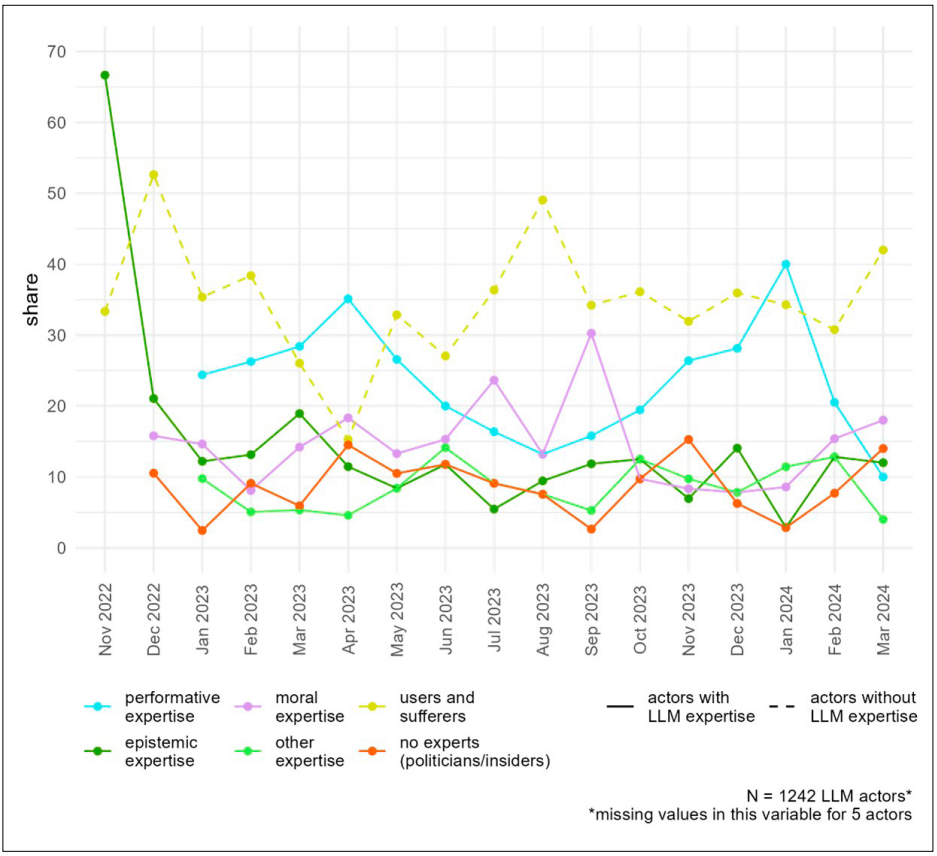
Figure 8. Distribution of LLM actors with (solid lines) and without (dashed lines) different LLM expertise per month (in %)



Looking at the social domains of the identified LLM actors in those months, for-profit representatives were still most frequently identified, accounting for half the quoted LLM actors in August 2023 (n = 27, 50.9%) and contradicting the dominant presence of evaluating expertise. Distinguishing the different actors according to their contribution of expertise beforehand (Fig. 9), we see a large share of the identified entrepreneurs in those months quoted as people concerned (n = 32, 52.5%) and therefore not adding any type of professionalised LLM expertise to the discussion. Evaluating expertise was particularly included through the selection of scientists (n = 18, 39.1%), non-profit ambassadors (n = 8, 57.1%) and cultural actors (n = 11, 68.8%).

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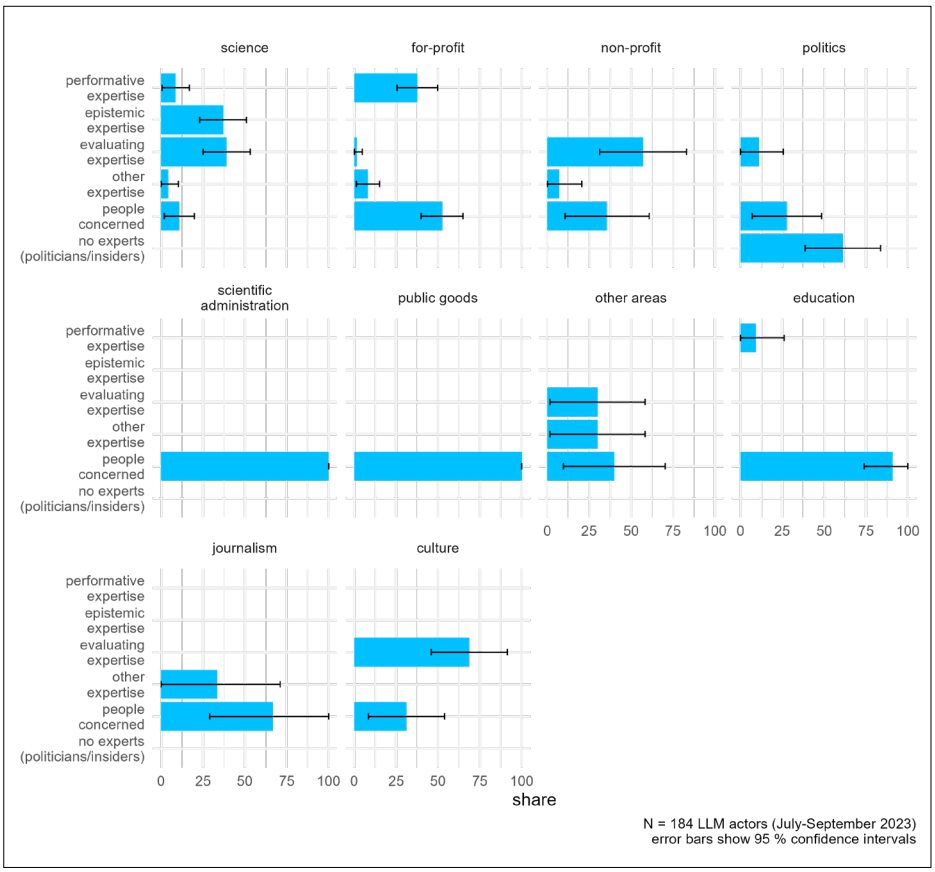
Figure 9. Distribution of contributed LLM expertise by different societal actors from July to September 2023 (in %)



5. Summary and discussion

While people with performative expertise were significantly more present in German news coverage than other experts in the narrow sense, their more frequent quotation did not align with the expected dominance of economic actors, especially in comparison to visible scientists.

To resolve this ambiguity, public discourse on the emerging AI technology included a third type of expertise besides "knowing how" and "knowing that": evaluating expertise. Broadening the concept of moral or ethical expertise – typically associated with philosophers who make or advise judgements on ethically correct practices (Singer, 2006, p. 187) – this type of expertise is tied to scientific approaches within the humanities and social sciences, like technology assessment or psychological research. Depending on their specific engagement with LLMs, scientists emerge either as experts on technical details of AI development – probably more intuitively counterbalanced to corporate AI developers – or as experts

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offering "follow-up knowledge" concerning the technology's contextualisation and consequences.

As media coverage of AI "shift[s] from portraying the technology as a concept or research subject … to focusing on the concrete economic, social, cultural, and political impacts," (Nguyen & Hekman, 2022, p. 12), the latter scientific experts may not always be perceived as equal counterweight to those with performative expertise by the public. This might give rise to concerns about "[a]n Industry-Led Debate" (Brennen et al., 2018, p. 1), only partially supported by our results, as we observe no differences in the presence of scientists and entrepreneurs until we control for the (in)dependence of scientists from partial interest organisations. Except for Brantner and Saurwein (2021, p. 5091), who examined Austrian media coverage of AI, prior content analyses focusing on topics, rather than actors, prevalently arrive at less ambiguous conclusions (e.g., Fischer & Puschmann, 2021, p. 18; Zhai et al., 2020, p. 146). Our findings on the actor constellation would benefit from further investigation using combined topic- and actor-based approaches, to avoid overstating or underestimating the industry's role in the discourse. The handling of researchers and scientific advances bound to partial interests and (other) actors contributing performative expertise, mainly associated with industrial stakeholders, deserves reconsideration if we are to critically assess claims of economic bias in the debate.

The question remains whether the mere (greater) presence of industry-linked actors is leading to an economically biased discourse, or if it rather reflects the specificity of technology development and expertise allocated to various people in charge. This seems plausible when comparing the presence of scientists and economic actors in this technological discourse to other science-related debates, where scientists are typically the most frequently identified group such as those concerning genome sequencing and cloning (e.g., Gerhards & Schäfer, 2009), molecular medicine (e.g., Milde & Ruhrmann, 2006), stem cell research (Schäfer, 2009), infectious diseases (Leidecker-Sandmann & Lehmkuhl, 2022) or genetic causes of certain behavioural patterns and disorders (Conrad, 1999). Scientists also feature prominently in techno-scientific discourses on nano- (e.g., Hauser, 2013) or biotechnology (e.g., Nisbet & Lewenstein, 2002), suggesting that technological development does not inherently entail an increasing importance of (emerging) industries. As soon as technologies are expected to be economically beneficial or disadvantageous, economic actors appear to assume a more central role in public debates, evident when comparing the AI discourse to media coverage of Carbon Capture and Storage (CCS) technologies (e.g., Schneider, 2019). Across various analyses of climate change and global warming discourse, second to politicians, scientific (e.g., Gärtner, 2023; Takahashi, 2011) or economic actors are more present (e.g., Boykoff, 2012; Tavares et al., 2022). This may reflect a shift in topical discourse focus, for example, from a more scientific search for causes to technology-supported adaptation (Carvalho & Burgess, 2005).

Expecting a similar dynamic in the still-emerging LLM discourse, we analysed how actor constellations evolved. Connecting these results to genuine LLM events outside media coverage indicates that we successfully captured and extrapolated actor-related characteristics of the LLM debate that might be linked to these de-

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velopments. For instance, the short-term shift in spring 2023, during which performative and evaluating experts displaced the previously and afterwards dominant group of people concerned, could be associated with the release of the AI moratorium in March 2023. The open letter urging "all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4 … that no one – not even their creators – can understand, predict, or reliably control" (Bengio et al., 2023) may have triggered increased public or laypeople attention for ethical and social aspects of the technology. This would signal a shift in public perception of the technology from a tool to support day-to-day practices of different societal actors to a transformative and possibly hazardous technology requiring sophisticated evaluations calling for AI expertise. Even if the AI moratorium had (co-)prompted this shift, it does not seem to have had a lasting impact. By summer 2023, evaluating expertise again came to the fore, replacing performative experts. Since we are not aware of any AI-related events explaining this shift, social and ethical aspects of the technology might gain relevance in the absence of immediate need for decision-making. Given the limited sample of German print media coverage observed over a short period, this insight primarily serves as a starting point for broader investigations into technology debates.

Another unexpected finding is the presence of actors from different social domains. Inconsistent with the increasing importance of the so-called "Leadership frame" (Ryazanov et al., 2024, p. 11) and in contrast to other scientific topics necessitating political decisions – like COVID-19 (e.g., Hart et al., 2020, pp. 685–687) or climate change (e.g., Gärtner, 2023, pp. 121–124) – we found little involvement of political actors in the LLM debate. This may be due to the LLM debate being an emerging technology debate that is (so far) shaped by technological fascination, (playful) experimentation (Zhai et al., 2020, p. 146), and novelty (Rotolo et al., 2015, pp. 1835–1836). As Bareis and Katzenbach (2022, pp. 875–876) argue, internal political narratives tend to be relatively "closed" in an uncritical or even hyped sense that "AI is established as a key sociotechnical institution; […] taken for granted and inevitable across many sectors already". This strategically useful narrative may explain why politicians are rather reluctant in the more controversial public AI discourse (Marcinkowski & Flaßhoff, 2024, p. 129). Another possible reason could lie in the technology's global interconnectivity and need for international political decision-making, accompanied by uncertainties regarding regulatory responsibilities (Cath et al., 2017).

The role of citizen voices and anecdotal evidence (e.g., Kleemans et al., 2017; Moore & Stilgoe, 2009) in such public debates might be worthy of further investigation, for example, as "non-professionalised expertise" existing alongside formally trained experts. From a normative perspective, such voices are essential in public technology assessments, which, following Grunwald (2019, pp. 704–705), can only fulfil the normative ideals of deliberative democracy if they are participatory and inclusive. Lastly, it would be valuable to explore the interplay and interconnections among the observed actors in the debate to gain deeper insights into the interactive nature of such communicative processes (van Dijk, 2009, pp. 2–3). It seems promising or even necessary to include more context conditions (e.g., content and composition of voiced statements).

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Although the results of our explorative quantitative study cannot be generalised to the entirety of genAI news coverage due to limitations of our sample, we hope to have offered a novel perspective on the ongoing public AI debate. By shedding light on the role of speakers from diverse societal backgrounds, we revisited concerns about an economically biased discourse to motivate further discussion of the identification, functions, and forms of expertise in an emerging technological issue. With new topics arising and, as Bartsch et al. (2024, p. 7) noted, novel actors who may not reveal their agendas straightaway, we expect this will remain an interesting yet increasingly complex research object.

Generative AI declaration

The authors used ChatGPT-5o to assist with language refinement. Afterwards, the proposed content was carefully reviewed and edited by the authors, who take full responsibility for the final publication.

Supplementary material

The supplementary material can be accessed here: https://osf.io/2xp7u

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Studies in Communication and Media

FULL PAPER

The influence of presumed social media influence: A longitudinal analysis of social media influence on adolescents' physical activity

Der Einfluss des vermuteten Einflusses sozialer Medien: Eine Längsschnittanalyse des Einflusses sozialer Medien auf die körperliche Aktivität von Jugendlichen

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Michelle Möri, Lukas Tribelhorn & Thomas Friemel

Abstract: Social media plays a central role in adolescents' lives, suggesting powerful direct and indirect influences on their social norms and behaviors. This study examines these influences by applying the influence of presumed media influence (IPMI) hypotheses to social media and physical activity. Physical inactivity is a pressing public health concern, particularly during adolescence, when activity levels often decline. Using data from a three-wave panel survey (N = 1,044), this study analyzes the development of perceived social media exposure among peers, peer influence, social norms, and personal behavior over time. The findings reveal that social media exposure directly increases physical activity, but also via indirect effects proposed by IPMI assumptions. Perceived peer exposure and presumed influence on others strengthened injunctive social norms, resulting in higher physical activity. No significant effects were found for descriptive social norms, showing that it is important to distinguish between injunctive and descriptive norms. Theoretical and methodological implications for future research and public health interventions are discussed.

Keywords: Influence of presumed media influence, indirect media effects, social media, social norms, adolescents

Zusammenfassung: Soziale Medien spielen eine zentrale Rolle im Leben Jugendlicher und haben einen starken direkten und indirekten Einfluss auf ihre sozialen Normen und Verhaltensweisen. Die vorliegende Studie untersucht diese Einflüsse, indem sie die Hypothese des „Einflusses des vermuteten Medieneinflusses" (Influence of Presumed Media Influence, IPMI) auf soziale Medien und Sport anwendet. Körperliche Inaktivität ist ein akutes Problem für die öffentliche Gesundheit, insbesondere im Jugendalter, weil dann das Aktivitätsniveau oft sinkt. Durch eine dreiwellige Panelerhebung (N = 1.044) analysiert diese Studie die Entwicklung der Nutzung sozialer Medien, den Einfluss auf Gleichaltrige, soziale Normen und Verhalten im Laufe der Zeit. Die Ergebnisse zeigen, dass die Nutzung sozialer Medien die körperliche Aktivität direkt erhöht und den wahrgenommenen Einfluss auf Gleichaltrige und den vermuteten Einfluss auf andere steigert, was mit den IPMI-Hypothesen übereinstimmt. Der vermutete Einfluss stärkte die injunktiven sozialen Normen, was wiederum körperliche Aktivität beeinflusste. Für deskriptive soziale Normen wurden jedoch keine signifikanten Effekte gefunden. Theoretische und methodologische Implikationen für zukünftige Forschung und Interventionen im Bereich der öffentlichen Gesundheit werden diskutiert.

Schlagwörter: Einfluss des vermuteten Medieneinflusses, indirekte Medieneffekte, soziale Medien, soziale Normen, Jugendliche

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1. Introduction

Physical inactivity is a leading public health issue (Strain et al., 2024) and a major cause of mortality and disability in developed countries (World Health Organization, 2024). While physical activity fluctuates across the lifespan, adolescence is a crucial period as it is an essential phase for establishing healthy behaviors (Aira et al., 2021). During this influential phase, adolescents are particularly susceptible to peer influences (Maxwell, 2002) and are among the heavy users of social media (Külling-Knecht et al., 2024). Social media has been recognized as a potentially powerful tool for promoting physical activity. The WHO (World Health Organization, 2018, p. 63) highlights social media in its global action plan as a platform for increasing physical activity. Physical-activity-related content is ubiquitous on visual social media such as Instagram (Vandenbosch et al., 2022, p. 1), where users encounter workout videos, fitspiration posts, and fitness influencers sharing their routines (Sokolova & Perez, 2021). Based on social learning theory (Bandura, 1986), such exposure can encourage adolescents to emulate physically active role models. Among other mechanisms, the effect of physical activity on social media on adolescents' physical activity can be attributed to the impact of social media content on perceived social norms, which, in turn, influence attitudes and behaviors (Gunther et al., 2006). However, the processes by which social media influence perceived norms remain underexplored. One explanation for these indirect media effects is the influence of presumed media influence (IPMI; Gunther et al., 2006; Gunther & Storey, 2003).

The IPMI hypotheses posit a stepwise indirect effect of media content on behavior, applied to physical activity as follows. First, individuals are exposed to media content referencing physical activity. Second, they infer others' exposure to the same physical activity content based on their own exposure. Third, they assume that these others are influenced by this physical activity content. Fourth, this assumed influence on others shapes individual's perceptions of descriptive and injunctive social norms regarding physical activity. Descriptive norms are based on perceptions of others' behaviors, while injunctive norms are based on perceptions of others' attitudes (Lapinski & Rimal, 2005). Fifth, these perceived social norms serve as a foundation for behavioral reactions, for example, by adapting their physical activity behavior (Gunther et al., 2006).

The IPMI hypotheses have been broadly applied in media research, particularly in health-related contexts, including adolescents' tobacco use (Cho et al., 2021; Wang & Jiang, 2017), body image and body satisfaction (Chia & Wen, 2010; Park, 2005), healthy diets (Ho et al., 2016; Hong & Kim, 2020), and alcohol consumption (Davis et al., 2019; Ho et al., 2014). Few studies have applied the IPMI framework to physical activity (Ho et al., 2016), despite its critical public health importance, especially among adolescents. Ho et al. (2016) demonstrated that, for adults, perceived peer exposure and perceived peer influence of media content promoting healthy lifestyles influenced their intentions to exercise and follow a healthy diet (Ho et al., 2016, p. 1076). However, they analyzed the IPMI hypotheses in the context of traditional mass media, specifically "print newspaper, television, and outdoor media" (Ho et al., 2016, p. 1075).

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To build on this research, we propose two adaptations. First, we apply the IPMI to adolescents. The World Health Organization (2025, first paragraph) defines adolescence as the period between 10 and 19, while this study focuses on late adolescents aged 14–18 (Patton et al., 2016, p. 2425). Social norms are especially relevant during adolescence (Steinberg & Monahan, 2007), physical activity typically declines during adolescence (Aira et al., 2021), and adolescents are among the heavy users of social media (Külling-Knecht et al., 2024). As a result, they are exposed to significant amounts of physical activity content on visual platforms such as Instagram (Durau et al., 2024).

Second, given the prevalence of social media use among adolescents, we will examine the influence of exposure to physical activity content on social media, more specifically on Instagram, which has been popular among adolescents in recent years (Gonzalez, 2023, second chapter). Physical activity is especially prevalent on the visual platform Instagram, with fitness influencers sharing workout plans and promoting active lifestyles (Pretorius et al., 2022; Sokolova & Perez, 2021). Thus, we apply the IPMI hypotheses to Instagram and adolescents with the overarching hypothesis that *exposure to physical activity content on Instagram increases adolescents' physical activity directly and indirectly through increased perceived peer exposure, presumed influence on others, and perceived social norms.*

Most IPMI research assumes a causal relationship between media use, perceived social norms, and behavior. This relationship has primarily been examined through cross-sectional surveys (e.g., Gunther et al., 2006, p. 56; Ho et al., 2016, p. 1075). Longitudinal data are necessary to clarify the causal relationships among media exposure, perceived peer exposure, presumed influence on others, and physical activity. Although the need for longitudinal studies has been highlighted in IPMI research (e.g., Bernhard & Dohle, 2018, p. 464; Cheng & Chen, 2020, p. 723), only a few studies have addressed this gap in topics such as smoking (Paek et al., 2011), pornography, or sugar consumption (Tal-Or et al., 2010). The mixed results of these studies underscore the importance of examining the interplay between media exposure, assumed peer exposure and peer influence, perceived social norms, and behavior over time. This study employed a three-wave panel survey to analyze the development of IPMI over time.

2. Theoretical background

2.1 Social media exposure and physical activity

Social media is integral to adolescents' daily lives and serves as a powerful tool for influencing their levels of physical activity (Dunlop et al., 2016, p. 44). While several studies have examined the general effects of social media use on physical activity (e.g., Rutter et al., 2021; Shimoga et al., 2019), few have investigated how specific content influences users' physical activity. However, studies highlight the relevance of the specific content consumed on social media as influential on attitudes and beliefs rather than the mere time spent on the platform (Sanzari et al., 2023, p. 6).

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The topic of physical activity is ubiquitous on visual social media such as Instagram (Vandenbosch et al., 2022, p. 1). Based on social learning theory (Bandura, 1986), it can be argued that observing others engage in physical activity may lead to modeling. Consequently, adolescents often exposed to people engaging in physical activity on social media should also engage in more physical activity. Users' exposure to physical activity content can be actively sought (e.g., by looking for a workout routine) or can happen passively (e.g., by scrolling through the feed) (Goodyear, Boardley, Chiou, Fenton, Makopoulou, Stathi, Wallis, Veldhuijzen van Zanten, & Thompson, 2021, p. 6). Physical activity on Instagram is multifaceted: Examples include "fitspiration" posts promoting healthy lifestyles, including workout videos, fitness influencers sharing their routines, athletes sharing insights into training sessions, friends posting about their workout routines or their most recent soccer games (Durau et al., 2024; Sokolova & Perez, 2021). Understanding the influence of physical activity content on Instagram on its users' physical activity requires examining their exposure to such content.

Empirical studies focused on the possible influence of physical activity on social media on adolescents' real-life physical activity. A meta-analysis, for instance, showed that social media interventions promoting physical activity successfully increase users' actual physical activity (Günther et al., 2021, p. 9). Followers of health and fitness channels on social media exhibited no differences in physical activity compared to non-followers (Folk & Kovacs, 2021, p. 107). Nevertheless, specific types of content, such as workout posts or fitness videos, can motivate diverse groups of users – including fitness technology users (Johns et al., 2017), inactive individuals (Goodyear, Boardley, Chiou, Fenton, Makopoulou, Stathi, Wallis, Veldhuijzen van Zanten, Wood, et al., 2021), active individuals (Sokolova & Perez, 2021), people with a body mass index over 25 (Santtila et al., 2014), and general social media users (Greyling & Naud, 2023) – to engage in physical activity. Empirical findings also support the influence of physical activity content on real-life physical activity. Based on this theoretical and empirical support, we propose the following hypothesis:

> *H1: Media exposure to physical activity content on social media increases adolescents' physical activity.*

2.2 Media exposure and presumed peer exposure

Following the IPMI hypotheses, it is not only the direct effect of media content on media users that influences their behavior but also the presumed media exposure of others. The theoretical assumptions are that individuals use their own exposure to social media to estimate their peers' exposure to the same content by means of a heuristic (Tversky & Kahneman, 1971, p. 105) or a false consensus effect (Mullen et al., 1985, p. 262). Applied to the context of physical activity on social media, the IPMI assumptions would be that individuals exposed to physical activity-related content on social media assume that their peers are similarly exposed to similar amounts and types of content. Research showed that individuals' exposure to a specific context increased their perceived peer exposure to such context (e.g., Cho

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et al., 2021, p. 426; Gunther & Storey, 2003, p. 207; Wang & Jiang, 2017, p. 126). The same influence was also shown for physical activity media content and individuals' perceived peer exposure to physical activity in mass media (Ho et al., 2016, p. 1076). Thus, we propose the following hypothesis:

> *H2: Media exposure to physical activity content on social media increases adolescents' perceived peer exposure to such content.*

2.3 Presumed media influence on others

In addition to the hypothesized effect on presumed peer exposure, the IPMI hypotheses posit that perceived peer exposure influences peers' actual behavior. This assumption is rooted in the third-person effect framework, which shows that individuals tend to believe that others are more strongly influenced by persuasive media messages than they are themselves (Davison, 1983, p. 3). The IPMI emphasizes the presumed media influence on others as a driver of attitudes and behaviors, regardless of perceived personal impact (Gunther et al., 2006, p. 53). The IPMI hypotheses assume that individuals' perception of how much physical activity content their peers encounter on social media influences their perception of how strongly their peers are influenced by such content (Gunther, 1998, p. 490).

> *H3: Adolescents' perceived peer exposure to physical activity content on social media increases their perceived influence of such content on others' physical activity.*

2.4 The role of social norms

The perceived influence of media content on others shapes individuals' perceptions of social norms about the same topic (Gunther et al., 2006, p. 53). Social norms are understood as unwritten behavioral codes within society. Through social interactions, norms are socially negotiated and established (Chung & Rimal, 2016, p. 3), subsequently influencing behaviors in two ways. First, according to social learning theory, individuals observe their social environment to identify prevalent and acceptable behaviors within their group (Bandura, 1986). Motivated by social conformity, individuals are often willing to adopt others' opinions to fit in and gain social approval (Cialdini et al., 1990, p. 1025). Second, social norms enable people to efficiently recognize socially accepted behaviors (Jacobson et al., 2015, p. 724). Together, these processes shape perceptions of social norms and influence attitudes and behaviors (Rimal & Real, 2005, p. 410). Consequently, social norms play a crucial role in health-related behaviors.

At the individual level, two types of social norms – descriptive and injunctive – must be differentiated (Rimal & Real, 2005, p. 391). Both are closely tied to specific reference groups (Cialdini et al., 1990, p. 1015f). Descriptive norms describe how common a particular behavior is within a social group, whereas injunctive norms reflect how strongly the group approves of that behavior (Lapinski & Rimal, 2005, p. 130; Rimal & Lapinski, 2015, p. 397). Descriptive norms are based on

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perceptions of others' behaviors, while injunctive norms are based on perceptions of others' attitudes (Lapinski & Rimal, 2005, p. 130). In other words, descriptive norms encompass people's beliefs about what social group members typically do. For example, if adolescents believe that their peers frequently exercise, this descriptive norm may influence their own exercise behavior. Conversely, injunctive norms encompass beliefs about what behaviors peers approve of, such as the belief that peers endorse regular exercise (Rimal & Lapinski, 2015, p. 397f).

During adolescence, individuals are particularly susceptible to social norms due to the general high relevance of social feedback (Cialdini et al., 1990, p. 1015; Steinberg & Monahan, 2007, p. 1533). In the context of health behaviors such as being physically active, adolescents are particularly susceptible to peer influences (Prinstein et al., 2001; Steinberg & Monahan, 2007, p. 1541). Adolescence is a crucial phase characterized by psychological and physical development (Maxwell, 2002). In this phase, adolescents' perception of peer norms around health behaviors are often more powerful than individual or parental attitudes (Prinstein et al., 2001), underlining the relevance of social norms for adolescents in this context of social media, peers, and physical activity.

Following the IPMI hypotheses, the perceived influence of physical activity content on others implies a change in the attitudes and behaviors of others and influences individuals' descriptive and injunctive social norms regarding physical activity (Ho et al., 2016, p. 1077). Based on social learning theory (Bandura, 1986) and social conformity (Cialdini et al., 1990), individuals form a belief about how prevalent physical activity is within their social group (descriptive norms) and how strongly their group approves of regular physical activity (injunctive norms). Accordingly, we propose the following hypothesis:

> *H4: Adolescents' perceived influence of physical activity content on social media on others' physical activity increases their (a) perceived descriptive social norms and (b) perceived injunctive social norms regarding physical activity.*

2.5 The influence of social norms on physical activity

Descriptive and injunctive social norms are relevant to health behavior. From a theoretical perspective, the Theory of Normative Social Behavior (Rimal & Real, 2005) posits that perceived social norms generally influence individual behavior. Beliefs about what others typically do (descriptive norms) affect people's behavior, partly depending on the perceptions of what others approve (injunctive norms). In the context of health behaviors, both types of social norms have been shown to influence various health-related behaviors. This is, for example, demonstrated in empirical IPMI studies, on health topics such as smoking (Gunther et al., 2006), following a healthy diet (Robinson et al., 2016), and having safer sex intentions (Hong & Kim, 2020). In the context of physical activity, descriptive norms have been less frequently studied than in areas such as drinking or environmentally conscious behaviors (Priebe & Spink, 2012, p. 284f). Meanwhile, injunctive social norms have frequently been analyzed in physical activity research, for example, in

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relation to the Theory of Planned Behavior (Kim et al., 2019). For adolescents, social norms have proven to be very influential for their physical activity (Fitzgerald et al., 2012, p. 953).

In these empirical studies, both types of social norms have been shown to influence people's physical activity. First, descriptive norms are an essential predictor of physical activity (Ball et al., 2010, p. 5; Priebe & Spink, 2011, p. 96). Among athletes, perceived descriptive norms predict their effort during practices and games (Spink et al., 2013, p. 815). Additionally, descriptive norm messages are more effective in increasing physical activity than other message types, such as those promoting health or appearance (Priebe & Spink, 2012, p. 289). Second, injunctive social norms also influence physical activity. For example, according to the theory of planned behavior, injunctive norms significantly affect physical activity (Blue et al., 2001, p. 491; Kim et al., 2019, p. 37). General research on physical activity has shown that injunctive norms increase activity levels across diverse groups, including adolescents (Abraído-Lanza et al., 2017, p. 291; Lu et al., 2014, p. 368). Building on the Theory of Normative Social Behavior (Rimal & Real, 2005) and the empirical findings outlined above, we hypothesize the following:

> *H5: Adolescents' (a) perceived descriptive social norms and (b) perceived injunctive social norms regarding physical activity increase their physical activity.*

2.6 Media influence, peer exposure, and physical activity development over time

Despite the causal assumptions in the IPMI hypotheses regarding media exposure, perceived peer exposure and peer influence, and attitudes or behaviors, many IPMI studies rely on cross-sectional data. A two-wave panel study showed that relationships between IPMI variables can be overinterpreted without longitudinal designs. For instance, presumed peer exposure (T1) did not influence perceived peer influence (T2), nor did perceived peer influence (T1) affect people's attitudes (T2). At the same time, peer exposure was positively related to peer influence and attitudes (Dohle et al., 2017, p. 605f). Cross-sectional studies cannot test causal relationships, underscoring the importance of analyzing temporal interplay with longitudinal data (e.g., Bernhard & Dohle, 2018, p. 463; Cheng & Chen, 2020, p. 723).

Some initial studies have addressed this research gap by analyzing assumptions about indirect media effects on people's behaviors using experimental or longitudinal designs (Dohle et al., 2017; Paek et al., 2011). For example, Tal-Or et al. (2010) used experimental methods to test IPMI hypotheses that perceived influence on others affects individuals' attitudes (Study I) and behaviors (Study II). The findings confirmed the IPMI assumptions in both studies, highlighting the significance of presumed media influence on attitudes and behaviors (Tal-Or et al., 2010, p. 820). A two-wave panel study by Paek et al. (2011) found that while media exposure (T1) did not directly affect attitudes (T2), its indirect effect (T1), mediated through presumed influence on others (T2), did shape attitudes (T2). These findings suggest that the perceived peer influence of media content on attitudes and behaviors develops over time (Paek et al., 2011, p. 139). There is a need for more IPMI research

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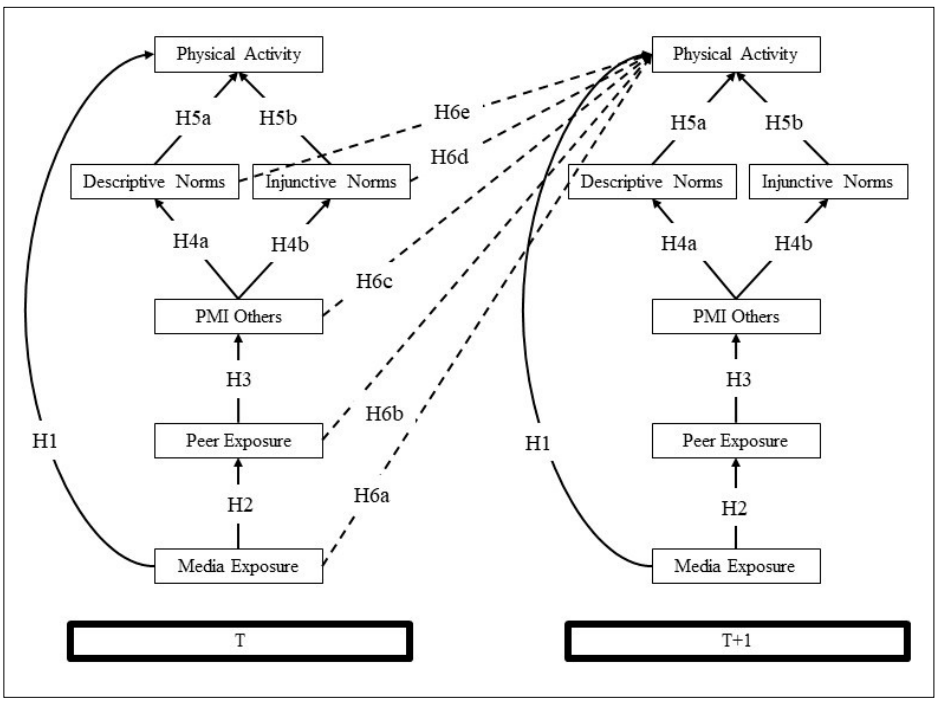
that employs longitudinal or experimental designs. Therefore, this study employs a longitudinal research design.

Based on the assumption that behavioral change in physical activity unfolds gradually (Aira et al., 2021, p. 2; Perry et al., 2023, p. 1725), whereas perceptual variables (e.g., exposure, perceived influence, and norms) are likely to adjust more quickly, we focused on examining how adolescents' physical activity changes over time. Consequently, we did not test the exact sequential order among all preceding variables in the IPMI model, as doing so would have required a different, shorter time lag of measurements and at least five measurement points.

> *H6: Exposure to (a) physical activity content on social media, (b) perceived peer exposure to such content, (c) perceived influence on others, (d) perceived descriptive norms, and (e) perceived injunctive social norms at time t will influence adolescents' physical activity at subsequent time T + 1.*

Figure 1. Hypothesized model for influence of presumed media influence on physical activity content on social media on adolescents' physical activity over time



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3. Materials and methods

3.1 Research design and procedure

This study was part of a larger research project, consisting of a three-wave longitudinal study involving adolescents in public schools in Switzerland. A random sample of 12 schools covering secondary, upper secondary, and vocational education was selected based on national education statistics (Bundesamt für Statistik, 2022). Schools were contacted by mail, e-mail, and telephone until participation was confirmed or declined. Of the 109 schools contacted, 12 participated in the study, including six upper secondary schools, three vocational schools, and three secondary schools.

Classes in the schools were selected to cover (late) adolescents in the age range of 14–18 years old. This focus was chosen due to substantial debate about changes in physical activity (Aira et al., 2021) and susceptibility to peer influence (Prinstein et al., 2001), but also due to practical reasons given by the Swiss school system and legal regulation for participation in surveys without parental consent. Some students in the selected classes were outside the defined age range. While students under the age of 14 were not allowed to participate in the survey for legal reasons, answers from students over the age of 18 were excluded post hoc.

Data were collected at the start of the school year (October/November 2023: N = 1,622, 51% female, 47% male, 2% non-binary, M_{age} = 15.48, SD_{age} = 1.15), in the middle of the school year (January/February 2024: N = 1,605, 52% female, 46% male, 2% non-binary, M_{age} = 15.75, SD_{age} = 1.22), and at the end of the school year (June/July 2024: N = 1,411, 50% female, 48% male, 1% non-binary, M_{age} = 16.06, SD_{age} = 1.19). The time points were selected to cover a full school year, with students in the same class to minimize the influence of changing group composition and other external factors. At each time point, the participants were informed about the study's purpose and provided consent before completing the online survey. Participation was voluntary, and students could opt out of the survey at any time without justification. The teachers did not supervise data collection, but the researchers did so to avoid any unintended pressure.

The survey, administered in German, is available in English on OSF (https://osf.io/s2ng7/). Variables were measured identically across all waves. As this study was part of a larger research project, participants were asked about social media use, physical activity, alcohol consumption, and sociodemographic information. The study was approved by the Institutional Review Board (NR. 23.04.27).

3.2 Participants

Only participants who participated in at least two of the three waves (N = 1,411) were included in the final sample. Participants who indicated that they did not use Instagram were excluded (n = 380). Consequently, the final sample consisted of 1,031 participants. Of these, 57% identified as female, 41% as male, and 2% as non-binary. At the start of the study (T1), participants were 14 to 18 years old (M = 15.46, SD = 1.14). A majority reported using Instagram several times a day

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(60%), with an additional 23% using it daily. On days they used Instagram, they reported spending an average of one hour and eight minutes (*SD* = 2h 7 min) on the platform.

Regarding physical activity, 97% of participants indicated engaging in sports in their free time within the past six months. Among the remaining 3%, about half stated that they had regularly participated in sports before. Among the 97% physically active participants reported exercising daily (12%), at least once a week (80%), at least once a month (5%), or less frequently (3%) in the last six months.

3.3 Measures

Unless stated otherwise, items were measured using seven-point Likert-type scales ranging from 1 (e.g., *never* or *do not agree at all*) to 7 (e.g., *very often* or *fully agree*). Descriptive statistics for all measures across all three waves are shown in Table 1.

3.3.1 Media exposure

The adolescents were asked how often they were exposed to physical activity content on the social media platform Instagram. To further specify physical activity content, they were informed that physical activity included all possible forms of sports and exercise. Examples of various physical activity forms were given, like running, hiking, swimming, cycling, yoga, playing soccer, or any other leisure-time sports activity. The adolescents were informed that all physical activity on Instagram counts for their media exposure, regardless of whether they were actively looking for it or stumbling over it, and even if physical activity was not the core or only focus of the content. After these explanations, the participants were asked, "How often do you see posts of people engaging in physical activity on Instagram?". They could answer on a seven-point Likert-type scale from 1 (never) to 7 (very often).

3.3.2 Perceived peer exposure

The perceived exposure of peers to physical activity content on Instagram was assessed by asking participants how often they thought other adolescents their age were exposed to such content. Like media exposure and using the same scale, participants were informed that physical activity includes all forms of sports and were given examples before being asked, "How often do you think other young people your age see posts of people engaging in physical activity on Instagram?"

3.3.3 Presumed media influence on others

Items assessing social media's influence on others were derived from previous IPMI studies (Hong & Kim, 2020, p. 1804; Paek & Gunther, 2007, p. 415). Participants were asked how strongly they believed social media content referencing physical

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activity influenced other adolescents to (1) start exercising, (2) engage in exercise more often, or (3) increase the time spent exercising.

3.3.4 Perceived descriptive social norms

Perceived descriptive social norms were measured with one item adapted from a similar assessment of adolescents' descriptive norms (Gunther et al., 2006, p. 58). Using a range slider, participants were asked to estimate how many people their age exercise at least once a week on a scale from 0 to 100%.

3.3.5 Perceived injunctive social norms

Perceived injunctive social norms were measured with one item based on a similar survey assessing injunctive norms for adolescents' health behaviors (Frey & Friemel, 2021). Participants were asked to estimate how people their age generally feel about others exercising less than once a week (1 = "not okay," 7 = "completely okay"). For the analysis, the item was recoded so that higher values represented stronger injunctive norms.

3.3.6 Physical activity

Participants were asked how many days in a typical week they engaged in physical activity outside of school or work, ranging from never (0) to daily (7) (Geusens & Beullens, 2021, p. 3).

Table 1. Descriptive statistics for all three waves.

	M	*SD*
Perceived media exposure		
T1	5.46	1.77
T2	5.47	1.68
T3	5.62	1.58
Perceived peer exposure		
T1	4.93	1.55
T2	4.88	1.50
T3	4.99	1.38
PMI others[a]		
T1	4.46	1.32
T2	4.52	1.25
T3	4.71	1.24

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Descriptive social norms		
T1	65.26	20.29
T2	64.72	21.04
T3	64.74	20.25
Injunctive social norms		
T1	2.85	1.82
T2	2.99	1.78
T3	3.07	1.73
Physical activity (times/week)		
T1	3.43	2.15
T2	3.40	2.19
T3	3.52	2.08

Notes. Media Exposure, Peer Exposure, and PMI others: 7-point Likert-scales. Physical activity: days per week. Descriptive norms: 0–100% [a]Cronbach's alpha for mean-index. PMI others: T1: α = .88, T2: α = .89, T3: α = 92.

3.4 Analysis

We employed a cross-lagged panel model to test our hypotheses, calculated in R (R Core Team, 2024) with the lavaan package (Rosseel, 2011). Cross-lagged panel models, a type of structural equation modeling, are used to analyze longitudinal data (Mackinnon et al., 2022, p. 3). These models allow testing of causal hypotheses by incorporating cross-lagged paths (connecting different variables measured at different time points) and autoregressive paths (connecting the same variables across time points). Standardized regression effects are reported to account for differences in measurement scales.

To justify the use of a cross-lagged panel model (Hamaker et al., 2015, p. 103), we first confirmed that our data met key assumptions. We reshaped the data into long form and fitted three-level null models (measurements nested within individuals, classes, and schools) for each construct. School-level intraclass correlations (ICCs) were all below 0.05, indicating negligible clustering, and individual-level ICCs ranged from 0.32 to 0.66 (residual within-person variance: 0.30–0.68). These results demonstrate sufficient within-person fluctuation to identify autoregressive and cross-lagged effects and minimal bias from the nested sampling design, supporting the appropriateness of our cross-lagged panel approach.

All participants participated in at least two of the three waves. Participants with missing data were managed via full-information maximum likelihood estimation in lavaan, allowing each participant's available waves to contribute to the model. Cases with missing predictors were retained, ensuring that all two-wave participants informed the autoregressive and cross-lagged estimates.

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4. Results

The results of the cross-lagged panel model are summarized in Figure 2 (Table A1). The overall model fit was assessed using the less restrictive thresholds of Hu and Bentler (1995, 1999): CFI ≥ 0.90, RMSEA ≤ 0.08, and SRMR ≤ 0.08. Given that (a) the model consisted of longitudinal data, (b) included cross-lagged and autoregressive paths, and (c) was calculated with a large sample (N > 1,000) (Chen, 2007; Marsh et al., 2004), the model showed an acceptable fit (RMSEA = 0.07, SRMR = 0.08). However, the CFI value (0.87) fell slightly below the threshold for a good fit, indicating potential for improvement.

Modification indices suggested including correlations between injunctive and descriptive social norms measured at the same time points. This correlation was deemed theoretically plausible, as injunctive and descriptive social norms describe related theoretical concepts (Lapinski & Rimal, 2005; Rimal & Lapinski, 2015). We decided to add these correlations to the model. The findings of the adapted model are reported below. This adaptation increased the model fit to a satisfactory level (RMSEA = 0.07, SRMR = 0.07, CFI = 0.91) without changes in the model's findings. This theoretically justified adaptation yielded a satisfactory fit and provided more consistent results across the three waves.

As a robustness check, we refitted the model, including age, gender, and school/class as covariates on wave 1 variables. The model fit indices slightly increased (CFI = 0.90, RMSEA = 0.05, SRMR = 0.06). The pattern and significance of the results remained unchanged except for one path,[1] which supports the robustness of our findings.

First, the autoregressive paths were analyzed. All effects were statistically significant (p < .001), with media exposure and physical activity strongly influenced by prior media exposure and physical activity, respectively. The relationships between peer exposure, presumed influence on others, and social norms over time were positive and of medium strength.

Second, the hypotheses were reviewed step by step. The direct effect of media exposure on physical activity, as assumed in H1, was confirmed. Media exposure to physical activity content on Instagram was positively related to adolescents' physical activity at the same time point (H1) and increased physical activity across time (H6a).

Hypotheses 2 to 5 posited an indirect influence of social media exposure to physical activity through perceived peer exposure, perceived influence on others, and perceived social norms on physical activity at the same time point. H6b–d proposed a mediated influence via these variables over time. Media exposure was positively related to adolescents' perceived peer exposure (H2 confirmed), which was positively related to their presumed media influence on others (H3 confirmed). Presumed influence on others was not positively related to descriptive social norms regarding physical activity (H4a rejected) but to their injunctive so-

1 In this adapted model, descriptive social norms did not significantly influence physical activity at T1. This is consistent with the lack of the same effect at T2 and T3 in the original and revised models.

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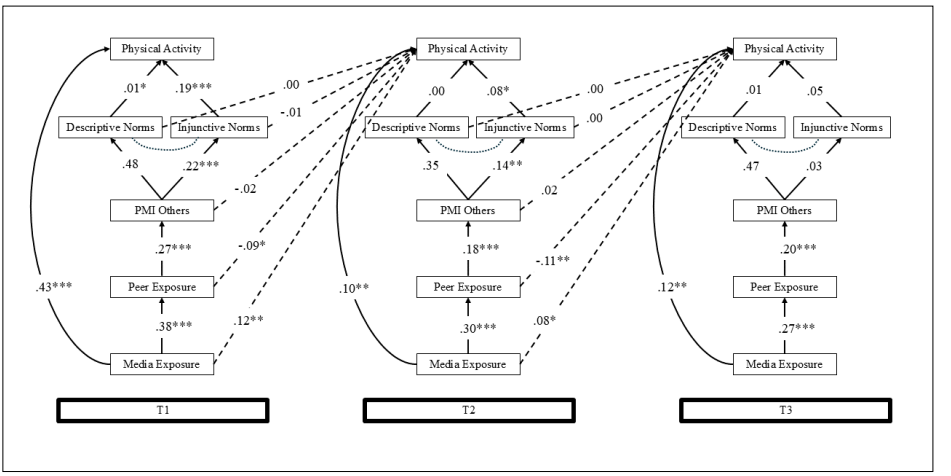
cial norms at T1 and T2, although not at T3 (H4b partially confirmed). Descriptive norms were positively related to physical activity only marginally and only at T1 (H5a rejected), while injunctive norms were positively related to physical activity at T1 and T2 but not at T3 (H5b partially confirmed). Regarding the longitudinal effects, peer exposure at a given timepoint (T) significantly decreased physical activity at the next timepoint (T + 1), rejecting H6b, as the effect was in the opposite direction to what was assumed. The other effects on physical activity (T + 1) were insignificant for presumed media influence on others (H6c rejected), descriptive norms (H6d rejected), and injunctive norms (H6e rejected).

Figure 2. Influence of presumed social media influence referencing physical activity on adolescents' physical activity (standardized effects)



5. Discussion

This study focused on the influence of presumed social media influence on adolescents' physical activity through longitudinal data analysis. This is relevant because adolescence is a crucial phase in developing healthy habits, and social media is omnipresent in adolescents' lives (Buda et al., 2021, p. 1032). Based on the IPMI hypotheses, it was assumed that the influence of social media exposure on physical activity was mediated through perceived peer exposure, perceived influence on others, and perceived social norms (Gunther et al., 2006). By evaluating these assumptions in a longitudinal design, this study contributes to existing literature in several ways.

First, while IPMI hypotheses have been extensively analyzed in media research, particularly for health-related topics, few studies have examined them in relation to physical activity (Ho et al., 2016). Second, despite the assumed causal relationships implied by the hypotheses, most IPMI research has relied on cross-sectional survey data, which precludes causal inferences (Paek et al., 2011). This study addressed this limitation by employing a three-wave panel design. Third, most re-

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search has focused on traditional mass media, which are less relevant in contemporary adolescents' lives. This study examined social media exposure to physical activity content, reflecting current media consumption habits.

Our findings confirm the direct effect of exposure to physical activity content on social media (i.e., Instagram posts) on adolescents' physical activity. Exposure to physical activity content on Instagram increased adolescents' physical activity both cross-sectionally and longitudinally. This aligns with previous studies showing a positive effect of fitness content on physical activity levels across various user groups (e.g., Goodyear, Boardley, Chiou, Fenton, Makopoulou, Stathi, Wallis, Veldhuijzen van Zanten, Wood, et al., 2021, p. 10; Johns et al., 2017).

The findings for the indirect media effect only partially supported the IPMI hypotheses. The pathway through injunctive social norms was largely consistent with prior findings (except at W3) and consistent with previous studies (Chia, 2006; Ho et al., 2016). The pathway through descriptive norms was not confirmed at any wave, contradicting earlier research (Gunther et al., 2006; Hong & Kim, 2020). Addressing criticisms of cross-sectional IPMI analyses (e.g., Bernhard & Dohle, 2018, p. 463; Cheng & Chen, 2020, p. 723), we analyzed the relationships between media exposure (H6a), peer exposure (H6b), presumed influence on others (H6c), descriptive (H6d), injunctive norms (H6e) on physical activity over time.

Presumed media influence on others, descriptive norms, and injunctive social norms showed no significant effects on subsequent physical activity. Peer exposure exhibited a negative effect on physical activity. This unexpected finding raises questions. While the assumed exposure of peers to physical activity content on social media was positively associated with physical activity cross-sectionally – mediated through presumed influence on others and injunctive norms – it directly decreased physical activity at the next time point. Although this negative effect was relatively small, it was consistent across the two intervals. A potential explanation for this finding is that adolescents' traits or the type of physical activity may be moderators of this relationship. For example, adolescents with low self-esteem who perceive their peers as highly exposed to physical activity content may fear that others are better at physical activities commonly performed in public gyms or in groups (e.g., yoga, weight training), leading them to refrain from participation.

With respect to the role of social norms, our findings contradict other IPMI studies that emphasized the relevance of descriptive norms for various health-related behaviors (Gunther et al., 2006; Hong & Kim, 2020) and general evidence supporting the influence of descriptive social norms on physical activity (for an overview, see Kim et al., 2019). With respect to adolescents' Instagram use, perceptions of socially approved behaviors (injunctive social norms) are more likely to be relevant than the perception of actual behavior (descriptive social norms; Cialdini et al., 1990). This may be explained by a general divergence between approving physical active and *actual* physical activity. While physical activity is widely recognized as healthy, many people are not as active as they would like to be or should be (Nilsen et al., 2023, p. 101394; World Health Organization, 2024).

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Another explanation for the limited influence of descriptive social norms on physical activity may lie in findings from other studies, suggesting that mediators or moderators play a role in this relationship. For example, the theory of normative social behavior posits that injunctive social norms moderate the influence of descriptive social norms on behavior (Rimal & Lapinski, 2015, p. 398). Contextual factors, such as privacy and ambiguity, may also be relevant (Chung & Rimal, 2016, p. 11). Hong and Kim (2020) demonstrated that for private, sensitive topics such as condom use intentions, descriptive social norms mediated the influence of presumed media exposure on behavior. Conversely, for the public, less ambiguous topics such as healthy eating or sunscreen use, presumed media influence directly affected people's behavior (Hong & Kim, 2020, p. 1807). These individual and contextual characteristics warrant further investigation to clarify the relationship between social norms and physical activity (Chung & Rimal, 2016, p. 16f).

Differences in how IPMI models are operationalized may also explain the inconsistencies across studies. Some research has examined the direct effect of perceived influence on others on behavior (Dohle et al., 2017), while other studies have introduced mediators such as social norms (Ho et al., 2016), attitudes toward the behavior of interest (Gunther et al., 2006), or perceived influence on oneself (Cho et al., 2021). These modeling differences, along with variations in research topics and media analyzed, likely contribute to discrepancies in the findings.

When reflecting the study's findings, it is also important to consider other possible outcome variables than physical activity. The influence of media exposure to physical activity content on social media on adolescents' physical activity may appear to be a positive media effect. Possible negative effects should also be considered. This includes potential negative effects of exposure to physical activity content on Instagram (e.g., fitspiration) on body satisfaction or as driver for excessive thinness or muscularity (Easton et al., 2018; Jerónimo & Carraça, 2022; Sukamto et al., 2019). Physical activity may not be the outcome of interest. In other areas, research has shown the importance of the exact content consumed on social media rather than the duration of use (Sanzari et al., 2023, p. 6). Future research should focus on the specific content to which adolescents are exposed to further shed light on the relationship between physical activity content and their attitudes, intentions, and behaviors.

5.1 Limitations

This study has some limitations that require discussion. First, the reference group of "other adolescents your age" had to be kept vague to apply to all study participants. For athletes, the relevant referent groups may not include all adolescents but rather an active subset such as other team members or athletes in their league (Spink et al., 2013, p. 815). The broad specification of the reference group may have influenced these findings (Shulman & Levine, 2012, p. 547). It is possible that social norms regarding the prevalence of physical activity within the general age group were less relevant than norms within close peer groups. Future

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studies should explore whether the prevalence of physical activity among adolescents' close friends influences physical activity over the long term.

Second, the one-year time frame does not allow accounting for dynamics that develop within shorter or longer time frames. For example, a meta-analysis found that physical activity changes occur earlier for girls (9–12 years) than boys (13–16 years) (Dumith et al., 2011, p. 695). Seasonal influences, which have been shown to influence adolescents' physical activity in other studies (Carson & Spence, 2010), were not accounted for. Defining the ideal research design becomes even more complicated as media use and its subsequent effects may occur in a much shorter timeframe. Hence, selecting the optimal time lag in panel studies in general (Dormann & Griffin, 2015; Griep et al., 2021) and in digital media research (Vandenbosch et al., 2025) will remain a challenge for future IPMI research on physical activity.

Third, physical activity was measured based on how often the adolescents engaged in physical activity during a typical week. This measure did not account for changes in the intensity or duration of physical activity. Other possible influences of social media content related to physical activity were also not examined. Physical activity content may motivate adolescents to try new activities, adjust their training plans, or add new exercises to their routines. Future research should gather more information on adolescents' physical activity to further explore these dimensions.

Fourth, exposure to physical activity content was measured using retrospective self-reports. These self-reports may be biased in several ways, such as over-estimation due to a single extensive episode (Schwarz, 2008). Our measurement did not distinguish between social media content actively sought and content on physical activity that adolescents were accidentally exposed to. This differentiation might have influenced our findings and should be further disentangled in future research. Exposure to physical activity content was only assessed for Instagram and did not include other social or mass media platforms. Consequently, other media influences (e.g., from TikTok or television) were not considered. Physical activity content on Instagram may encompass a wide range of content. Future research should dive further into the exact contents to which adolescents are exposed, for example, through the collection of tracking data or data donations covering the exact social media content to which adolescents were exposed.

Fifth, like all statistical models, cross-lagged panel models can be discussed critically, and one needs to acknowledge their presumptions and limitations regarding the interpretation of causal influences in longitudinal panel data (Hamaker et al., 2015, p. 104). Future research with a similar design could consider random-intercept CLPM (Hamaker et al., 2015, p. 105) to separate within- and between-person effects and focus on achieving satisfying statistical power on each level (Scherbaum et al., 2019).

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5.2 Conclusion

This study provides important insights into the complex relationship between social media exposure and adolescents' attitudes and behaviors. Based on a longitudinal application of the IPMI hypotheses and a three-wave panel survey on social media use and physical activity, the findings show that exposure to physical activity content on social media has both direct and indirect effects on adolescents' physical activity levels. Indirect effects operate through perceived peer exposure to such content, perceived influence of this content on others, and the perceived injunctive social norms of physical activity. In contrast to other studies, no such effects were found for descriptive social norms. Descriptive norms were neither influenced by presumed influence on others nor influenced physical activity.

When adolescents are exposed to Instagram content featuring people exercising, posting gym photos, or showcasing workout routines, they increase their subsequent physical activity. This effect persisted over time, highlighting the importance of social media content for adolescents' behavior during this critical phase of developing healthy lifestyle habits (Aubert et al., 2021). Beyond these topic-specific insights, the findings contribute to the literature on social media's impact on adolescents' health-related behavior in the broader IPMI framework. This study is among the few to use a longitudinal design to evaluate the direct and indirect effects of social media. The results suggest the need for further investigation into the distinct roles of descriptive and injunctive norms, the influence of different reference groups, and the need to account for dynamics at different time scales (i.e., shorter time lags for measures of media exposure and perception variables than for behavior change).

With respect to practical implications, these findings underscore the relevance of social media content in public health discussions and strategies to motivate adolescents to adopt healthy lifestyles. For example, the WHO (2024, p. WHO response, 6) aims to reduce physical inactivity by 15% by 2030. Supporting influencers who promote evidence-based health content on social media could be a valuable component of this strategy.

Generative AI declaration

AI-based tools were used to support language editing, including rephrasing sentences for clarity and coherence, and improving the structure and readability of the manuscript. All substantive content, theoretical arguments, and interpretations were developed by the authors.

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Appendix

Table A1. Results for the influence of presumed media influence on physical activity.

	β	*SE*	*z*	*p*	95% CI	
H1						
Physical activity – media exposure (T1)	.43	.04	11.00	<.001	[.35,	.50]
Physical activity – media exposure (T2)	.10	.04	2.79	.005	[.03,	.20]
Physical activity – media exposure (T3)	.12	.04	3.04	.002	[.04,	.20]
H2						
Peer exposure – media exposure (T1)	.38	.03	13.23	<.001	[.32,	.43]
Peer exposure – media exposure (T2)	.30	.03	7.94	<.001	[.24,	.35]
Peer exposure – media exposure (T3)	.27	.03	9.11	<.001	[.21,	.32]
H3						
PMI others – peer exposure (T1)	.27	.03	9.34	<.001	[.21,	.32]
PMI others – peer exposure (T2)	.18	.03	7.49	<.001	[.14,	.23]
PMI others – peer exposure (T3)	.20	.03	6.77	<.001	[.14,	.26]
H4a						
Descriptive norms – PMI others (T1)	.48	.53	.91	.362	[-.55,	1.51]
Descriptive norms – PMI others (T2)	.35	.50	.69	.488	[-.63,	1.32]
Descriptive norms – PMI others (T3)	.47	.53	.89	.376	[-.57,	1.51]
H4b						
Injunctive norms – PMI others (T1)	.22	.05	4.59	<.001	[.13,	.32]
Injunctive norms – PMI others (T2)	.14	.04	3.23	.001	[.28,	.41]
Injunctive norms – PMI others (T3)	.03	.05	.71	.480	[-.06,	.12]
H5a						
Physical activity – descriptive norms (T1)	.01	.00	2.15	.032	[.00,	.01]
Physical activity – descriptive norms (T2)	.00	.00	.74	.461	[-.00,	.01]
Physical activity – descriptive norms (T3)	.01	.00	1.68	.094	[-.00,	.01]
H5b						
Physical activity – injunctive norms (T1)	.19	.04	4.59	<.001	[.11,	.26]
Physical activity – injunctive norms (T2)	.08	.03	2.41	.016	[.02,	.15]
Physical activity – injunctive norms (T3)	.05	.04	1.37	.172	[-.02,	.12]
H6a						
Physical activity (T2) – media exposure (T1)	.12	.04	2.87	.004	[.04,	.20]
Physical activity (T3) – media exposure (T2)	.08	.04	2.02	.043	[.00,	.16]

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H6b						
Physical activity (T2) – peer exposure (T1)	-.09	.04	-2.16	.031	[-.17,	-.01]
Physical activity (T3) – peer exposure (T2)	-.11	.04	-2.71	.007	[-.19,	-.03]
H6c						
Physical activity (T2) – PMI others (T1)	-.02	.04	-.35	.725	[-.10,	.07]
Physical activity (T3) – PMI others (T2)	.02	.05	.33	.741	[-.07,	.10]
H6d						
Physical activity (T2) – descriptive norms (T1)	.00	.00	-.45	.651	[-.01,	.00]
Physical activity (T3) – descriptive norms (T2)	.00	.00	-.63	.527	[-.01,	.00]
H6e						
Physical activity (T2) – injunctive norms (T1)	-.01	.04	-.18	.857	[-.07,	.06]
Physical activity (T3) – injunctive norms (T2)	.00	.04	-.11	.911	[-.08,	.07]
Autoregressive paths						
Media exposure (T2) – media exposure (T1)	.52	.03	18.95	<.001	[.46,	.57]
Media exposure (T3) – media exposure (T2)	.47	.03	15.23	<.001	[.41,	.53]
Peer exposure (T2) – peer exposure (T1)	.25	.03	7.94	<.001	[.19,	.32]
Peer exposure (T3) – peer exposure (T2)	.30	.03	9.49	<.001	[.24,	.36]
PMI others (T2) – PMI others (T1)	.34	.03	11.59	<.001	[.28,	.39]
PMI others (T3) – PMI others (T2)	.42	.03	13.11	<.001	[.35,	.48]
Descriptive norms (T2) – descriptive norms (T1)	.35	.03	10.78	<.001	[.28,	.41]
Descriptive norms (T3) – descriptive norms (T2)	.40	.03	12.80	<.001	[.34,	.46]
Injunctive Norms (T2) – injunctive norms (T1)	.42	.03	13.95	<.001	[.36,	.48]
Injunctive Norms (T3) – injunctive norms (T2)	.46	.03	14.49	<.001	[.40,	.53]
Physical Activity (T2) – physical activity (T1)	.67	.03	26.26	<.001	[.62,	.72]
Physical Activity (T3) – physical activity (T2)	.62	.03	23.53	<.001	[.56,	.67]

Notes. Results of the cross-lagged panel model with standardized regression coefficients. R^2: Peer exposure T1 = .19, T2 = .22, T3 = .24; PMI others T1 = .10, T2 = .19, T3 = .24; Descriptive norms T1 = .00, T2 = .11, T3 = .18; Injunctive norms T1 = .03, T2 = .20, T3 = .23; Physical activity T1 = .16, T2 = .53, T3 = .49.

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Framing von Kriminellen in deutschen Regionalzeitungen: Spielt die Herkunft von Täter*innen eine Rolle?

Janine Brill, Henriette Pohle, Madeleine Schmidt & Lars Guenther

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FULL PAPER

Framing criminals in German regional newspapers: Does the perpetrator's origin matter?

Framing von Kriminellen in deutschen Regionalzeitungen: Spielt die Herkunft von Täter*innen eine Rolle?

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Abstract: The discrepancy between (regional) media coverage of criminal activity and official crime statistics, particularly concerning the portrayal of immigrant offenders, is widely acknowledged. The media's framing of crime and the corresponding presentation of perpetrators with a migration background play a critical role in shaping public perceptions and reinforcing existing stereotypes. In response to this issue, the German Press Council revised Guideline 12.1 of the Press Code in 2017 by introducing the criterion of a legitimate public interest for mentioning a perpetrator's origin. To investigate how regional news organizations apply the press code guideline, the present study identifies frames of criminals and conducts an in-depth analysis of origin references using a mixed-methods approach, combining a quantitative content analysis (n = 486) with a qualitative analysis (n = 27) of (online) crime reports from four German regional newspapers. Through cluster analysis, four frames of criminals were identified: *Felons*, *Thieves and burglars*, *Vandals*, and *Negligent traffic offenders*. Perpetrators or suspects with a migration background were referenced nearly five times more frequently than those of German origin. Furthermore, suspects identified as having a non-German background – whether explicitly stated or implicitly suggested – are often framed within a different contextual narrative. Our findings point to inconsistencies in the compliance with the guidelines outlined in the Press Code, potentially contributing to the hardening of stereotypes against minorities.

Keywords: Framing, crime news, reporting on criminals, regional newspapers, mixed methods, content analysis

Zusammenfassung: Die Diskrepanz zwischen (regionaler) Medienberichterstattung über Kriminalität und offiziellen Kriminalstatistiken, insbesondere im Hinblick auf die Darstellung von Täter*innen mit Migrationshintergrund, ist weithin bekannt. Das mediale Framing von Täter*innen mit Migrationshintergrund spielt eine entscheidende Rolle bei der öffentlichen Meinungsbildung und kann bestehende Stereotype verstärken. Um dieser Problematik entgegenzuwirken, überarbeitete der Deutsche Presserat 2017 die Richtlinie 12.1 des Pressekodex, indem er das weiter gefasste Kriterium des berechtigten öffentlichen Interesses für die Nennung der Herkunft eines Täters einführte. Um zu untersuchen, wie regionale Nachrichtenorganisationen die Richtlinien des Pressekodex umsetzen, analysiert die vorliegende Studie Täter*innen-Frames sowie die Nennung von Herkunftsbezügen in Berichterstattungen über Kriminalität. Methodisch wird ein Mixed-Methods-Ansatz verfolgt, der eine quantitative Inhaltsanalyse (n = 486) mit einer vertiefenden qualitativen Analyse

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(*n* = 27) von (Online-)Kriminalitätsberichten aus vier deutschen Regionalzeitungen kombiniert. Mithilfe einer Clusteranalyse konnten vier Täter*innen-Frames identifiziert werden: *Schwerverbrecher*innen*, *Dieb*innen und Einbrecher*innen*, *Vandal*innen* und *Fahrlässige Verkehrssünder*innen*. Täter*innen oder Verdächtige mit Migrationshintergrund werden in den untersuchten Artikeln fast fünfmal häufiger erwähnt als solche mit deutscher Herkunft. Zudem werden Tatverdächtige mit nicht-deutscher Herkunftsnennung oder -implikation in der Regel anders kontextualisiert. Die Ergebnisse deuten darauf hin, dass Journalist*innen deutscher Regionalmedien die im Pressekodex formulierten Richtlinien nicht konsequent befolgen, was Stereotype gegenüber Migrant*innen verfestigen könnte.

Schlagwörter: Framing, Kriminalitätsberichterstattung, Berichterstattung über Kriminelle, Regionalzeitungen, Mixed Methods, Inhaltsanalyse

1. Introduction

The structure and language of media content – commonly referred to as *media framing* – shape the representation of issues and provide specific interpretative frameworks. Through these frames, the media can affect how individuals perceive societal issues, such as crime (Greer & Reiner, 2015), and how these issues are discussed in public discourse. This influence is particularly relevant given that most individuals in (Western) societies have limited direct experience with criminal activity (Brill et al., 2025). Thus, discrepancies between media portrayals of crime or criminals and official crime statistics can become particularly problematic when such portrayals reinforce negative stereotypes about specific (minority) groups (Dittrich & Klimmt, 2020; Eberl et al., 2018; Kort-Butler & Habecker, 2018). These tendencies of discrepant reporting can be observed not only in Germany (see e.g., Dittrich & Klimmt, 2020) but also across country contexts (see e.g., Jacobs, 2017).

German print media operate under the ethical framework of the Press Code, which stipulates in Guideline 12.1 that a suspect's or offender's origin should only be referenced when there is a legitimate public interest – particularly to avoid reinforcing stereotypes about minorities (German Press Council, 2017). While practical guidelines already outline examples both for and against origin mentioning (German Press Council, 2024), empirical studies indicate that the non-German origin of suspects or offenders is still disproportionately emphasized in crime reporting (Brill et al., 2025; Dittrich & Klimmt, 2020; Klimmt et al., 2024). To date, research has primarily examined perpetrator framing in relation to origin-related information in national television broadcasts (e.g., Brill et al., 2025) and national (online) newspapers (e.g., Rahlf, 2024). While Klimmt et al. (2024) extended the scope to regional German newspapers, their study was not based on the framing approach. By complementing our quantitative part of the study with a qualitative analysis of a subsample of articles, we are, in contrast, able to investigate *how* the (subtle) reference to offenders' and suspects' origin is used and embedded in the narrative context.

Building on previous findings, the present study investigates how offenders and suspects are framed in crime reporting by German regional newspapers, with emphasis on the (explicit or implicit) mention of their origin. We adopt a mixed-

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methods approach that integrates both quantitative and qualitative content analysis. The quantitative analysis consists of 468 crime news articles, in which perpetrator frames are identified through cluster analysis, alongside an examination of patterns in the reporting of perpetrators' origin. To complement and enrich the insights derived from this analysis, we conducted a qualitative analysis on a subsample of the original dataset. This analysis adds value to the existing body of research by exploring in-depth how explicit or implicit references to perpetrators' origin contribute to their framing in regional media coverage.

2. Framing of crime and criminals

This study applies the framing approach as conceptualized by Entman (1993), who identifies four core elements of a frame: (1) problem definition, (2) causal attribution, (3) treatment recommendation, and (4) moral evaluation. The integration of these elements into a coherent structure constitutes a frame (Budde et al., 2018; Entman, 1993). The *problem definition* refers to the aspect of an issue that media coverage emphasizes as most salient, shaping the perceived relevance of the event and the roles of the actors involved (Goedeke Tort et al., 2016). In the present study, this element relates to the nature of the crimes committed and the portrayal of the individuals involved (i.e., the offenders or suspects). *Causal attribution* involves identifying the agents, conditions, or broader social contexts deemed responsible for the problem (Goedeke Tort et al., 2016). Within this framework, causal attributions in the analyzed media texts encompass both individual-level factors (e.g., mental health issues) and societal-level factors (e.g., religious affiliation) that are portrayed as contributing to the criminal act. The third frame element, *treatment recommendation*, refers to the solutions or interventions proposed in media coverage to address the identified problem, such as harsher penalties for perpetrators. The final element, *moral evaluation*, captures the normative judgment conveyed in the reporting, indicating whether the issue is presented in a negative, neutral, or positive light.

Although the framing approach was originally developed to analyze media portrayals of events or situations – such as criminal offenses (e.g., Conrey & Haney, 2020; Rafiee et al., 2021) – an increasing number of studies have applied this framework to the media framing of individuals or social groups, including activists, criminals, migrants, and refugees (e.g., Brill et al., 2025; Dan & Ren, 2021; Goedeke Tort et al., 2016; Lavie-Dinur et al., 2013; Lawler & Tolley, 2017; Muncie, 2019). Also, Chong and Druckman (2007) argue that frames – particularly those defined by Entman – can be applied to events, issues, and (political) actors. Since crime is inseparable from the actions of individuals, applying the framework to suspects or perpetrators seems both conceptually appropriate and analytically valuable.

In reporting on criminal activity, news media tend to focus disproportionately on severe offenses such as homicide, assault, terrorist attacks, burglary, and sexual violence (Brill et al., 2025; Dittrich & Klimmt, 2020). Analogously offenders are frequently prortayed as impulsive, aggressive, and inherently violent (Jewkes, 2011). While reports occasionally include additional details related to offenders'

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socioeconomic status, family circumstances, or broader social environments (Brill et al., 2025), contextual information is most of the time limited to easily accessible demographic attributes such as gender, age, and place of residence (Dittrich & Klimmt, 2020), hindering a nuanced and comprehensive understanding of the individuals involved in criminal acts. Despite Guideline 12.1 of the German Press Code discouraging origin references without a legitimate public interest, studies suggest that such references persist in German crime reporting – especially for suspects of non-German origin (Brill et al., 2025; Dittrich & Klimmt, 2020). Given the general scarcity of background information on offenders, origin references gain salience, potentially shaping public perceptions of both the criminal acts and social groups associated with them.

While mental health issues are frequently cited as motives for criminal behavior in media reporting (Jewkes, 2011), causal attributions in the case of minority groups – such as immigrants, refugees, or Muslims – often shift toward emphasizing their (foreign) origin, religious affiliation, or alleged connections to criminal or terrorist organizations (Aldrete, 2023; Betus et al., 2020; Brill et al., 2025; Slakoff & Brennan, 2019; Threadcraft, 2017). This type of framing tends to highlight the collective identity of the individuals involved, rather than portraying them as autonomous actors (Fengler & Kreutler, 2020).

Although a substantial body of research has investigated the framing of criminals in crime news, much of this work centers around specific crime types, such as school shootings, terrorist attacks, domestic violence, or femicide (e.g., Aldrete, 2023; Betus et al., 2020; LaRose et al., 2021; Yates, 2020), or particular offender groups, including men, women, adolescents, or minorities (e.g., Slakoff, 2020; Ryan & Tonkiss, 2023). In contrast, recent research examining broader patterns of offender framing, especially within the context of regional newspaper coverage in Germany, remains limited. To address this gap, the present study poses the following research question:

> *RQ1: Which frames of criminals can be identified in German regional newspapers?*

Scholars have emphasized that the origin of individuals plays a significant role in shaping how criminals are framed in media coverage (Brill et al., 2025; Fleras, 2016). The disproportionate and often stereotypical portrayal of individuals with a migration background – particularly in the context of terrorism and other serious crimes – can contribute to the reinforcement of social biases and the marginalization of minority groups (Dittrich & Klimmt, 2020; Goedeke Tort et al., 2016; Gruenewald et al., 2013). Prior research shows that suspects' foreign origin or migration background is often mentioned in crime news, particularly in relation to serious offenses (Goedeke Tort et al., 2016). While not legally regulated, ethical guidelines for crime reporting in Germany make it especially relevant to assess whether the origin of offenders is portrayed inconsistently across media frames. Accordingly, we pose the following research question:

> *RQ2: Does the frequency of references to perpetrators' or suspects' origins vary across the identified frames?*

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In addition, it is important to examine the extent to which regional newspapers in Germany differ in their prioritization of specific frames. Research suggests that newspapers' political and ideological orientations influence language choices and ultimately framing decisions, with liberal (e.g., *Süddeutsche Zeitung)* and conservative outlets (e.g., *Welt)* emphasizing different narratives (Dittrich & Klimmt, 2020). In regional media, such variation may be further shaped by regional historical and sociopolitical contexts. While some regional newspapers may rely on police reports[1], the selection of crimes reported on, the manner and length of coverage, as well as the withholding or emphasis of specific information, ultimately remain editorial decisions. At last, journalists carry editorial responsibilities, as outlined in professional standards such as the Press Code. A distinct emphasis on frames across regional newspapers can both reflect and contribute to divergent political discourses and developments within these areas. To explore this dimension, we pose the following research question:

RQ3: Do the identified frames vary across regional newspapers?

Despite ethical standards in journalism, unconscious biases can still influence editorial decisions: Empirical work shows that even journalists instructed to be objective are not immune to automatic forms of biases (e.g., Coleman, 2003). Given that frames may differ in the extent to which they reference the (non-German) origin of perpetrators, and that the distribution of these frames may vary across regional newspapers, it becomes essential to examine whether the mention of non-German origin itself differs systematically across newspapers. Considering the diverse historical trajectories, regional disparities, and recent political developments across Germany, analyzing the frequency with which non-German origins are referenced in crime reporting by different regional outlets may offer important insights into the role of local media in shaping public perceptions of minority groups. Accordingly, we pose the following research question:

RQ4: Does the frequency of mentioning perpetrators or suspects of non-German origin differ across regional newspapers?

Additionally, to gain a deeper understanding of how the explicit or implicit mention of an offender's or suspect's origin contributes to their framing, we complement our quantitative content analysis with a qualitative approach. We hence conduct an in-depth analysis of selected articles from the original sample. The aim is to explore how origin-related cues, whether explicit or implicit, affect the portrayal of offenders or suspects in German regional newspapers. Specifically, we address the following research questions:

RQ5: How are perpetrators or suspects portrayed in German regional newspapers, depending on the mention of their (non-)German) origin?

1 This reflects a long-standing practice, as the problematic interdependent relationship between local news outlets and the police as a source has been widely discussed (Grygiel & Lysak, 2020; Lewis et al., 2008; O'Neill & O'Connor, 2008).

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RQ6: What similarities and differences emerge across these portrayals?

RQ7: Does the way the origin of perpetrators or suspects is addressed vary across the different frames identified in the quantitative analysis?

3. Method

3.1 Study design

To study the framing of criminals in German regional newspapers, we chose a mixed-methods approach: First, we performed a quantitative content analysis on crime news published in four German regional newspapers representing German regions: *Neue Osnabrücker Zeitung*, *Freie Presse*, *Nürnberger Nachrichten*, and *Westdeutsche Allgemeine Zeitung*, from January to July 2024, which resulted in identifying the predominant frames. In a second step, we conducted a complementary, in-depth analysis of selected articles from the original sample that either mentioned perpetrators' origins directly or implicitly hinted they are of foreign origin, incorporating a qualitative content analysis.

3.2 Quantitative content analysis

3.2.1 Sampling

The four German regional newspapers *Osnabrücker Zeitung* (for Northern Germany), *Freie Presse* (for Eastern Germany; former German Democratic Republic), *Nürnberger Nachrichten* (for Southern Germany), and *Westdeutsche Allgemeine Zeitung* (for Western Germany) were chosen due to their extensive readership within their regions (Schröder, 2024).[2] The *Neue Osnabrücker Zeitung* is based in a relatively safe city but operates near high-crime areas such as Bremen and Hanover. However, Osnabrück has lately recorded an increased number of violent offenses, including assault, robbery, and threats, reaching one of its highest levels in the past 30 years (Polizeidirektion Osnabrück, 2025). The *Freie Presse* in Chemnitz reports from a city with an above-average crime rate that has drawn national attention due to incidents involving violent crime and right-wing extremism (Polizei Sachsen, 2025; Sächsische Staatskanzlei, 2025). It provides a compelling case for analyzing local crime reporting in politically charged settings. The *Nürnberger Nachrichten* covers one of the more crime-affected cities in otherwise safe southern Germany (Polizeipräsidium Mittelfranken, 2025), making it suitable for investigating how crime is framed in comparatively secure urban areas. The *Westdeutsche Allgemeine Zeitung* (WAZ), with editorial offices across the Ruhr area, operates in one of Germany's most crime-intensive regions (Landeskriminalamt Nordrhein-Westfalen, 2024). This area reflects urban challenges such as soci-

2 Certain newspapers with comparable or even greater reach were not included in the analysis, as their content was not accessible for us.

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al inequality, gang activity, and other forms of diversity, making it representative of crime discourse in Western metropolitan contexts.

The GBI-Genios WISO-net platform was utilized to access news articles from online outlets of regional newspapers, with authorized access granted through affiliation with Chemnitz University of Technology. To identify an article as relevant for analysis, it was required that at least one of the terms "offender," "victim," or "crime" appeared in conjunction with at least one other crime-related term, such as "trial," "arrest," or "police." Articles were excluded if the reported offense occurred abroad. Given the high volume of crime news published by these outlets, we employed artificial weeks for the evaluation period, resulting in a total sample of 468 crime news articles (*Westdeutsche Allgemeine Zeitung*: n = 204; *Freie Presse*: n = 199; *Neue Osnabrücker Zeitung*: n = 54; *Nürnberger Nachrichten*: n = 29). This approach ensures representative coverage of crime reporting trends within the analyzed period (January–July 2024).

3.2.2 Quantitative operationalization

A codebook was developed using a deductive-inductive approach (e.g., Brill et al., 2025; Dittrich & Klimmt, 2020; Goedeke Tort et al., 2016). The codebook included formal categories such as coder (κ = 1.00; r_H = 1.00), contribution number (κ = 1.00; r_H = 1.00), medium (κ = 1.00; r_H = 1.00), date (κ = 1.00; r_H = 1.00), and word count (κ = .89; r_H = .90) (see Rössler, 2017).

The codebook also encompassed content categories for each frame element (see Brill et al., 2025). This included the actors mentioned in the reports (mentioned, not mentioned), such as citizens (κ = 1.00; r_H = 1.00), police (κ = 1.00; r_H = 1.00), migrants (κ = .78; r_H = .97), and political parties (κ = 1.00; r_H = 1.00), as well as the crimes committed (mentioned, not mentioned), such as murder (κ = 1.00; r_H = 1.00), bodily harm (κ = .71; r_H = .90), rape/sexual abuse (κ = 1.00; r_H = 1.00), fraud (κ = 1.00), and traffic offenses (κ = .61; r_H = .90), to identify the problem definition in the articles.

Additionally, data were collected regarding the perpetrators' or suspects' portrayal (see Brill et al., 2025). This encompassed various aspects, including the number of individuals involved (not specified, single offender, several perpetrators, or a group/organization; κ = .74; r_H = .83), age categories (mentioned, not mentioned), such as adolescents aged 14 to 18 (κ = 1.00; r_H = 1.00), or adults aged 18 to 64 (κ = 1.00; r_H = 1.00), gender (mentioned, not mentioned), including not specified (κ = .87; r_H = .93), male (κ = .87; r_H = .93), female (κ = .65; r_H = .97), and other (κ = 1.00; r_H = 1.00), and description of appearance (described, not described; κ = 1.00; r_H = 1.00). It also included citations of the criminal/suspect (mentioned, not mentioned; κ = 1.00; r_H = 1.00) or related individuals, such as their attorney (κ = 1,00; r_H = 1.00), and origin (mentioned, not mentioned), including German (κ = 1.00; r_H = 1.00) and non-German/migration background (κ = 1.00; r_H = 1.00). The specific country of origin was recorded in cases of non-German offenders or suspects (open evaluation; κ = 1.00; r_H = 1.00). Furthermore, information was collected regarding whether the individuals involved in the criminal activity were identified (not specified, perpetrator still unknown, per-

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son suspected, perpetrator known; κ = .63; r_H = .76) and whether they had been arrested (not specified, perpetrator arrested or convicted, perpetrator not yet arrested or convicted, perpetrator on the run; κ = .60; r_H = .73).

The causal attribution (mentioned, not mentioned) encompassed both personal factors, such as family issues (κ = 1.00; r_H = 1.00), alcohol or drug use (κ = .76; r_H = .93), and mental health issues (κ = 1.00; r_H = 1.00), as well as social factors, such as religious affiliation (κ = 1.00; r_H = 1.00), origin (κ = 1.00; r_H = 1.00), and association with a criminal organization (κ = 1.00; r_H = 1.00), that were reported to have contributed to the commission of the crime. References to origin were treated as causal attributions only when a discernible connection to the crime was made, typically by implying sociocultural factors or by reporting migration- or origin-related causes (e.g., "He acted out of frustration over what he perceived as an unsuccessful appointment at the Kiel Immigration Office", case 110). A simple mention of origin was not sufficient to justify this coding. When reports provide limited contextual information, the portrayal of origin often implicitly links the affected social group to the crime. Including details such as a suspect's origin, appearance, or religion in a crime report constitutes a deliberate editorial judgment. It may activate cognitive schemas that imply culturally or socially rooted causes of criminal behavior. Such co-activation may then serve as a basis for subjective causal attribution by audiences (Dittrich & Klimmt, 2020).

The moral evaluation (κ = .68; r_H = .93) included no discernible evaluation, or explicit positive, negative, or ambivalent assessments (see Goedeke Tort et al., 2016). The frame element treatment recommendation encompassed the actions suggested in the reports to address or improve the situation or issue (mentioned, not mentioned), such as increased enforcement of controls or safety measures (κ = 1.00; r_H = 1.00) and the respective target audiences for these actions, such as citizens (κ = 1.00; r_H = 1.00) and government/city administration (κ = 1.00; r_H = 1.00).

To ensure the reliability and intersubjective reproducibility of the coding process, intercoder reliability was assessed on a randomly selected subsample of 30 cases, utilizing Cohen's Kappa (κ) (Altman, 1991; Landis & Koch, 1977) and Holsti's coefficient (r_H) based on paired comparisons (Rössler, 2017). Values of κ = .80 and r_H = .90 or higher typically indicate very high measurement quality, while values of κ = .40 and r_H = .70 or above are acceptable for more complex or ambiguous categories (Altman, 1991; Früh, 2017; Landis & Koch, 1977). Two experienced coders, who underwent extensive training to ensure consistency in their coding decisions, were involved. The average intercoder reliability achieved was κ = .87 and r_H = .98, with the lowest score for any individual variable being κ = .60 and r_H = .73. The results demonstrated that all categories achieved satisfactory reliability levels, justifying the remaining sample's independent coding.

3.2.3 Quantitative data analysis

To address RQ1, a cluster analysis was conducted. Given the study's exploratory nature and to enhance the reliability and validity of the analysis (Matthes & Kohring, 2004), frames were not predefined. First, the frequencies of all variables

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were examined. With a relatively small sample size, the usual 5% threshold was adjusted to 4%, and some categories were recoded as needed. In total, 25 variables related to the frame elements were included in the cluster analysis. The only exception was the frame element treatment recommendation, including the addressees, as the frequency of related variables was too low for meaningful inclusion. In the second step, divergent cases were identified through single-linkage clustering and dendrogram analysis. Four cases were excluded, resulting in a dataset of n = 480 for the cluster analysis. Finally, using Ward's linkage method, clusters were progressively merged. The elbow criterion indicated a four-cluster solution, identifying four distinct frames. Means and t-values were used to describe the frames, with F-values checked to confirm cluster homogeneity (see Table 2 for means). The clusters were found to be internally homogeneous. For all other RQs, subsequent tests (mainly Chi² tests) were performed.

3.3 Qualitative content analysis

To gain a more in-depth understanding of how perpetrators are portrayed and how crimes are contextualized, we conducted a content-structuring analysis (qualitative approach) using MAXQDA (Kuckartz & Rädiker, 2023). The category development followed a "mixed strategy" (Wiesner, 2022, p. 14) by deriving the main thematic categories deductively (such as the frame elements, or perpetrator's or suspect's origin) from the state of research and adding most subcategories inductively through an iterative coding process (Mayring, 2021). To ensure consistency in the application of codes, we employed a consensual coding approach involving collaborative discussion among the researchers contributing to the analysis.

For the qualitative content analysis, a purposive subsample from the original dataset was selected. The selection aimed at capturing variation across the three identified types of origin references (explicit German, explicit non-German, and implicit non-German), while also considering the prior identified frames and media outlets. There were n = 66 articles in total referencing perpetrators' origin explicitly or implicitly. The smallest number of articles referred to those reporting perpetrators' German origin, with a total of n = 9 articles. To ensure a more balanced comparison, we decided to use this group as the reference group and included nine articles for each subgroup of origin reference in the qualitative analysis. To ensure diversity within the sample and to avoid selection bias, we aimed for a balanced representation of newspapers and frames when selecting the articles. The final sample of n = 27 articles used for the qualitative analysis is depicted in Table 1.

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Table 1. Sample for qualitative analysis

Nr.	Article Nr.	Newspaper	Frame
Articles with mention of German origin of offenders (n = 9)			
1	598	Freie Presse	Vandals
2	233	WAZ	Felons
3	344	Freie Presse	Thieves and burglars
4	524	Freie Presse	Vandals
5	704	Nürnberger Nachrichten	Felons
6	541	Freie Presse	Vandals
7	604	Freie Presse	Vandals
8	436	Freie Presse	Thieves and burglars
9	251	Freie Presse	Felons
Articles with explicit mention of non-German origin of offenders (n = 9)			
1	375	Freie Presse	Negligent traffic offenders
2	395	WAZ	Negligent traffic offenders
3	801	Freie Presse	Vandals
4	275	Freie Presse	Vandals
5	470	Nürnberger Nachrichten	Felons
6	807	Nürnberger Nachrichten	Thieves and burglars
7	469	Neue Osnabrücker Zeitung	Felons
8	773	Neue Osnabrücker Zeitung	Felons
9	764	WAZ	Thieves
Articles with implicit mention of non-German offenders (n = 9)			
1	299	Nürnberger Nachrichten	Felons
2	861	Nürnberger Nachrichten	Thieves and burglars
3	306	Freie Presse	Thieves and burglars
4	420	Freie Presse	Thieves and burglars
5	415	Freie Presse	Thieves and burglars
6	812	WAZ	Felons
7	911	WAZ	Felons
8	935	WAZ	Thieves and burglars
9	742	WAZ	Thieves and burglars

Notes. The article numbers refer to a pre-selection of all articles published within the defined time-frame. Only those articles reporting on criminal offenses were included in the final sample.

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4. Results

4.1 Results of the quantitative content analysis

The results of the content analysis revealed that *Westdeutsche Allgemeine Zeitung* (*n* = 204; 42%) and *Freie Presse* (*n* = 199; 41%) reported on criminal matters more frequently than *Neue Osnabrücker Zeitung* (*n* = 54; 11%) and *Nürnberger Nachrichten* (*n* = 29; 6%). Average length of a report on a criminal offense was 238 words (*M* = 238.18; *SD* = 170.23). The actors most frequently referenced in crime news include representatives from the police or the judicial system (99%), citizens (96%), children or adolescents (20%), individuals with a migration background (10%), and political parties or politicians (5%). The most represented criminal offenses are theft (36%), bodily harm (29%), criminal mischief (22%), fleeing from justice (22%), traffic offenses (17%), and murder (11%).

In 44% of the cases, a single perpetrator or suspect was mentioned, while in 42% multiple perpetrators or a group of criminals were involved. In many cases, the perpetrator's or suspect's age was not specified (46%), but when provided, the age range was predominantly adults between the ages of 18 and 64 (46%), with younger individuals aged 14–17 being less frequently mentioned (8%). Regarding the gender, male perpetrators or suspects (65%) were considerably more frequently represented than of female perpetrators or suspects (6%). While the origin of criminals or suspects was typically absent from the reports (85%), the migration background was referenced at a rate nearly five times higher (13%) than that of German origins (3%). In cases where the country of origin of immigrant perpetrators was explicitly mentioned, the most frequently cited nationalities included individuals from Turkey (13%), Syria (11%), Poland (7%), and Romania (7%). When the non-German origin of perpetrators was indicated, it predominantly pertained to reports of theft or burglary, assault, murder, rape or sexual abuse, and illegal possession of weapons. Conversely, in the few instances where the German origin of perpetrators was noted, it was predominantly associated with property damage, assault, murder, theft or burglary, and sedition.

4.1.1 Frames of criminals in German regional newspapers (RQ1)

The cluster analysis identified four frames of criminals (see Table 2):

Felons (35%; *n* = 167): This frame is characterized by serious crimes, including bodily harm (42%), murder (25%), rape/sexual abuse (15%), and fraud (13%), disproportionately involving children (29%). Causal attributions frequently point to personal factors, primarily the criminal's social or family issues (26%) or mental health issues (12%). The moral evaluation is disproportionately negative (15%). Most perpetrators in this frame have been identified (67%) and apprehended (60%). They are disproportionately cited in the reports (15%). Most offenders are single individuals (56%). Although women were rarely featured in the analyzed articles, they are mentioned in 11% of cases in this frame, while men are explicitly cited as perpetrators or suspects in 81% of cases. Individuals over the age of 18 are named as perpetrators or suspects in 65% of cases, yet minors also

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appear at a higher-than-average rate (10%). In 8% of cases within this frame, the appearance of individuals involved in crimes is described. Names are disproportionately mentioned (fully or partially) in another 8% of cases. On average, the articles of this frame possessed the longest average word count among the examined frames (M = 312.15; SD = 188.11).

Thieves and burglars (29%; n = 141): This frame commonly encompasses theft or burglary (83%), flight from justice (40%), and bodily harm (20%). Immigrants are frequently mentioned as perpetrators or suspects (18%), with companies often identified as victims (15%). Causal attributions are infrequent but, when included, typically emphasize social factors, primarily the criminal's (foreign) background (10%). Generally, limited information is disclosed about the perpetrator or suspect. Criminals in this frame commonly act as a group (53%) and are often unknown (61%). Although age information is scarce, minors are involved at a higher-than-average rate (13%), whereas adults are specified in 35% of cases. In 63% of cases, the perpetrator or suspect is identified as male, and in only 3%, as female. The appearance of individuals involved in crimes is described disproportionally within this frame (17%). On average, the articles related to this frame were 199 words in length (M = 198.99; SD = 149.98).

Vandals (19%; n = 93): This frame primarily involves property damage (99%) and theft or burglary (37%), with causal attributions often linked to personal factors, such as the perpetrators' political attitudes (12%) or negligent behavior (11%). Crimes in this frame are frequently committed by groups (54%), and the perpetrators or suspects are often unidentified (59%). In 37% of cases, arrests are reported, whereas in 26% the suspects remain at large. Limited information is provided on the perpetrators or suspects: Males are mentioned in 24% of cases, while females are noted in only 3%. In 23% of the reports, the age of the adults involved was specified as between 18 and 64 years old. Minors were mentioned in 9% of the reports. The moral evaluation is explicitly negative in 5% of cases. On average, the articles in this frame were 179 words in length (M = 178.84; SD = 135.38) and thus the shortest in the sample.

Negligent traffic offenders (17%; n = 79): The last frame focuses on traffic offenses (87%), bodily harm (48%), and flight from justice (39%; i.e., hit and run), with causal attributions mainly pointing to personal factors, primarily negligent actions (61%) or drug or alcohol abuse (32%). Considerable information is disclosed about the perpetrators and suspects, who are primarily single offenders (76%), identified (75%), and, in many cases, arrested (44%). Women are disproportionately represented as suspects in this frame (8%), though most suspects remain male (76%). Most perpetrators or suspects mentioned are between 18 and 64 years old (65%). On average, the articles related to this frame were 218 words in length (M = 218.05; SD = 145.54).

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Table 2. Frames of criminals in German regional crime news

	Felons	Thieves and burglars	Vandals	Negligent traffic offenders
Problem definition (involved actors)				
Immigrants	8%	18%	4%	1%
Citizens	98%	95%	92%	100%
Police/justice system	98%	99%	100%	100%
Medical employees	14%	3%	1%	15%
Children/adolescents	29%	15%	11%	16%
Companies	7%	15%	16%	4%
Political Parties/government	11%	-	3%	1%
Problem definition (committed crimes)				
Murder	25%	5%	-	6%
Bodily harm	42%	20%	2%	48%
Theft or burglary	10%	83%	37%	5%
Property damage	5%	3%	99%	3%
Fraud	13%	1%	-	1%
Rape/sexual abuse	15%	1%	-	-
Insult	10%	1%	-	6%
Threat	10%	9%	1%	3%
Illegal possession of weapons	7%	6%	2%	-
Traffic offenses	1%	3%	5%	87%
Flight from justice	7%	40%	5%	39%
Causal attribution				
Origin	1%	10%	3%	-
Mental health issues	12%	1%	1%	-
Problems in the social environment	26%	1%	4%	3%
Drug or alcohol abuse	8%	2%	1%	32%
Negligent behavior	10%	1%	11%	61%
Political attitude	10%	1%	12%	3%
Moral evaluation				
negative	15%	1%	5%	1%

Note. $n_{\text{Felons}} = 167$; $n_{\text{Thieves and burglars}} = 141$; $n_{\text{Vandals}} = 93$; $n_{\text{Negligent traffic offenders}} = 79$.

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4.1.2 Differences in reporting perpetrators' origins across frames (RQ2)

Significant differences exist between the frames in highlighting a perpetrator's origin, $\chi^2(3) = 24.81$, $p < .001$, $V = .23$ (see Table 3). The origin of a perpetrator or suspect is most frequently emphasized in the *Thieves and burglars* frame, followed by the *Felons* frame. It is mentioned less often in articles concerning *Vandals* and *Negligent traffic offenders*.

Table 3. Frequency of reporting perpetrators' or suspects' origins across frames

	Felons	Thieves and burglars	Vandals	Negligent traffic offenders
Origin not mentioned	83%	75%	92%	97%
Origin mentioned	17%	25%	8%	3%

Notes. $n_{\text{Felons}} = 167$; $n_{\text{Thieves and burglars}} = 141$; $n_{\text{Vandals}} = 93$; $n_{\text{Negligent traffic offenders}} = 79$. $\chi^2(3) = 24.81$, $p < .001$, $V = .23$.

In the *Felons* frame, the non-German origin of perpetrators is explicitly noted in 16% of cases, compared to only 4% for German origin.[3] In the *Thieves and burglars* frame, non-German origin is frequently highlighted (24%), whereas German origin is mentioned in just 1% of cases. In contrast, the *Vandals* frame disproportionately emphasizes German origin (5%), with non-German origin referenced in only 3% of cases. For the *Negligent traffic offenders* frame, the origin of perpetrators is generally unspecified; however, when mentioned, it exclusively refers to non-German origins (3%).

4.1.3 Differences in the use of frames across newspapers (RQ3)

The analysis reveals significant variation in frame distribution across regional newspapers, $\chi^2(3) = 73.31$, $p < .001$, $V = .23$ (see Table 4). The *Freie Presse*, representing East Germany, tends to emphasize reports on *Vandals* and *Thieves and burglars*, while it reports less on *Felons* and *Negligent traffic offenders*. The *Westdeutsche Allgemeine Zeitung* (West Germany) primarily covers *Felons* and *Thieves and burglars*, with fewer reports on *Negligent traffic offenders* and *Vandals*. A similar frame distribution is observed in the *Neue Osnabrücker Zeitung* (Northern Germany), which focuses more on *Felons* and *Thieves and burglars*. Meanwhile, the *Nürnberger Nachrichten*, representing Southern Germany, focuses strongly on *Felons*, with less emphasis on the other frames.

3 Please note that German and non-German perpetrators may be mentioned simultaneously in a report.

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Table 4. Frame distribution across newspapers

	Felons	Thieves and burglars	Vandals	Negligent traffic offenders
Freie Presse	20%	30%	35%	16%
Westdeutsche Allgemeine Zeitung	42%	30%	9%	18%
Nürnberger Nachrichten	71%	14%	7%	7%
Neue Osnabrücker Zeitung	43%	32%	8%	17%

Notes. $n_{\text{Felons}} = 167$; $n_{\text{Thieves and burglars}} = 141$; $n_{\text{Vandals}} = 93$; $n_{\text{Negligent traffic offenders}} = 79$. $\chi^2(3) = 73.31$, $p < .001$, $V = .23$.

4.1.4 Differences in reporting perpetrators' origins across newspapers (RQ4)

While frames differ in how frequently they mention the non-German origin of perpetrators and frame distribution varies across newspapers, the newspapers themselves do not significantly differ in the frequency with which they mention the non-German origin, $\chi^2(3) = 4.33$, $p = .22$, $V = .10$ (see Table 5). The *Freie Presse*, *Westdeutsche Allgemeine Zeitung*, and *Nürnberger Nachrichten* exhibit similar frequencies in mentioning non-German origins. In contrast, the *Neue Osnabrücker Zeitung* references non-German origin less frequently.

Table 5. Frequency of reporting perpetrators' or suspects' non-German origin across newspapers

	Freie Presse	Westdeutsche Allgemeine Zeitung	Nürnberger Nachrichten	Neue Osnabrücker Zeitung
German origin mentioned/ origin not mentioned	88%	84%	86%	94%
Non-German origin mentioned	12%	16%	14%	6%

Notes. $n_{\text{Felons}} = 167$; $n_{\text{Thieves and burglars}} = 141$; $n_{\text{Vandals}} = 93$; $n_{\text{Negligent traffic offenders}} = 79$. $\chi^2(3) = 4.33$, $p = .22$, $V = .10$.

The German origin of a perpetrator or suspect was mentioned more frequently in *Nürnberger Nachrichten* (7%) and *Freie Presse* (4%) than in *Westdeutsche Allgemeine Zeitung* (2%) or *Neue Osnabrücker Zeitung* (0%); however, these differences are also not significant, $\chi^2(3) = 6.19$, $p = .10$, $V = .11$.

4.2 Results of the qualitative content analysis

The qualitative content analysis further revealed distinct patterns in how the origin of perpetrators with German or non-German backgrounds was reported (RQ5).

Concerning reports on crimes involving German suspects or offenders, little additional information about the perpetrators or suspects is disclosed; typically, only their sex and age were reported. In one instance, the perpetrator is described

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as a sports marksman. Notably, the explicit mention of German origin predominantly appeared in reports of criminal offenses committed by groups of men. This pattern may indicate an attempt to preempt anticipated accusations from right-wing commentators by clarifying the perpetrators' background. Only one article employs markedly dramatizing stylistic devices, referring to a "deed of blood", "hated neighbors", and stating that the victims were "virtually executed within a very short time." The perpetrator in this case is portrayed as particularly calculating, with the article noting: "The 64-year-old is said to have been lying in wait for this" (case 704).

The portrayal of perpetrators whose non-German origin is explicitly mentioned typically includes reference to their country of origin. Several articles emphasize the perpetrators' mental health status, using terms such as "psychotic" and "traumatized" (case 764), or describing them as psychologically unwell (cases 773, 110). In addition, substance use is frequently highlighted, with perpetrators reported to have been under the influence of alcohol and drugs. In one instance, the perpetrator's name is repeated multiple times ("Ibrahim A.", case 110), potentially reinforcing his otherness. A dramatizing language style is also evident in some of the portrayals, with phrases such as "horror and grief" (cases 110, 801), "brutal," "discarded like trash" (case 470), and a "Hollywood-like" police intervention (case 764) contributing to a sensationalized reporting.

The portrayal of perpetrators whose *non-German origin is implied* relies on a range of indirect markers. Such implications are made through phrases like "foreign youngsters" (case 415) or "young men from the Arab or North African region" (case 306). Names also serve as indicators; certain names are repeatedly mentioned, even in brief articles, for instance, "Jalil H.", "Hakim H.", and "Saad U.", whose names appear multiple times in article 299. Additionally, references to physical appearance contribute to this implicit framing: perpetrators are described as having a "tanned skin tone" (case 742), "dark curled hair" (case 306), or a "southern appearance" (cases 861, 420). Linguistic cues further reinforce the perceived otherness, with several articles noting non-German accents: Perpetrators are reported to have "spoken broken German with a heavy accent" (case 812), "spoken with a possibly Arabic dialect" (case 742), or used a "southern dialect" (case 935). Communication difficulties are highlighted as well, for instance, through remarks about "massive problems with communication [in court]," necessitating a translator or relying on a son to interpret, which reportedly led to misunderstandings. Such language barriers are described as obstacles to achieving justice (case 299).

A systematic comparison of the three groups of articles reveals both similarities and notable differences in the portrayal of perpetrators in connection with their (constructed) identity (RQ6). Across all groups, selective disclosure of personal details, such as age, sex, and occasionally occupation, are common tools for constructing criminal identities. However, differences emerged in how origin is used in the articles, emphasized and contextualized. In the context of most negligent crimes (e.g., traffic offenses), the origin of perpetrators was typically not mentioned. There is reason to believe that, in such cases, a German origin is implicitly assumed as the default and therefore deemed unworthy of mention. For perpetra-

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tors of German origin, their background is notably often explicated in cases involving groups of offenders, seemingly as a strategy to counter anticipated right-wing narratives of criminal clans or gangs. In contrast, non-German origin is either explicitly stated (see 4.1.2) or implicitly suggested through a range of cues, including country of origin, names, appearance, and language proficiency (see 4.2) and contextually more frequently associated with personal characteristics or shortcomings such as mental illness, substance abuse, and communication barriers, reinforcing stereotypes of otherness. Dramatizing elements appear more pronounced in cases where a non-German origin of perpetrators or suspects is mentioned or implied, with sensationalist phrases and detailed descriptions of their "foreign" traits. This comparison suggests a pattern of differentiation: while German perpetrators or suspects are presented in a more restrained, factual manner, non-German perpetrators or suspects are depicted through a lens of cultural and social deviance, both explicitly and implicitly. Since it is impossible to account for journalists' intentions in a content analysis, and coding causal attributions proved challenging in the quantitative component, we aimed to identify indications within the qualitative content analysis of whether the mention of perpetrator's or suspects' origin served to portray it as causally relevant. This was not the case: In none of the articles included in the subsample for the qualitative analysis was the mere mention of origin coded as an attribution of causality. This indicates that, although it would in principle be possible for perpetrators' or suspects' origin to be described in the articles as causal factor for their actions and accordingly coded as such, this does not appear to be an occurring pattern.

To assess how perpetrators' or suspects' origin is mentioned across the frames identified in the cluster analysis (RQ7), a qualitative review of the cases in the subsample was conducted. In the "traffic offenders" frame, no general implication of foreign nationality/migration background was observed; however, two instances explicitly mentioned the Polish nationality of drunk drivers. These references appear incidental and are not representative of the broader frame. Within the "vandals" frame, most suspects were identified as young Germans, often in connection with minor acts such as setting fire to garbage bins or damaging vehicles. In one case, a politically motivated attack on a constituency office was attributed to a German suspect. Occasionally, references to alcohol consumption served as causal attributions, but national origin was not foregrounded. The "thieves and burglars" frame revealed a different pattern: While one case of organized car theft explicitly named both suspects as German, descriptions of other suspects frequently included vague references such as "southern appearance", particularly in contexts where police were still searching for witnesses. This implicit form of attribution also appeared in a few instances within the "felons" frame, most commonly in relation to sexual assaults or physical altercations. Several reports involving more serious offenses, such as knife attacks or sexual violence, explicitly mentioned a non-German origin of the alleged perpetrators.

Overall, while explicit mentions of origin are rare and unevenly distributed, there seems to be a discernible tendency for foreign or non-German origin to be more frequently referenced – whether implicitly or explicitly – in frames associated with more serious or violent crimes.

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5. Discussion

Through quantitative content analysis of crime reports in German regional newspapers, we identified four frames predominantly used to describe and contextualize criminals. Reports about *Felons* were particularly frequent and stand out for their length, often disclosing more detailed information about the offender or suspect, such as (personal) factors that led to the commitment of the crime and their (non-German) origin, which may be explained by greater public interest in serious crimes and a higher news value (e.g., Brill et al., 2021). Offenders or suspects in this frame were quoted more frequently than average. These reports make it easier to obtain a more detailed picture of perpetrators or suspects and the circumstances, and are frequently framed in a morally negative manner. Reports about *Thieves and burglars* were also frequent, though shorter on average and provided less information about the perpetrators or suspects. Even more so than the *Felons* frame, these reports more strongly suggested a stereotypical portrayal of perpetrators with a migration background by typically solely including details about their (non-German) origin and the commitment of offenses in groups. *Vandals* received the shortest coverage, with limited information provided about the perpetrators or suspects. Crimes in the fourth frame, involving, *Negligent traffic offenders*, were reported extensively. However, these articles generally provided limited information about the perpetrators or suspects. Their origin was rarely mentioned; however, when it was, the emphasis was predominantly placed on their migration background. Typically, personal factors contributing to the crime, such as driving under the influence or simple misbehavior, were highlighted.

A comparison with official crime statistics reveals that certain types of crime – and by extension, particular offender profiles – are overrepresented in local media coverage. While the reports analyzed in our study primarily focused on offenses such as theft (36%), bodily harm (29%), criminal mischief (22%), traffic offenses (17%), murder (11%), rape or sexual abuse (6%), or fraud (5%), the official crime statistics paint a different picture. According to the national data (see Federal Criminal Police Office, 2025), violent crimes such as bodily harm account for approximately 11%, offenses against life (e.g., murder or manslaughter) for only 0.1%, and sexual offenses for about 2% of all recorded crimes – significantly lower than their frequency in local media reporting. Offenses such as criminal mischief, which make up around 9% of actual criminal offenses, are also overrepresented in media coverage. Conversely, fraud (13%) is underrepresented in local media. Only the frequency of reports on (serious) theft, which constitutes roughly 33% of recorded crimes, is consistent with official statistics. Traffic offenses are not directly included in official crime statistics, as they are not classified as independent criminal offenses but typically recorded under other categories, such as criminal mischief. Consequently, no direct comparison can be drawn between the frequency of traffic offenses in media reports and their representation in official crime statistics. According to crime statistics, foreign individuals account for nearly 35% of criminal suspects in Germany. This figure also includes individuals who do not reside in Germany but were temporarily present or those

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who entered the country with the specific intent to commit an offense in Germany (Federal Ministry of the Interior and Community, 2025). Accordingly, most criminal suspects are of German origin. While the origin of perpetrators or suspects was typically absent from the reports, a migration background was mentioned nearly five times more often (13%) than a German origin (3%), contradicting official crime statistics and potentially contributing to a distorted public perception.

Since the articles across all frames rarely included recommendations for action or addressed specific addressees, this frame element had to be excluded from the analysis. Given that moral evaluation was also infrequent, it can be concluded that journalists of regional newspapers tend to report about events or rephrase police reports than offer additional investigation, critical analysis of the subject matter, (local-level) policy implications or in-depth moral judgments. Still, decisions about selection, framing, and emphasis remain editorial choices for which journalists are accountable under professional standards like the Press Code.

The results further revealed that crime was predominantly reported in East and West Germany, with significantly fewer reports in southern and northern regions, which aligns with the regional distribution of crime rates (Kuhn & Niewendick, 2024). Considering their closer correspondence with these statistics, regional newspapers may offer a more accurate portrayal of criminal activity in a given region than national news outlets. The latter often disproportionately focus on serious crimes, such as murder or terrorism (see Brill et al., 2025). Still, the newspapers analyzed in this study exhibited a notable focus on serious crimes, frequently reporting on *Felons* and *Thieves and Burglars*. The *Nürnberger Zeitung* seems to dedicate a disproportionate amount of coverage to felonies, although, statistically, fewer such crimes occur in southern Germany. Among the outlets studied, only *Freie Presse* demonstrated a relatively balanced distribution of frames.

Another consistent theme in reporting criminal activity is the more frequent mentioning of non-German origin than German origin of perpetrators or suspects, although differences are even more pronounced in national news outlets (see Brill et al., 2025; Dittrich & Klimmt, 2020). Conversely, crime statistics indicate that German individuals are more likely to commit crimes than their non-German counterparts (Federal Ministry of the Interior and Community, 2025). The tendency to imply or explicitly state the non-German origin of perpetrators and suspects was evident to similar extents across all newspapers examined in the study. The country of origin was often explicitly emphasized when the individuals involved were from Turkey or Syria, nations already subject to prevalent stereotypes (Partain & Weaver, 2022). The repeated association of these nationalities with criminal activity risks reinforcing and entrenching these stereotypes (Klimmt et al., 2024). Notably, non-German origins were frequently highlighted in reports concerning serious criminal offenses such as assault, murder, rape, and sexual abuse i.e., in the *Felons* and *Thieves and burglars* frames. In such cases, one might argue that disclosing the perpetrators' origins could be justified in the public interest. This standard appears to be applied inconsistently, as the German origin of perpetrators was rarely mentioned explicitly, even in the context of similarly seri-

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ous offenses. The qualitative content analysis further revealed that, in the frames of *Felons* and *Thieves and burglars*, more subtle references are made to the origins of the individuals involved. This includes descriptions of appearance or the mention of foreign-sounding names. The qualitative analysis of a subsample identified this as a general pattern: A non-German background is often conveyed implicitly through linguistic, visual, or cultural cues such as names, appearance, and language proficiency. These indirect markers serve to classify suspects without explicitly naming their origin. Such "cues" are often sufficient to be recognized by audiences and can prime stereotypical perceptions (Gaddis, 2017). The qualitative analysis also revealed that, in contrast to reports on German offenders or suspects, cases in which a non-German origin is explicitly stated are often accompanied by stigmatizing details such as references to mental illness, substance abuse, or the use of dramatizing language. This might reinforce a narrative of deviance and otherness. Moreover, a non-German background is also conveyed implicitly through linguistic, visual, or cultural cues such as names, appearance, and language proficiency. These indirect markers serve to classify or even stereotype suspects without explicitly naming their origin.

Although we did not investigate the reasoning behind journalists' decisions, it seems likely that newspapers feel compelled by their readership to include information regarding the origin of perpetrators in their reports. Research suggests that journalists tend to align their reporting with audience preferences, particularly given the immediate feedback available through online comments (Ferrer-Conill & Tandoc, 2018; Reinemann & Baugut, 2014). Right-wing populist actors have been exerting pressure on news media to modify how foreign criminality is portrayed (Dittrich & Klimmt, 2020; Krämer, 2017), and in times of increased migration and populist calls for disclosure, the mentioning of perpetrators' origins increased in German newspapers (Klimmt et al., 2024). Additionally, it is possible that unconscious stereotypical biases can influence journalists' editorial decisions (Coleman, 2003). In certain cases, editors may perceive the origin of perpetrators as part of broader social or political issues and aim to highlight patterns or societal problems through their emphasis. Unfortunately, mentioning origin can also be driven by sensationalist motives, intended to make the report more 'exciting' or 'newsworthy' (Galtung & Ruge, 1965; Maier et al., 2018), and thereby attract more attention, clicks, or circulation. Some editors, however, adhere more to ethical guidelines that stress reporting only relevant facts necessary for understanding the offense, of which the origin is often not considered a part. To establish a causal relationship in either direction, it would be necessary to consider journalists' perceptions of such populists' demands and their reasoning behind the origin-related portrayal of criminals.

While the study provides valuable insights by combining qualitative and quantitative approaches, limitations must be acknowledged. First, the sample of articles was unevenly drawn from different regional newspapers, meaning that certain publications, with their specific perspectives or framing styles, may be overrepresented, potentially leading to a skewed depiction that may not accurately reflect the broader media sector analyzed. Nevertheless, since the sample was drawn under consistent conditions, by creating artificial weeks, it can be as-

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sumed that it accurately reflects the frequency of crime news and the distribution of topics, i.e., crimes, among the newspapers. Second, we focused solely on the textual content of the articles and did not analyze images that sometimes accompany crime reports in regional newspapers. Images depicting the perpetrator, potentially revealing visual traits such as skin color, may implicitly convey information about the perpetrator's migration background, as well as other characteristics such as gender. Third, since Entman's framing approach was originally developed to analyze media portrayals of events or situations, it is important to critically reflect on the extent to which it can be applied to the framing of individuals. Given that crime is inherently linked to individuals and the approach has already been applied to the framing of individuals or social groups (e.g., Brill et al., 2025; Dan & Ren, 2021; Goedeke Tort et al., 2016; Lavie-Dinur et al., 2013; Lawler & Tolley, 2017; Muncie, 2019), it seems conceptually valuable to apply the framework to perpetrators. While certain frame elements were rarely observed in our analysis, this is not problematic, as Entman (1993) explicitly notes that not all frame elements must necessarily be present in each frame.[4] This is supported by other studies showing that frame elements often appear selectively (e.g., Brill et al., 2025). Fourth, it can be questioned whether frames can be reliably identified in relatively short regional newspaper articles. We assume, however, the average article length of 238 words to allow for sufficient interpretive context. Longer texts may complicate frame attribution, since multiple interpretive patterns often coexist within them (Matthes & Kohring, 2008).

Despite these limitations, this study provides insights into the framing of criminals and suspects in German regional newspapers through a mixed-methods approach, combining quantitative analysis that identifies specific frames of criminals with qualitative analysis. In particular, the qualitative approach added value to the existing body of research by providing an in-depth exploration of how explicit or implicit references to perpetrators' origin contribute to their framing in regional media coverage. From an impact perspective, the findings raise considerable concerns: Frequent portrayals of minority group members involved in criminal activities are likely to solidify negative perceptions of these groups and reinforce existing prejudices. Such patterns can be observed not only in Germany (see e.g., Brill et al., 2025; Dittrich & Klimmt, 2020) but also in other countries' contexts (see e.g., Jacobs, 2017). Furthermore, this study confirms that such tendencies in reporting can be observed not only in national media (see e.g., Brill et al., 2025) but also in local media. Should journalistic practices in crime reporting remain unaltered, there is a risk of reinforcing xenophobic attitudes, potentially contributing to political polarization in Germany. In light of prevailing political tensions in the region, this issue assumes particular significance in East Germany, while simultaneously underscoring potential risks for other regions and countries. For minorities, more prevalent xenophobic attitudes pose a heightened risk of

4 This is emphasized by the use of "and/or" in the following quote: "To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (Entman, 1993, p. 52).

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experiencing verbal and physical hostility, leading to feelings of insecurity and creating barriers to social integration (Dittrich & Klimmt, 2020; Trebbe & Schoenhagen, 2011). Considering existing stipulations in the Press Code and its function as a set of guidelines rather than legally binding regulations, we encourage further training for journalists to increase their awareness of and sensitivity to this issue. The findings further suggest the need for clearer language in Guideline 12.1 of the Press Code.

Generative AI declaration

AI was used solely for linguistic editing of this manuscript to improve grammar and spelling, as the authors are not native speakers of the language in which the manuscript was written.

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Appendix

Composition of the three groups of articles (explicit German, explicit non-German, and implicit non-German)

Group 1: In the articles that mentioned the German origin explicitly (n = 9), the perpetrators were predominantly framed as *Vandals* according to cluster analysis (4 articles), *Felons* (3 articles), and Thieves (2 articles); no articles covered *Traffic Offenders*. These articles were primarily published in *Freie Presse* (7 articles), with one article each from *Nürnberger Nachrichten* and *Westdeutsche Allgemeine Zeitung*, but no articles from *Neue Osnabrücker Zeitung*.

Group 2: In Articles with explicit mention of non-German origin (n = 39) offenders were mainly portrayed as *Felons* and *Thieves*, with a few articles featuring *Vandals* (2) and *Traffic Offenders* (2). Most articles originated from *Freie Presse* and *Westdeutsche Allgemeine Zeitung*, but some also from *Neue Osnabrücker Zeitung* (3 articles) and *Nürnberger Nachrichten* (2 articles). Multiple articles per frame and outlet were included, with five articles from *Westdeutsche Allgemeine Zeitung* clustering around the *Thieves* frame (e.g., article IDs 471, 813, 863, 132, 764).

Group 3: The articles that suggested a non-German origin through indirect cues (e.g., names, appearance, cultural references) (n = 18) were mostly drawn from *Westdeutsche Allgemeine Zeitung* and *Freie Presse* (4 articles), along with two from *Nürnberger Nachrichten*. *Neue Osnabrücker Zeitung* was not represented in this group. Only the *Felons* and *Thieves* frame was represented in this subgroup; no articles belonged to the *Vandals* or *Traffic Offenders* frames.

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Social Influence in sozialen Medien. Wie Meinungen der Mehrheit und In-/Outgroup im persönlichen Newsfeed die Meinungsformung zu neuen Problemen beeinflussen

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Wolfgang Schweiger

Abstract: Social media platforms play a central role in shaping public opinion on political and societal issues. Users are constantly exposed to a mix of algorithmically and socially filtered content, which can influence how they perceive new topics and form attitudes. Drawing on theories of heuristic information processing, social impact, and social identity, an experimental study explored the impact of opinions in a social media newsfeed on users' selective attention, evaluation, and opinion formation. A 2x2 design with N = 197 participants, integrating forced and selective exposure elements, confronted subjects with a novel (fictitious) issue and a feed of six related opinion posts. Two factors were analyzed: (1) whether posts – in favor or against the issue – came from voices that participants identified as ingroup versus outgroup, and (2) whether the pro or con posts were in the majority versus minority. Results show that posts from ingroup voices do not receive more attention than outgroup posts but are perceived as more credible in general and are more persuasive under certain conditions: When ingroup posts are in the majority and when users are low-involved. The persuasive effect also occurs when the ingroup is hardly related to the issue under discussion. This underscores that no impermeable filter bubbles are needed to influence user opinions on social media. According to the results, persuasion takes place on social media when individuals are predominantly confronted with the opinions of people with whom they feel close and connected–regardless of whether this connection is topic-specific or not.

Keywords: Social media, social influence, social cues, selective exposure, majority influence, ingroup-outgroup bias, persuasion, low-involvement

Zusammenfassung: Soziale Medien spielen eine zentrale Rolle bei der Meinungsbildung zu politischen und gesellschaftlichen Themen. Nutzer sind ständig einer Mischung aus algorithmisch und sozial gefilterten Inhalten ausgesetzt, die beeinflussen können, wie sie neue Themen wahrnehmen und Einstellungen bilden. Basierend auf Theorien der heuristischen Informationsverarbeitung, des sozialen Einflusses und der sozialen Identität untersucht die Experimentalstudie den Einfluss von Posts in einem Social-Media-Newsfeed auf die selektive Aufmerksamkeit, Bewertung und Meinungsbildung der Nutzenden. Ein 2x2-Experiment konfrontierte die N = 197 Probanden in einer Kombination aus Forced- und Selective-Exposure-Design mit einem neuartigen (fiktiven) Thema und einem Feed aus sechs zugehörigen Meinungsbeiträgen. Zwei Faktoren wurden analysiert: (1) ob die Posts–für oder gegen das Thema – von Stimmen

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stammten, die die Teilnehmenden als Ingroup oder Outgroup identifizierten, und (2) ob die Pro- oder Contra-Posts in der Mehrheit oder Minderheit waren. Die Ergebnisse zeigen, dass Beiträge von Ingroup-Stimmen zwar nicht mehr Aufmerksamkeit erhalten als Outgroup-Beiträge, aber generell als glaubwürdiger wahrgenommen werden und unter bestimmten Bedingungen persuasiver wirken, und zwar wenn Ingroup-Beiträge in der Mehrheit sind und wenn die Nutzenden ein geringes Involvement aufweisen. Der Persuasionseffekt tritt auch dann auf, wenn die Ingroup kaum einen Bezug zum diskutierten Thema hat. Dies unterstreicht, dass keine undurchlässigen Filterblasen erforderlich sind, um die Meinungen von Menschen in sozialen Medien zu beeinflussen. Den Ergebnissen zufolge findet Persuasion in sozialen Medien statt, wenn Individuen überwiegend mit den Meinungen von Menschen konfrontiert werden, denen sie sich nahe und verbunden fühlen – unabhängig davon, ob diese Verbindung themenspezifisch ist oder nicht.

Schlagwörter: Soziale Medien, sozialer Einfluss, Social Cues, Selective Exposure, Mehrheitseinfluss, Ingroup-Outgroup-Bias, Persuasion, Low-Involvement.

1. Introduction

Despite a growing corpus of research on persuasive and polarizing effects of social media use caused by algorithmic personalization, filter bubbles, echo chambers, etc., empirical results remain inconsistent and strongly depend on methodological approaches and contexts (for overviews, see Bruns, 2019; Hartmann et al., 2025; Kubin & von Sikorski, 2021; Möller, 2021; Schweiger, 2025; Törnberg, 2022). Even the underlying mechanisms are still controversial: First, how much opinion-consonant and dissonant information and opinions do social media platforms display to individual users? In other words, how permeable are the so-called filter bubbles? Although research is not uniform, there is agreement that users are mainly exposed to consonant opinions on social media, but also often see dissonant content (Bakshy et al., 2015; Törnberg, 2022). Second, which criteria shape users' selective attention to and processing of specific content on a social media newsfeed (Ohme & Mothes, 2020), and how does this influence their opinion formation?

Theoretical approaches suggest that individuals select and process incoming information and opinions incompletely and superficially, i.e., heuristically. This is particularly true in low-involvement situations, when users have little interest in certain content or have no time or opportunity to thoroughly select and process it (Petty & Cacioppo, 1986). Studies have shown that social media use often occurs under low-involvement conditions, which increases the likelihood of heuristic processing (e.g., Metzger & Flanagin, 2013). This contrasts with the requirements of democratic societies, where informed citizens who are willing to engage with complex issues and form a qualified opinion are needed.

Heuristic selection and processing of information is either guided by users' characteristics or striking stimuli within the incoming information – so-called cues – or a combination of both. Accordingly, some approaches focus on attitude persistence and reinforcement: Partisan selective exposure, confirmation bias, and motivated reasoning imply that users tend to defend their opinions by selecting and processing new information that fit their identities, interests, and attitudes (for an overview, see Sude & Knobloch-Westerwick, 2022). While these approaches emphasize attitude reinforce-

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ment, others highlight processes of persuasion and attitude change through social influence: The spiral of silence theory, for example, predicts that users are influenced by the climate of opinion, i.e., their perception of the majority opinion (Noelle-Neumann, 1993). Online-specific approaches address social cues (e.g., individual endorsement or the number of likes, comments, or recommendations) as heuristics shaping the perception, processing, and impact of social media posts (e.g., Karnowski et al., 2017).

We posit that one of the most influential social cues is the origin of social media content users encounter – whether posts come from so-called ingroups or outgroups. This concept refers to social identity theory, assuming that individuals categorize themselves as members of identity groups (ingroups) as opposed to other groups (outgroups). Thus, they favor ingroup opinions (ingroup favoritism) and are mainly influenced by them (ingroup persuasion effect; for an overview, see Spears, 2021). We believe that ingroup favoritism and persuasion significantly shape user behavior on social media as they connect users' core values and social identities with social cues and heuristics.

This study empirically tests these assumptions, focusing specifically on how ingroup versus outgroup cues influence opinion formation in a typical social media setting: When individuals are confronted with a new political issue on their social media feed and try to form their own opinion. In a 2x2 interactive experiment, we analyze how social media users perceive and evaluate opinion posts from ingroup versus outgroup members (factor 1) that are in the majority versus minority in their feed (factor 2) and how they are influenced by them. Additionally, we will consider user-involvement, the similarity in content between the in- and outgroups on a specific topic, and selected user-characteristics.

2. Social media use, heuristics, and selective attention

When users scroll through a social media feed, they usually scan a never-ending stream of posts or stories from different sources on a variety of issues. Kümpel (2021) describes this with a five-dimensional framework: Users have *incidental* (unfocussed and non-directed) and *granularized* contact (exposure to individual news items without broader context) with *non-exclusive* content (different sources and types of content are directly competing for users' attention), which is selected and ranked by *algorithmic personalization* and *social recommendations and interactions*.

Two implications are relevant: First, due to algorithmic and social personalization (Beam, 2014), social media feeds do not provide users with a balanced and representative selection of news where they can observe the *factual* opinion climate (e.g., Zerback & Fawzi, 2016). Accordingly, most users expect news on social media that is "personally important" to them (Newman et al., 2021). Second, the abundance, diversity, and granularization of non-exclusive sources, content types, and issues form a "high-choice media environment" (e.g., Strömbäck et al., 2022). As individuals' attention and ability to process information are limited, this often leads to information overload (e.g., Knobloch-Westerwick, 2008), which can correlate with 'news snacking' (Meijer & Kormelink, 2014), "characterized by briefly checking headlines and teasers rather than an in-depth involvement with information." (Ohme & Mothes, 2025, p. 2). When posts are linked to full news stories, users rarely click on them (Boczkowski et al., 2018); some platforms, like Instagram or TikTok, do not even offer this functionality. Often, users

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do not intentionally seek information but expect relevant news to find them incidentally (Gil de Zúñiga et al., 2017). In summary, social media users often skim newsfeeds with low attention and little engagement (Ohme & Mothes, 2025), especially on mobile devices (Keib et al., 2022; Molyneux, 2018).

What does that mean for information selection in such an environment? If individuals are in a typical mode of low-involved social media use and expect personalized content, they will not actively search for opinion-consonant content as this would require high mental effort. Instead, they will essentially rely on the algorithmic and social personalization of platforms. As dual-process theories (elaboration-likelihood model; Petty & Cacioppo, 1986; heuristic–systematic model; Chaiken, 1980) predict, individuals in low-involvement situations are likely to select information heuristically. Typical heuristics include the salience and cognitive availability (through familiarity, repeated or recent contact) of an option (e.g., Gigerenzer et al., 1999). Thus, users primarily pay attention to information that is salient and/or familiar to them.

Selective exposure to media content is mainly driven by users' topical interest or involvement (e.g., Kaiser et al., 2018; Kümpel, 2019; Ohme & Mothes, 2020) and need for opinion-consonant information (e.g., Dahlgren et al., 2019; Winter et al., 2016). But how do users predict the political leaning of a specific post, especially when they are low involved? Or do they rely on the system-customization of a feed and pay the same attention to all items? While some studies confirm partisan selective attention on social media (e.g., Bakshy et al., 2012; Iyengar & Hahn, 2009; Kaiser et al., 2018; Messing & Westwood, 2014; Turcotte et al., 2015), other studies find only weak or no effects (Flaxman et al., 2016; Nelson & Webster, 2017; Sülflow et al., 2019).

3. Social media, information processing, and opinion formation

This does not answer the question whether social media users process all posts/opinions in the same way or whether they are guided by the presentation of opinions and process ideologically consonant content more favorably than dissonant content (motivated reasoning; Kahan, 2013).

The spiral of silence theory supports the first position, claiming that humans observe their social environment, try to figure out the *public* opinion concerning a specific issue, and may be influenced by the majority opinion (Noelle-Neumann, 1993). Studies show that online users are influenced by perceived opinion ratios on social media platforms when forming their own opinions (Ross et al., 2021), even if these platforms do not offer a balanced representation of the factual opinion climate.

Other approaches emphasize that individuals' information processing and opinion formation are shaped by the presentation and opinion consistency of available content. From persuasion and media effects research, we know that the source of a message heavily influences the persuasiveness of the information (Hovland, 1951). This leads to *social cues* on social media, which are pieces of information about the users who produce, share, endorse, or discuss content, i.e., those who can be regarded as message sources in the broadest sense. Social cues are usually presented directly next to a post and are highly visible. Several studies have shown that they influence how users perceive and process social media posts and, thus, foster social influence (Anspach, 2017; Dvir-Gvirsman, 2019; Messing & Westwood, 2014; Ohme & Mothes, 2020; Winter et al., 2016).

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How social cues influence information processing and persuasion depends on several factors: The most important is the *relationship between a recipient and a source;* the underlying recognition heuristic seems to be highly effective. Research has shown that individuals preferably select (Bakshy et al., 2012; Kaiser et al., 2018; Turcotte et al., 2015) and are especially persuaded by *strong ties,* i.e., sources with which they have a close relationship and frequent exchange (Anspach, 2017; Bakshy et al., 2012; Xu, 2013). The same applies to sources perceived as *opinion-leaders* (Turcotte et al., 2015), *credible* (e.g., Knobloch-Westerwick et al., 2015; Sülflow et al., 2019; Turcotte et al., 2015), that have a high *social position* (e.g., Haas & Unkel, 2015) and are *similar* to the recipient (Sundar & Nass, 2001). Other studies have demonstrated that the *common partisanship* between source and user leads to selective exposure (e.g., Iyengar & Hahn, 2009; Kaiser et al., 2018; Messing & Westwood, 2014), reinforces persuasive effects (e.g., Dahlgren et al., 2019; Knobloch-Westerwick et al., 2015; Knobloch-Westerwick, Mothes, et al., 2015), and increases the probability to publicly endorse and share messages (e.g., Yardi & Boyd, 2010).

4. Social media groups as ideological camps

In times of affective polarization in many Western democracies, even in multiparty systems (for a review, see Leininger et al., 2023), the ideological camp from which a message derives is probably a powerful social heuristic. Known actors and recognizable markers of ideological camps are media brands, elite actors as politicians or economic leaders, other influencers, and interest groups. They all may serve as cognitive shortcuts for ideological alignment. On social media platforms, like Facebook, ideological camps are often represented as public groups (e.g., 'NoVac', 'MAGA' or 'Green life'). Users may encounter posts from such groups because they have liked them or platform algorithms recommend their content. When a group name is recognizable or semantically suggestive, users may feel connected or opposed to it. Given that social media platforms are designed to foster connection and community (Carr, 2017), the perceived affiliation of a group likely functions as a salient social cue in online opinion formation.

According to social identity theory (Tajfel, 1978), individuals derive their self-concept not only from personal attributes but also their group memberships. This leads to a fundamental distinction between ingroups – to which one belongs – and outgroups – from which one distances oneself. A central implication is *ingroup favoritism*, whereby individuals evaluate ingroup members and their positions more favorably, thereby enhancing their self-esteem (meta-analysis by Rivera et al., 2024). Consequently, people are more likely to accept and be persuaded by arguments from ingroup sources – a phenomenon known as the *ingroup persuasion effect* (Cakanlar & White, 2023; Fielding et al., 2020; Lin et al., 2018; Mackie et al., 1992; McGarty et al., 1994; Wei et al., 2023). In contrast, outgroup arguments typically have no effect or may even reinforce existing attitudes (Cakanlar & White, 2023). These mechanisms can contribute to collective group polarization (de Benedictis-Kessner et al., 2019; Isenberg, 1986). The extent to which selective exposure follows this pattern likely depends on additional factors, including content valence (Knobloch-Westerwick & Hastall, 2010).

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As empirical research on ideological ingroup and outgroup influence in social media environments remains limited, we draw on general theories and findings. According to Sia et al. (2002), ingroup–outgroup effects are more pronounced online than in face-to-face interactions. This is explained with the SIDE theory (Spears & Lea, 1994), which suggests that the less personal information users have about group members (e.g., appearance, clothing, para- and nonverbal cues), the more they perceive them as prototypical representatives of their group, and the less they view them as autonomous individuals. As a result, when groups interact online, their behavior is shaped primarily by group-based identities and stereotypes, while individual characteristics fade into the background.

The strength of the ingroup persuasion effect depends on individual, group, and situational characteristics (Aronson et al., 2021; Cialdini & Goldstein, 2004). In the context of social media, two factors appear especially relevant and are examined in our experiment – both concern the relationship between individuals, groups, and the political issue under discussion:

First, the *relationship between the individual and the issue*. Research indicates that individuals with low *issue involvement* are especially susceptible to ingroup influence (e.g., Chartrand & Bargh, 1999), as they are less motivated to invest cognitive effort and therefore tend to adopt their ingroup's opinion. This effect may be amplified by issue-related uncertainty, when the issue is unfamiliar or complex and users feel unable to decide without additional information (Walther et al., 2002). In both cases, individuals are more likely to rely on ingroup-based heuristics.

Second, the *relationship between group and issue*. Sometimes, individuals obtain information from groups that are salient to the issue; in other cases, involved groups have little to no relevance to the topic. For example, a climate policy debate may involve climate activists and climate skeptics – both highly salient groups. The same issue could also be discussed by less relevant groups (e.g., "Citizens against Government") or groups unrelated to the topic (e.g., "Beautiful Vacations" or "Beatles Fans"). How the perceived issue-related salience of in-/outgroups affects their influence remains unclear. Brewer (1979) theorized that a more pronounced ingroup-outgroup distinction strengthens favoritism. In contrast, a meta-analysis by Mullen et al. (1992) found no link between a group's attribute relevance and its persuasive power.

5. Hypotheses

To derive specific research questions and hypotheses from the assumptions discussed, let us figure out a typical usage situation. When a new issue of societal relevance arises and is discussed on social media, users encounter a variety of arguments, worldviews, framings, and opinions from different actors. Due to algorithmic and social personalization, users are predominantly exposed to posts from ingroup voices with similar attitudes in their newsfeeds, but may also see posts and comments from outgroup voices.

An increased selective attention to posts from ingroup voices – and thus salient and/or familiar voices – is conceivable but not yet empirically supported. Here, selective attention is understood and measured as a binary construct (attention vs. no attention) and should not be confused with more elaborate forms of cognitive processing.

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RQ1: Do social media posts from ingroup voices receive more attention than posts from outgroup voices?

Due to the role of in-/outgroup sources of posts as social cues, ingroup favoritism, and the ingroup persuasion effect, we expect individuals to evaluate posts from ingroup voices as more credible and be more influenced by them than outgroup voices.

H1: Social media posts from ingroup voices are perceived as more credible than posts from outgroup voices.

H2: Social media posts from ingroup voices are more persuasive than posts from outgroup voices.

The next hypothesis draws from the spiral of silence theory and refers to the persuasive effect of the climate of opinion.

H3: When social media posts confirming a position are in the majority (and posts opposing this position are in the minority), they are more persuasive than when they are in the minority.

What happens when the ingroup voices are in the majority and the outgroup voices in the minority, and vice versa? How does the distribution of ingroup and outgroup opinions on a Facebook feed influence an individual's opinion formation? The next hypothesis compares the relative strength of these cues, if ingroup-based social cues are more persuasive than majority position alone. According to the logic of the spiral of silence and ingroup persuasion theories, both mechanisms are likely to reinforce each other.

H4: When social media posts from ingroup voices are in the majority, they are more persuasive than when they are in the minority.

As discussed, ingroup favoritism and persuasion are expected to be especially strong under low-involvement conditions, when users' behavior is guided by social heuristics. In the experiment, we could not manipulate the individual *usage* involvement. However, we could realistically expect a satisfying variance of *issue* involvement among participants. When *issue involvement* is low, social media use should occur under low-involvement conditions. Conversely, a higher issue involvement should also increase situational involvement and thus decrease users' tendency to apply heuristics. Individual issue involvement was controlled as a proxy for usage involvement to test whether subjects were in a low-involved news-snacking situation or not. As research has also indicated, a higher degree of issue-related uncertainty should additionally increase the probability of ingroup effects. Both moderators were tested.

H5: (a) The lower the issue-related involvement and (b) the higher the degree of issue-related uncertainty, the more persuasive ingroup voices are in comparison to outgroup voices.

Although the empirical research is unclear at that point, the predicted effects might also depend on perceived relevance of the groups involved with respect to the topic under discussion. Since this study focuses on subjective group perceptions and their effects,

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we ask whether perceived issue-related salience – rather than objective relevance – moderates ingroup or outgroup effects.

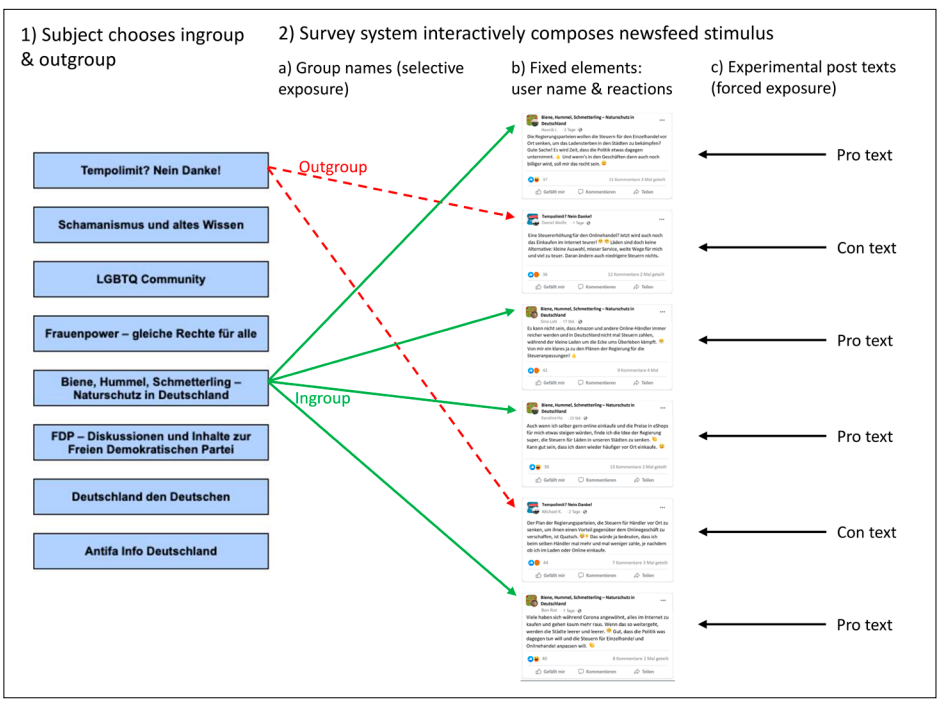
> *RQ2: Are the effects of in-/outgroup voices on individual opinion formation moderated by the perceived issue-related salience of the in-/outgroups?*

6. Method

6.1 Overview

The hypotheses and research questions were tested with an online experiment that combined selective and forced exposure elements (for procedure, see Figure 1). This design has only recently become feasible due to online survey tools like SoSci Survey. We employed a so-called PICA design (Preference-Incorporating Choice and Assignment Design; de Benedictis-Kessner et al., 2019). Participants were first asked to select one Facebook group they most identified with (ingroup) and one they least identified with (outgroup) from a list of eight fictitious groups. They were then exposed to a feed with posts about a new, fictitious political issue from members of these groups. Two experimental factors were manipulated: (1) the opinion expressed by the ingroup (pro vs. con), with the outgroup taking the opposite position; and (2) the majority opinion in the feed (pro vs. con).

Figure 1. Experimental PICA procedure



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6.2 Experimental design and procedure

At the beginning of the online survey (for German questionnaire, see Appendix in OSF), respondents were presented with eight fictitious Facebook groups with a broad array of ideological orientations (e.g., "LGBTQ Community", "Germany to the Germans", for stimuli, see Appendix in OSF). The groups and their names had to meet four criteria: (1) they had to appear as realistic Facebook groups; (2) they had to cover a broad range of ideological orientations and values so that (3) there would be at least one group to which each respondent could feel close and at least one group that they would reject; and (4) the groups should have no obvious connection to the issue under discussion (see below) to ensure sufficient between-subject variance in this variable, as we intended to measure the influence of perceived issue-related salience.

Participants were asked to select their favorite group (ingroup) and the one that least suited them (outgroup). Afterwards, several questions concerning personal media exposure and political characteristics were posed that will be reported elsewhere. These questions also served to distract respondents from the ingroup–outgroup selection in the beginning. In the next step, subjects were informed that their opinion on a new political topic was to be recorded. The issue, a fictitious but plausible political plan, was introduced as follows: "The retail sector in German cities is suffering from falling sales. One reason is the great success of Internet retailing. The German government is considering supporting local retailers. To this end, taxes for stationary retailers are to be decreased and increased for Internet retailers. This should make buying on the Internet more expensive and in stores cheaper." This topic was chosen as it ties in with existing debates in Germany, has a medium level of conflict between moral worldviews, and should generate solid interest among participants.

After measuring subjects' issue-related involvement, their issue-related uncertainty, they were shown a one-page screenshot with six fictitious issue-related Facebook posts that alternately spoke for and against the tax plan–depending on the version, there were four pro and two con posts or vice versa (Figure 2). Six posts were used to ensure within-feed variance for selective-attention indices while keeping total reading time compatible with typical panel respondents' behavior. The 4:2 ratio of pro/con posts provides a minimal majority manipulation that is empirically detectable but avoids artificial unanimity, preserving ecological validity and statistical sensitivity for interaction tests.

The content of the pro and con posts was kept constant (for stimuli, see Appendix in OSF). The post authors were different members of the Facebook group that each participant had previously chosen either as ingroup or outgroup. All author names were inconspicuous usernames. Each post consisted of a short personal text with one argument and a clear opinion (for or against the mentioned plan); the texts were between 247 and 289 characters long. To make the posts as realistic as possible, emojis were inserted (two per post) and Facebook-typical user reactions were added (type and number of reactions, number of comments, and shares). The user reactions differed only slightly, so that no aggregate social cues stood out. The number of six posts was chosen based on the assumption that

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most participants in an online access panel would not read all texts entirely, which encouraged selective exposure. On average, subjects viewed the newsfeed page for 54 seconds (median; *SD* = 41 seconds), which equals roughly two-thirds of the time needed to read all six posts.

The combination of individually chosen in- and outgroups and a stimulus containing Facebook statements by members of those groups allowed us to test a 2x2 design (Figure 2): Factor 1 was the *in-/outgroup opinion* concerning the proposed lower taxes for local retailers: Ingroup voices were either collectively in favor of or opposed to the proposed plan, and outgroup voices collectively held the opposite position. Factor 2 varied the *majority opinion*: Most voices were either pro (four pro versus two con voices) or con (four con versus two pro voices). The design included a pro and con version for each of the four combinations of the two factors, which in turn enabled us to determine the persuasiveness of approving versus disapproving posts, especially when the ingroup was in the majority versus the minority.

No treatment check was conducted regarding the *perceived* portion of in-/outgroup or pro/con posts in the feed. We assume that in social media use as a low-involvement situation, majority distributions can be effective even if recipients are not consciously aware of them.

Figure 2. Experimental design

		F1: Ingroup opinion (outgroup opinion opposite)	
		pro	**con**
F2: Majority opinion (minority opinion opposite)		(n = 53)	(n = 55)
	pro	Feed of 6 posts in this order: 1. Ingroup pro 2. Outgroup con 3. Ingroup pro 4. Ingroup pro 5. Outgroup con 6. Ingroup pro ➔ Ingroup pro in majority – outgroup con in minority	Feed of 6 posts in this order: 1. Outgroup pro 2. Ingroup con 3. Outgroup pro 4. Outgroup pro 5. Ingroup con 6. Outgroup pro ➔ Ingroup con in minority – outgroup pro in majority
		(n = 49)	(n = 60)
	con	Feed of 6 posts in this order: 1. Outgroup con 2. Ingroup pro 3. Outgroup con 4. Outgroup con 5. Ingroup pro 6. Outgroup con ➔ Ingroup pro in minority – outgroup con in majority	Feed of 6 posts in this order: 1. Ingroup con 2. Outgroup pro 3. Ingroup con 4. Ingroup con 5. Outgroup pro 6. Ingroup con ➔ Ingroup con in majority – outgroup pro in minority

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6.3 Measurement

The dependent and moderating variables were measured as follows (for English translations of scales, see Appendix in OSF).

To register subjects' *selective attention* to posts, a classical copy-test procedure (Sar & Rodriguez, 2017) was applied: Subjects were shown all post texts again at the end of the questionnaire and asked for each to indicate whether they had read it entirely (2), partially (1), or not at all (0). These ratings were condensed to mean indices for ingroup and outgroup posts (see Results).

The *credibility* of posts by the self-selected Facebook groups was measured using typical subdimensions of source credibility, as discussed in the literature on online and media credibility (e.g., Appelman & Sundar, 2016; Fawzi et al., 2021). The 5-point Likert scales consisted of five items each (trustworthy, competent, convincing, interesting, and relevant) and were condensed into mean indices, which were highly reliable (Cronbach's $\alpha = .92$ for ingroup credibility; $\alpha = .94$ for outgroup credibility).

Persuasion was measured as subjects' post-exposure opinion by asking: "What is your opinion? What do you think about giving local retailers a better tax position than online retailers?", using an answer scale from 1 = "I am clearly against it" to 5 = "I am clearly for it." This yielded an almost perfectly balanced distribution of opinions ($M = 3.07$; $SD = 1.25$).

Concerning controls and moderators, several user traits (media-related and political variables) and issue-related user characteristics were measured. In this paper, the following moderators are analyzed:

Issue involvement was assessed with a single-item scale from 1 = "Issue is completely unimportant" to 7 = "Issue is extremely important." $M = 4.90$ ($SD = 1.30$) indicated that most respondents found the political issue quite relevant. Due to the right-skewed distribution, we reduced the variable to two groups: Lower (points 1–4; 34.6% of subjects) and higher involvement (5–7; 65.4%).

Issue-related uncertainty was measured with one question: "Do you know enough about the subject to form an opinion?" with response options "I know enough" (25.3%) and "A little more info would be helpful" (74.7%).

To assess the perceived *issue-related salience of the in- and outgroup*, respondents were asked whether they thought the selected in- and outgroup (1) "actually has nothing to do with the issue," (2) "has little to do with the issue," or (3) "has a lot to do with the issue." As the mean values for all Facebook groups indicated weak to moderate salience, the variables were recoded into dummies (0 = no salience and 1 = medium or high salience). The average salience of all in-/outgroups can be found in the Appendix in OSF.

6.4 Sampling

Sample size planning was conducted using G*Power before data collection. According to the current state of research, small to medium effects were to be expected. Hence, the analysis aimed to detect small to medium effects ($f = .20$) in an incomplete between-subjects design with initially ten groups and three covariates (see H5 and RQ2), using ANCOVA with an $\alpha = .05$ and power $(1 - \beta) = .95$. The minimum requi-

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red sample size was $N = 434$. Sampling was done by a professional online access panel (Respondi) and intended to provide a representative sample of Germans aged 18–70 who use Facebook at least occasionally. The online survey was administered in summer 2022. Valid interviews had to meet two requirements: First, a completed questionnaire with a total completion time of at least four minutes (median completion time was 8:20); second, respondents had to pass an explicit attention check ("Check the box on the far left indicating complete disagreement"). This resulted in a final net sample of $N = 454$ subjects. For this publication, a sub-sample of 2x2 groups was analyzed, consisting of $n = 197$ participants (for final datafile and syntax, see Appendix in OSF). This sub-sample still ensures sufficient power for detecting small to medium effects. It is roughly representative of the German online population in terms of age ($M = 42.6$, $SD = 13.5$), sex (46.7% female, 53.3% male, no others), and education (51.3% with lower versus 48.7% with higher education, equaling the German Abitur). Group sizes vary slightly due to data cleaning and are listed in Figure 2. All four groups are statistically equal in terms of sex ($p > .98$) and education ($p > .61$, both chi-square tests) and slightly differed in age ($p = .07$, ANOVA).

7. Results

7.1 Main effects

RQ1 asked whether social media users pay more selective attention to ingroup posts than outgroup posts. Table 1 shows a within-subject comparison indicating that participants gave equal attention to both groups. This result was additionally tested using a general linear model of repeated measures controlling for age, sex, and education, which also found no effect.

As already mentioned, subjects spent a relatively long time on the newsfeed page ($M = 54$ seconds). This corresponds to a usage situation in which individuals are confronted with a new political issue in their feed and aim to form an opinion. On the other hand, it contrasts with the typical social media situation, where users scroll quickly and inattentively. Therefore, the analysis was repeated with a subsample of participants who viewed the feed for no more than 20 seconds ($n = 32$). Again, no differences were found between the selective attention to in- versus outgroup posts.

Two explanations – or a combination of both – seem plausible. First, when confronted with the task of forming an opinion about an unfamiliar issue, users may attempt to review all positions and arguments, regardless of whether they come from ingroup or outgroup voices. Second, users might strongly rely on the algorithm's personalization (based on their prior selection) and thus pay equal attention to all posts presented. The fact that there was also no difference among the subsample of "quick skimmers" supports the second explanation: Low-involved users do not invest cognitive effort in selecting particular posts but scan the entire feed without discrimination.

H1 predicted higher perceived *credibility* of ingroup posts compared to those from outgroup voice. As hypothesized, subjects rated the credibility of *ingroup* posts rather positively ($M = 3.32$, above scale center), while the credibility of *outgroup* posts was

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rated negatively (*M* = 2.53, below scale mean). This difference was highly significant and confirms H1.

To check for main and interaction effects of the ideological names of the selected in-/outgroups (e.g., "Speed limit? No, thank you."), additional repeated measures ANCOVAs were conducted for both attention and credibility that confirmed the just reported results: There are no differences concerning the selective attention to ingroup and outgroup posts regardless of the specific names of the two groups (RQ 1). Ingroup voices are more credible than outgroup voices regardless of the selected group names (H1).

Table 1. In-/outgroup main effects on selective attention and credibility

Group	Ingroup posts	Outgroup posts	
Selective attention	*M* = 1.38 (*SD* = .62)	*M* = 1.39 (*SD* = .59)	*t* = .22
Credibility	*M* = 3.32 (*SD* = .94)	*M* = 2.53 (*SD* = 1.02)	*t* = 8.36***

Notes. *n* = 197; paired samples t-tests; *** $p < .001$. Attention: mean of all presented in-/outgroup posts on a scale from 0 to 2 (0 = "not seen", 1 = "partially read", 2 = "completely read"); credibility from 1 = low to 5 = high.

Examining H2 requires a between-subjects analysis. The prediction was that the ingroup's opinion would be more persuasive than the outgroup's opinion. Since all ingroup posts expressed the same opinion (either pro or con) and all outgroup posts held the opposite opinion, we compared participants who saw confirming ingroup posts (ingroup opinion pro) with those who saw confirming outgroup posts (outgroup opinion pro). A preliminary comparison of post-exposure opinions shows no significant differences between these two groups (see Table 2). At most, there was a slight tendency to adopt the ingroup opinion. H3 referred to the persuasive impact of the majority opinion in the newsfeed. As shown in Table 2, this effect was also weak and non-significant. Thus, both assumptions – that persuasive effects are driven unconditionally either by ingroup sources or by the numerical majority in a social media feed – must be rejected, at least in the present experimental setting.

Table 2. Main effects on persuasion

Group	**Ingroup** (Ingroup opinion pro – outgroup opinion con) (*n* = 103)	**Outgroup** (Outgroup opinion pro – ingroup opinion con) (*n* = 94)	
Persuasion	*M* = 3.13 (*SD* = 1.28)	*M* = 3.01 (*SD* = 1.23)	*t* = .66
Group	**Majority** (Majority opinion pro – minority opinion con) (*n* = 105)	**Minority** (Minority opinion pro – majority opinion con) (*n* = 92)	
Persuasion	*M* = 3.15 (*SD* = 1.25)	*M* = 2.97 (*SD* = 1.24)	*t* = 1.04

Notes. Independent samples t-tests; n.s. Persuasion from 1 = "I am clearly against it" to 5 = "I am clearly for it".

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7.2 Interaction and moderation effects

This leads us to the hypothesized interaction and moderation effects. H4 posits that ingroup voices are more persuasive when they are in the majority – and less so when in the minority. We further argued that this interaction effect may be moderated by specific conditions: Low involvement and high issue-related uncertainty (H5) and possibly by a perceived issue-related salience of in- and outgroups (RQ2). To test these effects, multiple regression models were calculated (see Table 3) including predictors of opinion distribution (ingroup/outgroup, majority/minority, and their interaction), issue involvement and uncertainty (main and interactive effects), and issue-related salience of in-/outgroups (main and interactive effects). In all models, sociodemographic controls (age, gender, education) were included.

Model 1 tests the main and interaction effects of ingroup and majority controlling sociodemographics. While the model ($R^2 = .045$, $p < .05$) and the main majority effect ($\beta = .461$, $p < .05$) are significant, the ingroup effect, the interaction and sociodemographics are not. This suggests that the hypothesized interaction effect (H4) occurs at best to a limited extent under general conditions and cannot be explained by age, gender, and educational backgrounds.

In Model 2, issue involvement and issue-related uncertainty were added. This increased both ingroup and majority effects and improved model fit ($R^2 = .086$, $p < .01$): When the pro position was articulated by ingroup voices, participants were significantly more likely to agree ($\beta = .717$; $p < .01$). The same applied to majority opinion: When the majority of posts supported the tax proposal, agreement increased ($\beta = .543$; $p < .05$). A significant interaction between both effects ($\beta = –.608$; $p < .05$) will be discussed below. Higher issue involvement increased approval ($\beta = .667$; $p < .05$) and moderated the ingroup effect ($\beta = –.542$; $p < .05$). We will return to this result below. In contrast, the majority effect appears unaffected by involvement ($\beta = –.027$; n.s.). Finally, issue-related uncertainty showed a small, non-significant effect ($\beta = .229$, n.s.). The data do not allow us to determine whether the effect is absent or whether the experimental setup failed to induce realistic uncertainty.

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Table 3. Regression models for persuasion

	Model 1	Model 2	Model 3
	β	β	β
Distribution of opinions in feed			
F1: Ingroup opinion (0 = con, 1 = pro) – outgroup opinion opposite	.446+	.717**	.394
F2: Majority opinion (0 = con, 1 = pro) – minority opinion opposite	.461*	.543*	.500*
F1 x F2	–.554+	–.608*	–.584+
Issue involvement & uncertainty			
Issue involvement (0 = lower, 1 = higher)		.667*	
F1 x issue involvement		–.542*	
F2 x issue involvement		–.027	
Issue uncertainty (0 = lower, 1 = higher)		.229	
F1 x issue uncertainty		–.022	
F2 x issue uncertainty		–.106	
Issue-related salience of in–/outgroup			
Issue salience of ingroup (0 = no, 1 = medium/high)			–.317*
F1 x issue salience of ingroup			.125+
F2 x issue salience of ingroup			.228
Issue salience of outgroup (0 = no, 1 = medium/high)			.302
F1 x issue salience of outgroup			.121
F2 x issue salience of outgroup			–.327
Controls			
Age	.024	.063	.016
Gender (0 = female, 1 = male)	–.138+	–.087	–.118
Education (0 = lower, 1 = higher)	–.138+	–.134+	–.130+
Model	**R^2corr. = .045***	**R^2corr. = .086****	**R^2corr. = .044+**

Notes. n = 197. Multiple regressions, ** $p < .01$, * $p < .05$, + $p < .10$

7. 3 Directions of interaction and moderation effects

A closer look at the significant interaction effects brings more clarity. As shown in Figure 3, ingroup voices strongly influence opinion when in the majority, but have little effect when in the minority. This suggests that both cues – the numerical majority and ingroup affiliation – are noticed and processed. When the ingroup is in the majority, recipients seem more open to processing and persuasion (left co-

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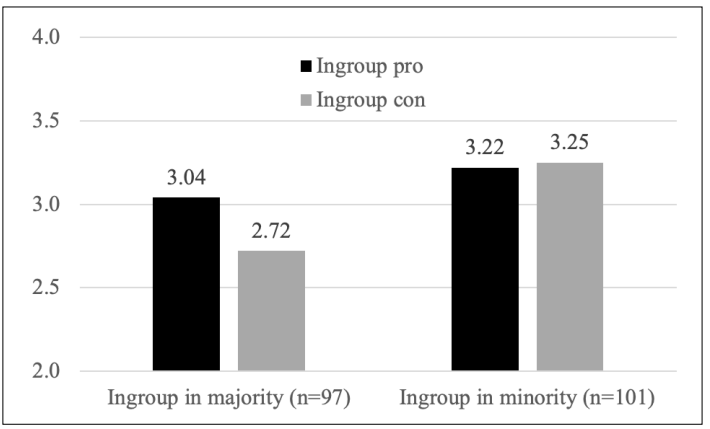
lumns: M = 3.04 vs. M = 2.72). In contrast, when the ingroup is in the minority and the outgroup dominates, users still read all posts (see above) but may experience reactance due to perceived hostility – resulting in no influence (right columns: M = 3.22 vs. M = 3.25). There is no evidence of a backfire effect, where dominant outgroup posts strengthen opposing opinions. Note that in the given setting, all posts contained valid arguments. If the outgroup were both dominant and posted invalid or emotional content – as often seen on social media – reactance or backfire effects would likely be stronger. In sum, the hypothesized ingroup effect occurs only when ingroup posts constitute a numerical majority (H4).

Figure 3. Ingroup versus majority effects on persuasion



Note. Opinion from 1 = "strongly con" to 5 = "strongly pro".

Figure 4 illustrates the interactions between issue involvement and both ingroup and majority effects. Regarding the ingroup effect (Figure 4a), participants with lower issue involvement adopted the ingroup opinion (M = 3.16 versus M = 2.49), whereas highly involved participants were not influenced by the ingroup (M = 3.11 versus M = 3.30). This effect was significant overall (Table 3: β = –.542, p < .05) regardless of whether the ingroup was in the majority or minority. Thus, a clear ingroup effect is evident under low-involvement conditions, but it disappears among highly involved users. In contrast, the majority effect appears independent of involvement (Table 3: β = –.027, n.s.): Both highly and less involved participants showed slightly greater agreement when the majority of posts supported the tax proposal (Figure 4b). The only difference was that greater involvement correlated with generally stronger agreement (Table 3: β = .667, p < .05). This is consistent with previous research (e.g., Johnson & Eagly, 1989) but not directly relevant in this context.

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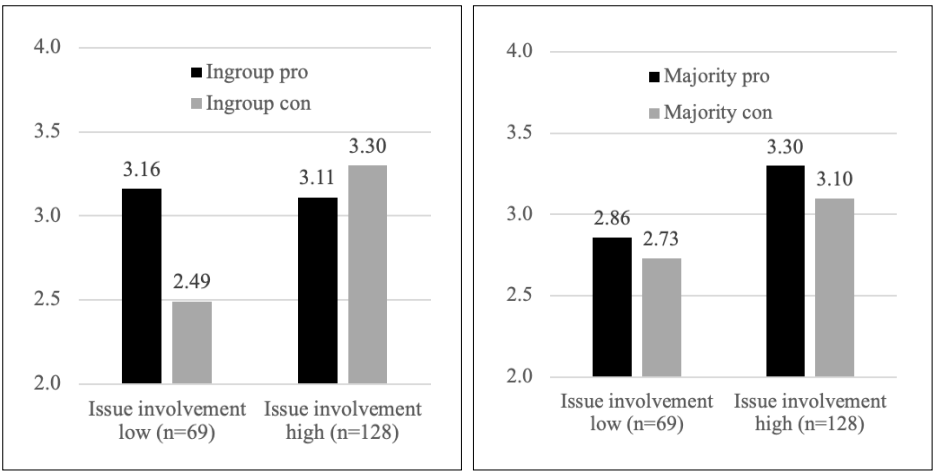
Figure 4. Ingroup versus majority effects on persuasion by issue involvement
(a) Ingroup/outgroup opinion (b) Majority/minority opinion



Thus, consistent with H4a, lower involvement increases the likelihood of an ingroup effect during opinion formation in social media, while the persuasive impact of majority opinion occurs independently of involvement. With respect to uncertainty, no differences in persuasion by ingroup or majority voices were found between individuals with high or low information needs (H5b rejected).

Finally, RQ2 examined whether the persuasive effect is moderated by the perceived issue-related salience of both ingroup and outgroup. As shown in Table 3, Model 3, *out*group's salience had no significant effect. In contrast, *in*group salience significantly decreased support for the tax change, regardless of the ingroup's stance ($\beta = -.317$, $p < .05$). This surprising result may be explained by the fact that the two groups most strongly associated with issue salience ("Germany to Germans" and "Free Democrats | FDP"; for stimuli, see Appendix in OSF) can be both considered market-liberal[1] and generally oppose tax increases. Thus, participants who chose one of these as their ingroup were more likely to reject the proposed tax. However, this is a *direct* effect, while RQ2 asked whether salience moderates in-/outgroup effects – which the data do not support.

The absence of moderation suggests that users are influenced by group opinions – even when the groups are largely unrelated to the issue. For example, someone aligned with vaccine opponents might adopt that group's stance on an unrelated topic. Similarly, users may reject outgroup opinions even when the issue lies outside that group's domain. This resembles the phenomena of affective polarization and ideological sorting. These concepts suggest that individuals emotionally reject opposing camps (affective polarization), develop consistent intra-camp opinions, and sort themselves ideologically across topics (e.g., Phillips, 2022).

1 The claim "Germany to the Germans" refers to racist and extremely right movements in Germany. The AfD is the only explicitly racist party in the German parliament and decisively pursues market-liberal policies.

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8. Conclusion

8.1 Key findings

This study explored how social media users form political opinions in response to ingroup and outgroup cues as well as majority signals in social media feeds. Drawing on theories of heuristic information processing, social impact, and social identity, we tested whether voices from ideological ingroups exert more influence than those from outgroups and majority opinion in a feed shapes individual opinion formation. A 2x2 experimental design using a simulated Facebook feed, combined with selective and forced exposure elements, allowed us to test main, interaction and moderation effects.

The findings show that ingroup voices do not receive more selective attention than outgroup posts but are perceived as significantly more credible. The assumption that social cues in a social media feed can influence opinion formation as strongly as, or even more strongly than, majority opinions is supported under certain conditions – namely, when users exhibit low involvement and when the ingroup position dominates the opinion climate. Interestingly, low-involved users were significantly more susceptible to ingroup cues, while majority influence remained stable regardless of involvement. Contrary to expectations, neither issue-related uncertainty nor the perceived salience of the groups significantly moderated the effects.

8.2 Limitations

The study has several limitations. First, because we investigated opinion formation on an entirely unfamiliar topic – i.e., starting from scratch – we chose a fictitious political issue. While this ensured experimental control, it limits ecological validity. More importantly, it restricts the generalizability of the findings to this specific usage scenario. Caution is therefore advised when applying the results to other forms or stages of opinion formation.

Second, although we used a realistic mock-up, a Facebook feed consisting of six posts from users affiliated with just two groups on a single issue does not fully replicate a typical social media experience. Moreover, participants were aware they were taking part in an experiment. Both factors may have influenced their level of engagement and limited the natural flow of social media interaction.

Third, and arguably both the study's greatest strength and its main methodological limitation: Because participants selected their ingroup and outgroup at the beginning of the experiment, they may have been particularly sensitized to these categories during feed exposure. This may have resulted in a priming effect, potentially inflating perceived credibility and persuasive impact.

Fourth, our operationalization of issue-related uncertainty relied on a self-report measure that required participants to make an unusually conscious judgment. It was implemented as a binary variable, which may have lacked sensitivity. Additionally, asking participants whether they wished more information about the issue may have conceptually overlapped with the construct of involvement.

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Fifth, there was no treatment check regarding the *perceived* portion of in-/outgroup or pro/con posts in the feed. This decision was made deliberately, as prompting participants to consciously reflect on the opinion distribution would have disrupted the low-involvement usage situation the experiment aimed to simulate. Nevertheless, the absence of such a check reduces internal validity, as we cannot determine with certainty whether respondents consciously registered the numerical distribution of in-/outgroup and pro/con posts. At the same time, the observed effect patterns – particularly the selective interaction between majority and ingroup cues – suggest that the manipulation operated as intended.

Sixth, the study was not fully preregistered. While the experimental design, stimuli, and questionnaire were preregistered, several analytical decisions – particularly regarding model specifications and variable codings – were made during the research process. This reduces transparency and limits the confirmatory character of the findings.

Finally, while our sample was demographically balanced, it consisted of self-reported Facebook users in Germany. This limits the generalizability of our findings to other platforms, cultural contexts, and media systems.

8.3 Implications and outlook

The findings offer insights into how social identity and group cues shape political opinion formation in digital environments. In times of increasing ideological fragmentation, the tendency of individuals to follow the voices of their ingroup – especially when these voices are numerically dominant and even when they are unrelated to the issue at hand – poses challenges for democratic deliberation. Echo chambers may not only reinforce preexisting beliefs but also inhibit open-minded consideration of opposing views, particularly among low-involved citizens.

The absence of a backfire effect offers a cautiously optimistic perspective: Exposure to opposing views may not further polarize users, provided that the discourse remains grounded in arguments. However, the limited influence of outgroup voices – even when they offer valid arguments – raises concerns about the declining role of deliberation and reasoned exchange.

From a normative perspective, platform design and content curation play a crucial role. Algorithms that reinforce ingroup exposure and amplify majority opinion may undermine opinion pluralism. Conversely, designs that promote exposure to diverse, yet credible perspectives could help counteract group-based biases.

Moreover, our findings suggest that in algorithmically personalized environments, political cues such as ingroup affiliation and majority alignment may outweigh the informational quality of arguments – particularly for low-involved users. This contributes to a more nuanced understanding of how filter bubbles operate: Not merely as echo chambers of like-minded opinions but as structurally biased environments where social heuristics are prioritized over deliberative engagement.

Looking ahead, future research should examine how these effects unfold in multi-issue environments, whether users recognize their own biases, and how plat-

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form affordances (e.g., comment sections, algorithmic filtering) interact with social heuristics. Policymakers and platform designers alike should consider the subtle yet powerful role of group-based cues in shaping democratic discourse online.

Generative AI declaration

AI-assisted tools were used to refine the English language, review the argumentation, remove redundant passages, and optimize the sampling section.

Supplementary material

The supplementary material can be accessed here: https://osf.io/f6x3u/

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FULL PAPER

Self-effects of (perceived) public vs. private opinion expression, elaboration, and composition

Selbsteffekte von öffentlichen vs. privaten Meinungsäußerungen, Elaboration und Komposition

Teresa K. Naab & Anna Schnauber-Stockmann

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Self-effects of (perceived) public vs. private opinion expression, elaboration, and composition

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Abstract: Self-effects in communication research refer to effects of opinion expressions on the senders themselves. Despite growing empirical support for self-effects, moderators and mediators of these self-effects are barely researched. The article outlines theoretical arguments that individuals elaborate more and put more effort into message composition when expecting a public vs. a private setting. This, in turn, should lead to higher self-effects on the senders' perceived knowledge, issue interest, and behavioral intentions. In a preregistered between-subjects experiment, we found tentative support for these assumptions.

Keywords: Self-effects, opinion expression, political interest, elaboration, experiment

Zusammenfassung: Selbsteffekte in der kommunikationswissenschaftlichen Forschung sind Effekte von Meinungsäußerungen auf die sich Äußernden selbst. Trotz zunehmender empirischer Belege für die Existenz von Selbsteffekte sind Moderatoren und Mediatoren kaum untersucht. Der Artikel führt theoretische Argumente aus, wonach Menschen mehr elaborieren und mehr Aufwand auf die Gestaltung einer Meinungsäußerung verwenden, wenn sie (vermeintlich) in einem öffentlichen vs. privaten Kontext kommunizieren. Dies sollte zu stärkeren Selbsteffekten auf ihr wahrgenommenes Wissen, ihr Themeninteresse und ihre Handlungsintentionen führen. Eine präregistrierte Experimentalstudie unterstützt diese Annahmen teilweise.

Schlagwörter: Selbsteffekte, Meinungsäußerung, politisches Interesse, Elaboration, Experiment

1. Introduction

When we express our opinions, we might influence not only others but also ourselves. In her seminal piece, Valkenburg (2017) draws attention to a phenomenon "that can be named self-effects: the effects of messages on the cognitions (knowledge or beliefs), emotions, attitudes, and behavior of message creators/senders themselves" (p. 478). Whereas such self-effects have also been researched in private settings with no or a very small audience (e.g., Gonzales & Hancock, 2008; Tice, 1992), they received growing scholarly interest with the rise of social media (for an overview, see Carr et al., 2021; Pingree, 2007; Valkenburg, 2017). Such

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settings can have a public character; individuals can communicate their messages to larger and less identifiable audiences (Carr et al., 2021; Wang & Sundar, 2022). Research indicates that the context of a message matters for self-effects, with stronger self-effects generally observed in public settings (e.g., Carr et al., 2021).

Two central mechanisms may account for differences in the strength of self-effects in public vs. private settings: First, when people anticipate speaking in public, they engage in greater *elaboration* on the issue to perform well (Pingree, 2007). This increased elaboration then increases self-effects (e.g., Eveland & Thomson, 2006). Second, opinion expression often affords *composing a message*, that is, transforming thoughts into language, and constructing a coherent idea (Pingree, 2007). This process is heightened by the anticipation of a larger audience (Bargh & Schul, 1980).

The current study sets out to test these mechanisms in the context of self-effects on variables influencing political behavior. In a preregistered between-subjects experiment, it investigates how public vs. private opinion expression – via elaboration and composition as mediators – influences the expressers' interest and perceived knowledge on the political issue of expression and their intention to further engage in the issue.

The paper makes three important contributions: First, it explores the mechanisms behind self-effects and thus contributes to theory building and testing. Second, by examining expressions on a controversial political issue, it applies self-effects to the less intensively studied field of political communication (for exceptions see Lane et al., 2019; Neubaum & Lane, 2023; Prochazka et al., 2025; Winter et al., 2024) and therefore tests its applicability in additional contexts. Third, it contributes to the understanding of the determinants of political engagement in an era of enhanced opportunities to express opinions in front of more and less public audiences (Abramson & Aldrich, 1982; Prior, 2010).

2. Self-effects of public and private expressions

Research in different areas finds general support for self-effects. For instance, self-presentations of character traits influence the self-perception of these traits (Carr et al., 2021; Gonzales & Hancock, 2008). Van Oosten et al. (2018) show that sexy self-presentations in social media lead adolescents to think of themselves as being more sexually outgoing. Expressions can even lead to behavioral effects: Users who shared health-related messages in social media were more likely to comply with the stated healthy or unhealthy behavior (D'Angelo & Moreno, 2019; Nabi et al., 2019). Self-effects have also been found in political online communication. Research shows that people who communicate their attitudes on political issues online later advocate these attitudes more strongly and have a stronger preference for originally favored political candidates (Cho et al., 2018). Lane et al. (2019) show that political self-expression in social media can influence the self-perception of being interested and engaged in politics. Gil de Zúñiga et al. (2014) find that political expression in social media has behavioral self-effects as well – it increases political participation online and offline.

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The strength of self-effects is contingent on the communication setting, which can vary, among other aspects, in its degree of publicness: Public refers to settings with broad or undefined audiences, while private refers to those restricted to specific individuals or small groups. The perception of publicness is at least partly construed: When (considering) sharing content with others in online contexts, individuals imagine their audience based on available information and individual evaluations (e.g., Litt, 2012; Litt & Hargittai, 2016). This results in interindividual variations in the perception of how public a communication setting is.

(Presumably) public compared to private expressions create a sense of "public commitment" (Schlenker et al., 1994). Individuals are driven to be consistent in their self-presentation of their beliefs about themselves, their attitudes towards issues, as well as their behaviors. They feel committed to the external image of their public self-presentation and are motivated to remain consistent with it in their internal and external states (Cialdini & Goldstein, 2004; Leary & Kowalski, 1990). Therefore, they internalize their public self-presentation (Tice, 1992). Public expressions should thus have stronger self-effects, while expressions in front of a smaller or less relevant audience motivate less commitment (see also release effects, Pingree, 2007). This process is reinforced by concerns of social desirability: People want to be seen positively by others and adjust their self-expressions in line with prevailing social norms and expectations (Paulhus, 1991). At the same time, the motivation to maintain a coherent and consistent identity fosters alignment between one's public and private selves, since inconsistencies could threaten both self-integrity and social credibility (Swann, 1983). Research supports this: Identity shifts in reaction to self-presentation of character traits are stronger in public than private contexts (Carr & Hayes, 2019; Gonzales & Hancock, 2008) and when the communicator is identifiable (Carr et al., 2021; see H1 below).

3. Self-effects through elaboration and composition

In addition to the effect of publicness, we differentiate two cognitive processing mechanisms behind self-effects: Elaboration and composition (similar to Pingree, 2007). *Elaboration* refers to the extent to which a person deeply thinks about and considers the information and its implications. It includes recalling pre-existing knowledge, tying together ideas, and interpreting them in meaningful ways (Eveland, 2004; Petty & Cacioppo, 1986). The process of *composition* includes transforming one's thoughts into language and constructing a coherent idea (Pingree, 2007).

Substantiating the potential influence of *elaboration on self-effects*, research on effects of media reception and interpersonal discussions provides extensive evidence that cognitive processing – foremost elaboration – has positive effects on objective political knowledge and opinion strength (Eveland, 2004; Eveland & Thomson, 2006, but see for social media news use, Oeldorf-Hirsch, 2018). Additionally, Nanz and Matthes (2022) show that superficial processing is negatively correlated with interest and subjective knowledge, while deeper elaboration is positively related (see below, H2 b-path of the mediation).

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With regard to a *composition effect*, Nekmat (2012) shows that composing a message increases learning (in education research: Lachner et al., 2022). Lane et al. (2019) find that expressive political behavior on Facebook that is more effortful (commenting, posting) leads to higher political interest and perceived engagement, while merely liking content does not. This suggests that the higher composition afforded by creating posts and comments increases self-effects compared to less composition during liking (see below, H3 b-path of the mediation).

Elaboration as well as composition can create familiarity with a topic (Choi et al., 2017), which, in turn, enhances the perception of being knowledgeable (Müller et al., 2016; Schäfer, 2020). Additionally, greater cognitive effort during self-presentation (whether through elaboration, composition, or both) increases commitment to the presentation and related future behaviors (Cialdini & Goldstein, 2004). For example, participants who actively declared their participation in a study were more likely to act on it weeks later than participants who only passively agreed to participate in the same study (Cioffi & Garner, 1996). This suggests that the goal to behave consistently with one's expression is stronger after more effortful self-presentation.

4. Relation between the public context of expressions and elaboration and composition

Elaboration and composition should be contingent on the context of the opinion expression. An important reason for elaboration and composition in expectation of future expression is the (potential) senders' motivation to perform well (Bargh & Schul, 1980). The motivation to perform well is greater in public settings, because the senders would like to present a favorable public image (Goffman, 1967), because they have an interest in convincing their audience (Eveland, 2004), and because the audience has the power to sanction the senders negatively for disliked messages (Neubaum & Krämer, 2018). Eveland (2004) refers to this mechanism as anticipatory elaboration: "the expectation of an impending discussion is an internal motivation that then increases cognitive elaboration" (p. 180) of information (see below, H2 a-path of the mediation). The perception that the audience will hold them accountable (Tetlock et al., 1989) also requires senders to consider the audience's characteristics and create a message that is defensible and effective (Nekmat, 2012). Thus, they engage in the composition of the message (see below, H3 a-path of the mediation).

Educational research, too, supports that people show increased conceptual learning when they expect to teach on a subject compared to when they only prepare for themselves (for an overview, Lachner et al., 2022): The preparation to teach increases retrieval practice as well a generative processing. Through these processes, students build a coherent mental representation of the subject matter. Additionally, the expectation of the audience triggers adaptations and adjustments in the presentation to make it more comprehensible to the public, thus it stirs composition. Actually tutoring others further increases learning effects over only preparing to teach others (Annis, 1983), even if teaching only includes pre-

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senting the lesson without interaction with the students (Fiorella & Mayer, 2013; Lachner et al., 2022).

5. The present research

The present study tests the differences in self-effects of public and private opinion expression and the mediating role of elaboration and composition on variables relevant for political engagement, more specifically, issue interest, perceived knowledge, and behavioral intentions.

Interest in an issue increases information search, leads to more certain attitudes, and can enhance discussion willingness and engagement in further behaviors related to the issue (Petty & Cacioppo, 1986). In the realm of politics, political interest is an essential determinant of further information consumption, news use (Stromback et al., 2013), and political participation (Gil de Zúñiga & Diehl, 2019; Prior, 2010). However, the self-effects of one's own communicative behavior on interest are largely unknown. Yet, Neubaum and Lane (2023) and Lane et al. (2019) show that political expression on social media can increase the senders' political interest.

Politically knowledgeable individuals hold stronger attitudes (Marquart et al., 2019). They are also more likely to participate in politics, for example, by attending discussions, contacting politicians, or voting (Andersen et al., 2016; Gil de Zúñiga & Diehl, 2019; McLeod et al., 1996; McLeod et al., 1999). However, evidence is accumulating that it is not necessarily objective knowledge but *perceived knowledge* that exerts effects (Lee et al., 2022). The difference is relevant insofar as (social) media use can create an illusion of knowledge by enhancing familiarity (Park, 2001). Even though factual and perceived knowledge on an issue do not necessarily coincide (Schäfer, 2020), perceived knowledge is positively related to attitude strength (Aertsens et al., 2011; Raju et al., 1995), willingness to discuss a topic (Rios et al., 2018), and behavioral intentions (Dreston & Neubaum, 2023). Schäfer (2020) even finds that while perceived knowledge is related to these outcome variables, factual knowledge is not. Furthermore, the feeling of being informed can prevent the use of further news sources (Müller et al., 2016).

Recent research has already considered how exposure to social media influences perceived knowledge. Most importantly, the great amount of news and its repetitiveness can create the illusion of being informed, although one has not read the full source (Müller et al., 2016; Schäfer, 2020). What is missing from the picture is how active participation contributes to perceived knowledge. Albeit, Ward et al. (2023) show that sharing news content even without reading it (Sundar et al., 2024) increases subjective knowledge because people believe they are as knowledgeable as their posts make them appear. However, it is possible that engaging more effortfully with a topic and trying to compose a more complex message makes individuals more aware of their deficits (Weber & Köhler, 2017).

Beyond cognitive self-perceptions of interest and knowledge, engaged individuals are also more likely to *intent behaviors* related to the issue under consideration (Nabi et al., 2019; D'Angelo & Moreno, 2019). Expression on social media

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might increase their willingness to further express themselves about the issue and self-mobilize further actions on the communicated issue.

To sum up, based on the theoretical arguments that self-effects are stronger in public vs. private settings and that elaboration and composition account for this, we hypothesize:[1]

> *H1: a) Interest in the issue of opinion expression, b) perceived knowledge, and c) behavioral intention are greater when an opinion is expressed in a public compared to a private setting.*
>
> *H2: Opinion expression in a private vs. public setting increases a) interest in the issue, b) perceived knowledge, and c) behavioral intention through higher levels of elaboration.*
>
> *H3: Opinion expression in a private vs. public setting increases a) interest in the issue, b) perceived knowledge, and c) behavioral intention through higher levels of expression composition.*

6. Method

The hypotheses, study design, and analysis plan were preregistered (https://osf.io/d6hce/). All materials, data, and code are publicly available (https://osf.io/tfj4g/).

6.1 Design and procedure

We conducted a between-subjects experimental design embedded in an online survey, manipulating the degree of publicness (public vs. private) of the context of the opinion expression. Participants received information about the real-life, non-governmental campaign "The Angry Cactus", which criticizes advertisements with sexist portrayals of women. Participants saw exemplary advertising images. They were then randomly assigned to one of the two experimental groups. In both conditions, participants were asked to state their opinion on portrayals of women in advertising and on "The Angry Cactus". In the public condition, participants were informed that their statement would be published on the website and social media channels of a news provider with about 500,000 followers, including their first name and place of residence. The news provider's name was fictitious but resembled real news providers. This scenario was chosen based on a comprehensive pretest with 130 participants comparing three different versions

1 The hypotheses, study design, and analysis plan were preregistered (https://osf.io/d6hce/). The order of the hypotheses deviates from the preregistration because we restructured the postulated mediation effects. Furthermore, we excluded the hypotheses referring to the direct effects of a public compared to a private setting on elaboration and composition. Nevertheless, these paths are tested in the mediation analyses (H2 and H3 in the preregistration). We reformulated the wording of H2 and H3 (H4 and H5 in the preregistration) to indicate the postulated causal direction. Finally, we changed the wording from perceived expertise to perceived knowledge to adhere to a more established term in the literature. The construct itself, however, remains the same.

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of the manipulation of the public condition (see OSF). In the private condition, participants were informed that only the researchers read their statement. All subjects were fully debriefed at the end of the study.

6.2 Measures

After the manipulation, participants answered the following items on a scale from 1 = "strongly disagree" to 7 = "strongly agree". *Issue interest* was measured with eight items (e.g., "I'm interested in how women are portrayed in advertising"; $M = 4.62$, $SD = 1.60$, $\alpha = 0.93$; based on Otto & Bacherle, 2011; for all items see questionnaire in OSF). *Perceived knowledge* on the topic area was measured with four items (e.g., "I can make a statement about whether or not an ad is sexist"; $M = 4.83$, $SD = 1.31$, $\alpha = 0.83$; based on Flynn & Goldsmith, 1999). *Behavioral intention to engage with the issue in the future* was measured with six items (e.g., "I could see myself volunteering to teach others about sexism in advertising."; $M = 3.91$, $SD = 1.41$, $\alpha = 0.83$; developed for the specific topic). *Elaboration on the topic* was measured with six items (e.g., "I thought about what I already know on the subject"; $M = 5.44$, $SD = 1.18$, $\alpha = 0.76$; based on Eveland et al., 2003). *Expression composition* in the creation of a statement was measured with four items (e.g., "I have tried to write in a way that makes my opinion as convincing as possible."; $M = 5.76$, $SD = 1.04$, $\alpha = 0.77$; developed based on Pingree, 2007). Prior to the manipulation, *involvement in the topic* was measured as a control with seven items (e.g., "It is important to me that women are not portrayed as sexual objects."; $M = 4.88$, $SD = 1.27$, $\alpha = 0.82$; developed for the specific topic). The perception how many people had seen the participants' statement (1 = "very few" to 7 = "very many"; $M = 2.67$, $SD = 1.40$) as well as five items on the participants' perception of publicness (e.g., "My opinion will be published on the Internet", $M = 3.24$, $SD = 1.45$, $\alpha = 0.80$) served as *manipulation checks*. Additionally, we measured *gender, age,* and *education level* and conducted an *attention check* ("Please choose '7' as answer here").

6.3 Sample

The target group was individuals 16 years or older with online access. The sample was recruited via an online access provider (SoSci Panel). After completing the questionnaire, participants had the option to participate in a lottery and the chance to win one of five vouchers worth €50.

Participants were eligible for the study if they had (1) made a statement and (2) could see the advertisements (i.e., no technical obstacles). Following a power analysis for parallel mediation models (.85 power to detect a medium effect size of .20 with a standard alpha error probability of .05; Schoemann et al., 2017), we targeted a sample size of 330 participants (approx. half in each experimental condition) who created a statement about sexist advertising. Before checking the inclusion criteria and data cleaning, the sample comprised 396 participants.

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Twenty-eight participants had not made a statement[2] and two could not see the advertisements. After data cleaning (34 excluded because they did not pass the attention check, none because they took less than three minutes to complete the entire study), a total of 333 participants remained for the following analyses (64% female, 93% highly educated, M_{age} = 44.31, SD_{age} = 17.18), 167 in the private and 166 in the public condition.

6.4 Data analysis

We estimated three parallel mediation models to analyze the data using the package lavaan (Rosseel, 2012) in R (R Core Team, 2021). Outcome variables were a) issue interest, b) perceived knowledge, and c) behavioral intention. The public vs. private context of the opinion expression served as independent variable, elaboration and composition served as mediators. Involvement and gender served as control variables.

7. Results

7.1 Manipulation check

The manipulation check was successful (t(325.81) = -1.97, p < .05, d = -0.22); participants in the public condition (M = 2.83, SD = 1.47) estimated their audience to be larger than the private condition (M = 2.52, SD = 1.31). Participants in the public condition also perceived more publicness (M = 3.73, SD = 1.41) compared to participants in the private condition (M = 2.76, SD = 1.33; t(327.67) = -6.42, p < .001, d = -0.71).

7.2 Hypotheses testing

The results of the parallel mediation models are summarized in Tables 1–3. H1a–c are not supported: Issue interest, perceived knowledge, and behavioral intention did not differ in public vs. private settings (total effects, c-paths). Elaboration was associated with higher issue interest and behavioral intentions (but not perceived knowledge). Composition was associated with higher perceived knowledge (but not issue interest and behavioral intentions, b-paths). The experimental manipulation also did not impact elaboration and message composition (a-paths). Thus, there were no significant mediation effects (indirect effects, a1*b1-paths and a2*b2-paths); H2a–c and H3a–c are not supported.

2 Participants who did not make a statement differed from those who made a statement in behavioral intention (t(25.56) = -3.12, p = .004, those who made a statement had stronger behavioral intentions). They did not differ in issue interest (t(23.68) = -0.89, p = .380), perceived knowledge (t(25.71) = -1.68, p = .106), elaboration (t(24.37) = -1.00, p = .327), gender (χ^2(1) = 0.58, p = 0.444), and education (χ^2(1) = 1.64, p = 0.201). Experimental condition and participant characteristics influenced whether participants made a statement (experimental condition (χ^2(1) = 4.99, p = 0.026, a higher number in the public condition did not make a statement), age (t(27.97) = -2.49, p = .019, older participants more often made a statement), involvement (t(26.16) = -2.87, p = .008, participants more involved more often made a statement)).

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Table 1. Parallel mediation model – IV experimental manipulation, DV issue interest

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	0.11	0.13	0.82	.413
X → M1 (a1)	-0.16	0.13	-1.25	.210
X → M2 (a2)	0.09	0.12	0.81	.419
M1 → Y (b1)	0.53***	0.06	9.49	< .001
M2 → Y (b2)	0.02	0.06	0.30	.763
X→ M1 → Y: indirect effect (a1*b1)	-0.09	0.07	-1.24	.214
X→ M2 → Y: indirect effect (a2*b2)	0.00	0.01	0.28	.777
X→ Y: total indirect effect (a1*b1 + a2*b2)	-0.08	0.07	-1.21	.225
X → Y: total effect (c)	0.02	0.15	0.16	.873

Notes. X = experimental manipulation (0 = private, 1 = public), M1 = elaboration, M2 = composition, Y = issue interest. Control variables: gender and issue involvement.

Table 2. Parallel mediation model – IV experimental manipulation, DV perceived knowledge

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	-0.04	0.11	-0.38	.704
X → M1 (a1)	-0.14	0.13	-1.10	.272
X → M2 (a2)	0.11	0.12	1.00	.340
M1 → Y (b1)	0.06	0.05	1.29	.198
M2 → Y (b2)	0.24***	0.05	4.37	< .001
X→ M1 → Y: indirect effect (a1*b1)	-0.01	0.01	-0.84	.403
X→ M2 → Y: indirect effect (a2*b2)	0.03	0.03	0.93	.351
X→ Y: total indirect effect (a1*b1 + a2*b2)	0.02	0.03	0.58	.564
X → Y: total effect (c)	-0.03	0.12	-0.22	.824

Notes. X = experimental manipulation (0 = private, 1 = public), M1 = elaboration, M2 = composition, Y = perceived knowledge. Control variables: gender and issue involvement.

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Table 3. Parallel mediation model – IV experimental manipulation, DV behavioral intention

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	0.19	0.13	1.48	.140
X → M1 (a1)	-0.14	0.13	-1.12	.263
X → M2 (a2)	0.11	0.12	0.93	.353
M1 → Y (b1)	0.14**	0.05	2.63	.009
M2 → Y (b2)	0.06	0.06	1.03	.303
X→ M1 → Y: indirect effect (a1*b1)	-0.02	0.02	-1.03	.303
X→ M2 → Y: indirect effect (a2*b2)	0.01	0.01	0.69	.490
X→ Y: total indirect effect (a1*b1 + a2*b2)	-0.01	0.02	-0.63	.532
X → Y: total effect (c)	0.17	0.13	1.36	.175

Notes. X = experimental manipulation (0 = private, 1 = public), M1 = elaboration, M2 = composition, Y = behavioral intention. Control variables: gender and issue involvement.

7.3 Exploratory analyses

Given the null findings and the possibility that participants may vary in their audience perception (see above; Litt, 2016; Litt & Hargittai, 2016), we reran all analyses with the perceived audience size as the independent variable instead of the experimental manipulation. The results are reported in Tables 4 to 6.

Table 4. Parallel mediation model – IV perceived publicity, DV issue interest

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	0.25***	0.05	5.45	< .001
X → M1 (a1)	0.15**	0.05	3.29	.001
X → M2 (a2)	0.09*	0.04	2.14	.032
M1 → Y (b1)	0.49***	0.05	9.00	< .001
M2 → Y (b2)	0.00	0.06	-0.04	.969
X→ M1 → Y: indirect effect (a1*b1)	0.07**	0.02	3.09	.002
X→ M2 → Y: indirect effect (a2*b2)	0.00	0.01	-0.39	.969
X→ Y: total indirect effect (a1*b1 + a2*b2)	0.07**	0.02	3.01	.003
X → Y: total effect (c)	0.33***	0.05	6.45	< .001

Notes. X = perceived publicity, M1 = elaboration, M2 = composition, Y = issue interest. Control variables: gender and issue involvement.

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Table 5. Parallel mediation model – IV perceived publicity, DV perceived knowledge

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	0.12**	0.04	3.01	.003
X → M1 (a1)	0.14**	0.05	3.13	.002
X → M2 (a2)	0.08*	0.04	2.04	.041
M1 → Y (b1)	0.05	0.05	1.00	.319
M2 → Y (b2)	0.23***	0.05	4.19	< .001
X→ M1 → Y: indirect effect (a1*b1)	0.01	0.01	0.95	.342
X→ M2 → Y: indirect effect (a2*b2)	0.02	0.01	1.84	.066
X→ Y: total indirect effect (a1*b1 + a2*b2)	0.03*	0.01	2.05	.041
X → Y: total effect (c)	0.15***	0.04	3.61	< .001

Notes. X = perceived publicity, M1 = elaboration, M2 = composition, Y = perceived knowledge. Control variables: gender and issue involvement.

Table 6. Parallel mediation model – IV perceived publicity, DV behavioral intention

Path	Effect	*SE*	*z*	*p*
X → Y: Direct effect (c')	0.32***	0.04	7.53	< .001
X → M1 (a1)	0.14**	0.05	3.12	.002
X → M2 (a2)	0.08*	0.04	2.03	.043
M1 → Y (b1)	0.10	0.05	1.89	.059
M2 → Y (b2)	0.04	0.06	0.76	.447
X→ M1 → Y: indirect effect (a1*b1)	0.01	0.01	1.61	.107
X→ M2 → Y: indirect effect (a2*b2)	0.00	0.01	0.71	.477
X→ Y: total indirect effect (a1*b1 + a2*b2)	0.02	0.01	1.75	.080
X → Y: total effect (c)	0.34***	0.04	8.04	< .001

Notes. X = perceived publicity, M1 = elaboration, M2 = composition, Y = behavioral intention. Control variables: gender and issue involvement.

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For all three independent variables, the assumed audience size had a significant impact (total effects, c-paths); the larger the assumed audience, the higher issue interest, perceived knowledge, and behavioral intention. This also showed for the mediators; the larger the assumed audience, the more participants elaborated and the more effort they put into message composition (a-paths). For issue interest, the mediation showed for elaboration, but not composition (indirect effects, a1*b1-paths and a2*b2-paths). This was not the case for perceived knowledge and behavioral intention.

8. Discussion

The presented study contributes to our understanding of the mechanism of self-effects of opinion expression. We tested whether public opinion expression compared to private expression would increase self-effects on interest in the issue, perceived knowledge, and intention to engage with the issue in the future.

Our results showed that publicness of a statement does neither increase self-effects on interest, perceived knowledge, and behavioral intentions, nor does it increase the cognitive processing mechanisms that we assumed would lead to the self-effects. Thus, the results raise questions about the impact of audience size on self-effects. For one, this might be due to methodological limitations: Participants expressed their opinion only once, on a predetermined topic, in a hypothetical setting, and the effect was measured immediately after the expression. In such a procedure, participants might be less motivated to elaborate and convince their audience and feel less committed to the voiced opinion, and thus not infer individual characteristics from this behavior. Additionally, the mock-up character of the study, too, could have been obvious to some participants and biased the results compared to opinion expression on authentic websites and users' social media accounts. Furthermore, the sample was not representative of social media users actively posting statements on political issues. Thus, the results cannot be generalized. It is possible that individual characteristics like participation experiences and issue involvement could moderate self-effects. Longitudinal studies with diverse samples and repeated expressions on multiple topics might be especially fruitful for understanding how self-effects of opinion expression cumulate over time. However, some previous studies have found self-effects even in single public expressions (e.g., Gonzales & Hancock, 2008; Walther et al., 2011).

Thus, the present study strengthens the suggestion by Carr et al. (2021) who, after summarizing contradictory findings on the effect of publicness in identity shift research, state: "people […] have different understandings of what constitutes a 'public' behavior and who or what their imagined audience is [… and] it is possible publicness does not matter as much as the value a social media user attaches to the audience for whom they are – or think they are – performing" (p. 206; see also Litt, 2012; Litt & Hargittai, 2016). This is supported, for one, by the participants' subjective interpretation of the size of the audience of 500,000 followers, which varied strongly (see standard deviation of the manipulation check variable in the public condition). For the other, it is supported by the fact that the assumed relationship of publicness of the expression with the mediators

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and the dependent variables showed in the exploratory analyses based on the de facto perception of publicness. In other words: If a participant perceived the audience as large by their own standards, they elaborated more, put more effort into composing their statement, and showed higher levels of issue interest, perceived knowledge, and behavioral intention. However, when interpreting the results of the exploratory analyses, we need to keep in mind that – since they lack an experimental design – we cannot be certain about the causal order. It is also possible that the associations between the variables represent a „reversed self-effect": More elaboration, composition, issue interest, perceived knowledge, and behavioral intentions might influence the communicators' mental conception of the imagined audience. If people express their opinion, elaborate a lot, and perceive a topic as interesting and worthy of their future engagement, they might falsely overestimate how many others engage with this topic and read their statement (cf., false consensus effect, Mullen et al., 1985). We think it is worth pursuing this line further: It adds to the literature on self-effects because it considers an additional outcome variable. Expressing one's opinion on social media could influence one's impression of the audience of social media. It thereby adds to the literature on predictors of imagined audiences (Litt, 2012; Litt & Hargittai, 2016), because, to our knowledge, this research area has not fully considered that imagined audiences could be contingent on self-confirmation motivation or a false consensus effect.

Additionally, the size of the audience may matter less for public commitment and as a motivation to perform well. Instead, the visibility of the opinion to relevant others could be influential (see e.g., Carr & Foreman, 2016) as well as the assumed involvement of the audience in the discussed issue. For example, users elaborate more intensively when creating media content for an audience similar to themselves and recipients who are presumably critical or highly involved (Kornfield & Toma, 2020; Nekmat, 2012). Future studies should thus additionally take the relational closeness of the audience into account.

The lack of effect of the experimental condition could also indicate particularities of the area of *political expression* self-effects. Many previous experimental studies examined identity shifts due to public self-presentation of personality traits (e.g., extraversion, Carr et al., 2021). The present study considered self-effects of expressions on political interest, knowledge, and behavioral intentions, which are conceptually different and less stable over time and across situations than personality traits. Previous studies in the area of political self-effects (Cho et al., 2018; Gil de Zúñiga et al., 2014; Lane et al., 2019; Neubaum & Lane, 2023; Prochazka et al., 2025; Winter et al., 2024) have barely tested the effect of public expression context experimentally. It needs further research to differentiate whether public commitment plays different roles for expressions in different areas.

Beyond the influence of public and private contexts for self-effects, this article also set out to investigate cognitive mechanisms that lead to stronger effects of expression on the senders themselves. We assumed that higher levels of elaboration and composition resulted in stronger self-effects. In line with previous research, the study supported the impact of elaboration on two of the three dependent variables, namely issue interest and behavioral intention (Gil de Zúñiga et

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al., 2014; Kwak et al., 2005; Lee et al., 2022; Müller et al., 2016; Nanz & Matthes, 2022; Schäfer, 2020; Shah et al., 2005). It is particularly noteworthy that the present study investigated elaboration on a specific topic. Thus, the study adds to the literature that applies (panel) surveys on political elaboration, interest, and engagement in general. The lack of influence of elaboration on perceived knowledge is worth further investigation. It substantiates the claim that deeper elaboration – contingent on circumstances or personality characteristics – can make individuals more aware of their lack of knowledge (Weber & Köhler, 2017). As discussed above, we did not find support for the assumed mediation as the experimentally manipulated context of the expression did not affect elaboration. The exploratory analyses, however, partly supported the mediating role of elaboration for the perceived audience size.

The effects of composition are less consistent. The participants' effort to transform their thoughts into language and make them most understandable for their audience only increased perceived knowledge. This supports the assumption that when people put thoughts into writing and thereby construct a more coherent argumentation, they might infer their own knowledge about the subject from this process.

It should be noted, however, that the effect of elaboration and composition on the three outcomes of self-effects was not tested experimentally. This opens the possibility of a reversed causal order or at least reciprocal effects, in which online users with greater interest, perceived knowledge, and engagement intentions elaborate and compose more.

To sum up, our study is limited in its artificial and short-term setting. Still, our results provide important insights into research on self-effects: (1) We find that the perceived audience size seems to be more important than the actual audience size. (2) We find sufficient support for elaboration as an important mechanism explaining self-effects, but weak and inconsistent support for the role of composition. (3) Considering the unclear (as non-experimentally manipulated) direction of our effects, we provide important avenues for future exploration of potential "reversed self-effects" and research on the construction of the imagined audience.

Generative AI declaration

This work was completed without the use of AI-assisted tools.

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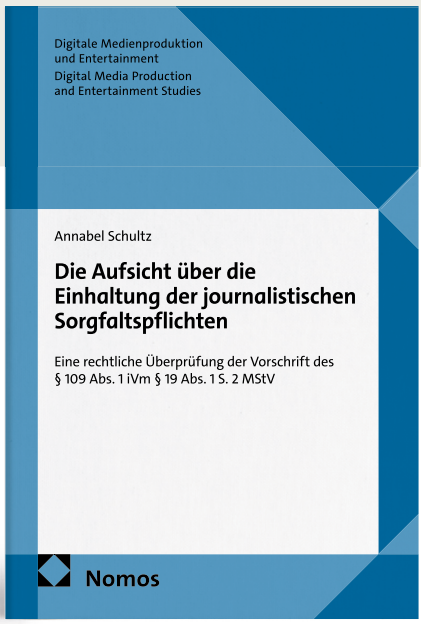
Ensuring Media Supervision Independent of the State



Die Aufsicht über die Einhaltung der journalistischen Sorgfaltspflichten

Eine rechtliche Überprüfung der Vorschrift des § 109 Abs. 1 iVm § 19 Abs. 1 pp. 2 MStV

By Dr. Annabel Schultz

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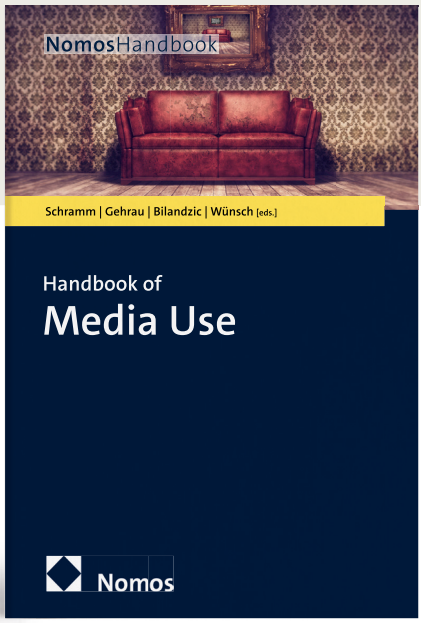
The New Standard Work on Reception Research



Handbook of Media Use
Edited by Prof. Dr. Holger Schramm, Prof. Dr. Volker Gehrau, Prof. Dr. Helena Bilandzic and Prof. Dr. Carsten Wünsch
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This handbook offers a comprehensive overview of the subjects and theories of media use research. In 37 contributions, the questions and subjects of the discipline are presented, the current state of research is analysed and an outlook on open questions is given. The contributions thus provide a systematic approach to the state of research on each topic from a communication science perspective. The handbook is divided into four parts: (1) the foundations of media use, (2) questions of media choice and attraction, (3) specific phenomena of media experiences and processes, and (4) the most important contexts of media use. Modern media effects theories can no longer forego analysing media experiences and processes. The handbook therefore examines these phenomena before and during media use in detail.

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