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ARTICLE

User perceptions of incidental exposure to science content on social media — a qualitative study

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Abstract

So far, incidental exposure (IE) to science information has been largely overlooked although science information can inform individually and societally relevant decisions. Semi-structured interviews with 19 social media users revealed that most participants believed IE to science information being largely algorithmically driven. Participants reported that content processing and engagement heavily depend on personal relevance and interest while content engagement is mostly passive. Participants commonly relied on trust, familiarity, and verification strategies to assess credibility as they were aware of misinformation. Although scarcely reported, IE to science information can inform decision-making. This exploratory study highlights shared mechanisms of IE across domains and provides a foundation for future quantitative research.

Keywords

Science and media; Digital science communication; Informal learning

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1 ▪ Introduction

Social media is the primary source of exposure to science information around the world [Mede et al., 2025]. Although users can still actively search for content on social media, it seems more common that they are *incidentally exposed* to it. Incidental exposure (IE) describes the phenomenon that users unintentionally encounter content such as news while they were pursuing a different goal, like seeking entertainment or sports information [Matthes et al., 2020]. The reasons for IE range from channel subscriptions to algorithmic filtering [Thorson & Wells, 2016]. Accordingly, IE is not coincidental, but the result of personal or algorithmic decisions which increase the likelihood of encountering content that aligns with existing interests and preferences [Sabir et al., 2022; Thorson, 2020].

So far, the phenomenon of IE has been approached mainly from a political news perspective. It appears that IE to political news may positively affect users' knowledge, content engagement, and political participation [Dreston & Nanz, 2026; Dreston & Neubaum, 2025; Matthes et al., 2020; Nanz & Matthes, 2022; Oeldorf-Hirsch, 2018; Thorson, 2020]. Arguably, political news can be important for informed decision-making both on an individual and a societal level, which explains the significant academic attention given to the phenomenon [Matthes et al., 2020]. Surprisingly, despite the fact that certain science information such as socio-scientific issues (e.g., genetically modified foods, vaccinations or global warming) is vital for both individual and policy decision-making [Fischhoff, 2013], only few studies have examined IE in this context. To understand whether users experience any differences (e.g., in exposure frequency or processing difficulty) compared to IE to political news and whether similar learning and engagement effects can be expected [see e.g., Anderson et al., 2021; Rousseau, 2024], it is crucial to learn more about IE to science news and science content in general on social media.

Whereas political news describes content mentioning political actors, authorities, or decisions and can be both relevant and irrelevant for decision-making [Matthes et al., 2020], science content can refer to any information related to scientific topics. Accordingly, science content includes information about both socio-scientific issues that deal with questions relevant to society and individuals (e.g. global warming or vaccinations), as well as topics that are less relevant to societal and individual decision-making (e.g., the extinction of the dinosaurs or black holes). There appears to be a particular overlap between science content covering socio-scientific issues and political news as both can inform political outcomes such as participation or voting. Despite this overlap, science information also differs from political news in certain ways, which may affect its perception and cognitive processing. While political news focus merely on political outcomes [Matthes et al., 2020], science information comprises topics relevant for individual decision making [e.g., whether to consume genetically modified food or getting vaccinated; Fischhoff, 2013]. Thus, the general informative value of science information and political news may differ. Moreover, as users report being exposed to science content rather rarely between several times a year to once or twice per month [Mede et al., 2025], the average user may be more likely to incidentally encounter political news [European Parliament, 2025] which are produced and disseminated more frequently. Finally, political news focus on current events and often deal with questions for which there is no objectively correct answer [e.g., the height of the minimum wage; Reinemann et al., 2012]. Science information is ideally based on (established or emerging) empirical evidence and (tentative or solidified) expert consensus, thus, potentially providing more objective answers to certain questions [e.g., that human emissions cause the

temperature on our planet to rise; Vraga & Bode, 2020]. Also, science content is generally a broader category than political news because it comprises not only information about current events, but also about established information.

To gain an in-depth understanding of the entire process of IE to science information on social media — from the moment users are exposed to science content to the perceived consequences of exposure — this study employs a qualitative approach. The current study explores how IE to science information occurs (e.g., shared by social contacts or algorithmically), the decision to process incidentally encountered content or keep scrolling, the decision to engage with the content (e.g., liking, commenting, or sharing), the judgment of the content's truthfulness, and the perceived consequences of IE to science content. Finally, the study will help understanding whether users perceive any differences between IE to science information and political news. As a guiding theoretical framework, the Political Incidental News Exposure model [PINE; Matthes et al., 2020] is used and its core assumptions are explored for the topic of science information to understand whether IE is a generalizable phenomenon or whether there may be content-specific differences.

2 ▪ Theoretical rationale

2.1 ▪ *Reasons behind incidental exposure to science content*

Although the phenomenon of IE describes that users come across content unintentionally, this does not mean that they are coincidentally exposed to this content [Thorson, 2020]. Customized feeds, channel subscriptions, shared content by social ties, and algorithmic recommendations are all reasons for IE [Thorson & Wells, 2016]. Algorithmic filtering appears to play the most significant role in exposing users to political news which are based on automatic classifications [Sabir et al., 2022; Thorson et al., 2021]. The same may be true for IE to science content. Rousseau [2024] found that active engagement (e.g., liking, commenting, or sharing) with science content about the anthropogenic climate change increased the likelihood to be incidentally exposed to similar content a few months later. This suggest that social media algorithms play a significant role in the distribution of scientific content to users. However, so far, there appears to be no direct evidence about the different reasons behind IE to science content. This leads to the first question of the current study, which focuses on the (perceived) reasons behind IE to scientific content on social media:

RQ1: What reasons do social media users identify for incidentally encountering science information?

2.2 ▪ *Processing incidentally exposed science content*

When being incidentally exposed to science information, users can either ignore it or engage in more thorough cognitive processing of the content. With the Political Incidental News Exposure (PINE) Model, Matthes and colleagues [2020] offer a theoretical framework to better understand the psychological mechanisms underlying IE to political news on social media. In general, PINE suggests that users have an initial *processing goal* when using social media (e.g., to be entertained). However, users' processing goal may change after a so-called *relevance appraisal* of incidentally encountered political news (e.g., shifting from the motivation to be entertained to the motivation to learn about politics). Further, PINE

distinguishes two processing levels. Following positive relevance appraisals, users switch from passively scanning content (*first level*) to more cognitively demanding processing of incidentally encountered content (*second level*). Recent studies support the general propositions of the PINE model. Political interest and personally relevant content are positively related to more thorough (second-level) cognitive processing of the content [Nanz et al., 2026] and second level processing is associated with higher recall and learning [Dreston & Neubaum, 2025; Nanz & Matthes, 2020].

Placing their focus on political news, PINE only distinguishes between political and non-political content and processing goals. Matthes et al. [2020] argue that IE to political news should be separated from IE to non-political news because the main research interest lies in understanding the political consequences of IE. Building on this line of reasoning, I argue that, since information about socio-scientific issues is vital for making informed decisions that are relevant to both individuals and society [Fischhoff, 2013], research should rather focus on topics more relevant for societal and individual decisions (e.g., politics and socio-scientific issues) and topics less relevant for decision-making (e.g., entertainment and science information not informing decision-making). Accordingly, the interest in studying IE to science information lies in understanding whether users can learn from science content relevant for decision-making they encounter when having different processing goals and how such learning affects subsequent decision-making.

Following the basic logic of the PINE model, users' processing goal should change when they incidentally encounter relevant science content. This should enable more thorough content processing and further engagement and learning. The present study will examine whether the psychological process of incidentally encountering science information on social media and deciding to engage in cognitive processing differs from the process of IE to political content. The following questions are asked:

RQ2a: How do users process science content (first vs. second-level processing)?

RQ2b: What are the motives to switch from passive scanning to more effortful processing of science content?

2.3 ▪ *Content engagement*

Positive relevance appraisals and more thorough cognitive processing of incidentally exposed content increase the likelihood of further engagement [Matthes et al., 2020]. Engaging with social media postings involves actions like liking, commenting, or sharing [Oeldorf-Hirsch, 2018]. Since content engagement increases the likelihood of IE to similar content in the future [Rousseau, 2024], it is important to study why users engage and interact with science content. This is relevant not only for understanding individual exposure, but also for grasping the general distribution of scientific content on social media platforms. Posts that generate high amounts of interactions are further spread through algorithmic recommendations and might even reach users beyond their personal interests [Narayanan, 2023].

RQ3a: How do users engage with science content?

RQ3b: What are the reasons for (no) active engagement?

2.4 ▪ *Credibility judgements and trust*

With more thorough processing of incidentally encountered science content, people will also start to evaluate its credibility. This is important since users may come across content from unknown sources. Generally, credibility judgements can either be systematic and effortful or heuristic and less effortful [Chaiken, 1980]. The first, more analytical and controlled, processing mode describes instances in which people evaluate the credibility of information based on available information, such as relying on prior knowledge. Within the second, less effortful mode, people are rather relying on heuristic cues to judge the credibility of the content. Past research has shown that the reputation of a source and people's familiarity with it serve as important heuristic cues to evaluate the veracity of information [Metzger et al., 2010; Nowak et al., 2025]. Another important heuristic is people's trust in news and (science) information on social media which might either cause users to believe the content too quickly or lead them to question it more critically [Xiao et al., 2021]. Since not only accurate information but also misinformation and false claims about science topics circulate on social media, the question how users evaluate the truthfulness of incidentally encountered science information is crucial.

RQ4a: How do users determine the credibility of science information?

RQ4b: Do users trust incidentally encountered science information?

2.5 ▪ *Consequences of IE to science content*

According to the PINE model, IE can lead to learning [Matthes et al., 2020]. Especially when the encountered political content is processed more thoroughly, learning is more likely [Dreston & Nanz, 2026; Nanz & Matthes, 2020]. Regarding IE to science information, empirical evidence of learning is scarce. Anderson et al. [2021] found no direct but a moderated relationship between IE to information about gene-modification and objective knowledge about gene-modification: those who rarely discuss science related topics with others and have heterogenous networks showed the highest levels of knowledge together with higher IE. Meier [2024] found direct positive relationships between IE to various science topics and objective knowledge about these topics. However, both studies are correlational. Due to this scarce evidence about the consequences of IE to science information and objective knowledge, it is an important first step to ask participants about their subjective impression of experiencing any consequences. Moreover, an increase of subjective or objective knowledge is not the only consequence that might be associated with IE to science content. For instance, IE to science content might increase intentional science information consumption on other platforms [Strauß et al., 2020] and inform decision-making [Fischhoff, 2013].

RQ5: What are the perceived consequences users ascribe to being incidentally exposed to science content on social media?

RQ6: Do users believe that their usual science content consumption has changed because of incidental exposure?

2.6 ▪ *IE to political content vs. science content*

Lastly, as described above, there may be certain differences between political news and science information about exposure frequency as well as the content itself. To better understand the phenomenon of IE in general detached from particular topics, it is important to learn more about users' perceptions about being exposed to both kinds of information.

RQ7: What importance do users attribute to scientific content compared to political content on social media?

3 ▪ Method

To answer the main research questions, semi-structured interviews were conducted. Before taking part in the interviews, participants responded to basic sociodemographic questions, were asked about their subjective science knowledge, the channels on which they encounter science information most frequently, and their social media use habits. The interview guide was developed along the main research questions of this manuscript and can be found together with the coding scheme on OSF: https://osf.io/rcb4v/. Two undergraduate students recruited participants from their degree program and personal networks and conducted the interviews as part of their degree requirements. The conduct of this study was approved by the ethics committee of the Faculty of Computer Science of the University of Duisburg-Essen (ID: 2504SPRM5121).

3.1 ▪ *Sample*

Nineteen German social media users (7 women, 12 men) aged 20 to 62 with a mean age of about 28 years were interviewed. Most participants were highly educated. Seven persons had a university entrance qualification and eight had a university degree. Asked for their subjective knowledge about various socio-scientific issues such as global warming, vaccinations, or genetically modified foods on a Likert-scale from 1 ("very little") to 7 ("a lot"), participants rated their knowledge as medium. However, the range was high with several participants rating their subjective knowledge as (rather) low while several participants rated their knowledge as (rather) high. All but one participant reported encountering science information on social media. None of the participants reported exclusively seeing science information on social media. All participants reported encountering scientific information through at least two sources. See Table 1 for an overview of the sample characteristics.

3.2 ▪ *Data collection and analysis*

All interviews took place in May and June 2025 and were conducted either in an official laboratory room of the university or online through Zoom. The interviews were audio-recorded and transcribed with the help of additional software. On average, the recordings are 26:32 minutes long. All participants gave their written consent that the interviews can be audio-recorded and that their data can be used for data analysis in a completely anonymized form.

The interview guide contained a total of 21 questions. The first set of questions was related to the general use of social media. Next, the interviewer provided a definition of science

Table 1. Sample characteristics.

Pseudonym	*Age*	*Subjective Science Knowledge (1 = very little, 7 = a lot)*	*On which channels do you encounter scientific topics?*	*What social media platforms do you typically use?*	*How often do you use social media? (1 = less than once a month, 6 = (almost) the whole time)*
Florian	26	5	TV, streaming, social media, online newspaper	X, Instagram, TikTok, YouTube	6
Phil	26	6	streaming, social media, online newspaper	Instagram, TikTok, Reddit, YouTube, Twitch	5
Steven	26	7	TV, radio, print, online newspaper	Reddit	4
Katrin	25	6	TV, streaming, social media	Instagram, YouTube	5
Daniel	22	3	radio, streaming, social media, online newspaper	X, Instagram, TikTok, YouTube	6
Marcus	62	5	TV, streaming, social media, print	Facebook, Instagram, YouTube	5
Jonas	23	2	TV, social media, online newspaper	Instagram, YouTube	5
Andre	26	6	streaming, social media, online newspaper	TikTok, Reddit, YouTube	5
Patrick	23	3	streaming, social media	X, Instagram, TikTok, YouTube	5
Michael	26	3	streaming, social media	Instagram, TikTok, Reddit, YouTube	5
Sebastian	26	3	streaming, social media, print	Reddit, YouTube	5
Jana	27	5	radio, streaming, social media	Instagram, YouTube	5
Miriam	49	4	TV, radio, social media, print	Facebook, Instagram	5
Sophie	20	6	TV, streaming, social media	Instagram, YouTube	5
Lena	25	6	streaming, social media, online newspaper	Instagram, YouTube, Tumblr	5
Anna	24	5	TV, streaming, social media, online newspaper	Facebook, Instagram, TikTok, YouTube, Snapchat	5
Lucas	27	3	TV, radio, streaming, social media	Instagram, TikTok, YouTube	5
Laura	30	2	TV, radio, streaming, social media	Instagram, YouTube, Pinterest	5
Toby	27	4	streaming, social media	X, Instagram, TikTok, YouTube, Twitch	6

content on social media so that all participants would have a concrete understanding of the central topic. This definition did not describe the content of science information, but merely its form (e.g., content from official news agencies or private individuals and content resembling news or entertainment). The subsequent questions focused on the importance and typical consumption of science information. Afterwards, the phenomenon of IE was explained so that participants would only discuss IE and not, for example, intentional searches for science information in the subsequent questions. These questions asked for details about the IE process (initial contact, processing, and engagement). Lastly, questions were asked about the perceived effects of IE on the participants' everyday lives and the perceived differences between IE of political news and scientific content.

The transcribed audio recordings were coded and analysed with the help of MAXQDA24. This study follows a post-positivist systematic paradigm, employing Mayring's [2022] qualitative content analysis to ensure a transparent and reproducible analytical process. Firstly, categories were assigned deductively based on the theoretical rationale and the main questions in the interview guide. Several new categories then emerged inductively during the coding process. When evaluating the research questions, consideration was given to the number of relevant codes for each specific question. All interview excerpts presented below were automatically translated from German into English with the help of DeepL Translator (a tool for automated translation) to ensure high accuracy of translations. All outputs were reviewed and verified by the author. Translations are idiomatic and aim to preserve meaning and tone rather than literal phrasing. German original quotes can be found on OSF.

4 ▪ Results

All names used below are pseudonyms to preserve participants' anonymity. The information in brackets before or behind quotes presents the participants' pseudonym, their age, as well as their subjective science knowledge. For better readability, values of 1 and 2 are indicated as "low", values of 3, 4, and 5 as "medium", and values of 6 and 7 as "high" subjective science knowledge. Exact values are reported in Table 1. Although it was not part of the interview guide, several participants explicitly mentioned science content to which they are exposed. The most frequently mentioned topics were vaccinations, global warming, Covid-19, and environmental disasters. Other topics mentioned included medicine, food, sports, health, chemistry, psychology, and technology.

4.1 ▪ *Frequency and reasons of IE to science content*

The reported frequency of IE to science content varied greatly among participants (*RQ1*). Some reported being exposed to science content daily while others stated that they only rarely see science postings. One participant even stated that he never sees science content on social media. On average, however, most participants stated to be rather frequently exposed to various kinds of science topics when they visit social media. Nearly all participants believed that social media algorithms are the primary reason for IE to science content. Many participants explicitly mentioned social media algorithms, while others only implicitly described algorithmic recommendations, for instance: "And so, yes, there [on Reddit] are also things that you're not actively looking for, but somehow they just wash up on your doorstep" (Michael, 26, medium science knowledge). Also, several participants were

aware that their past interactions with science content drives future exposure to similar content: "I think [...] that depends a little on my algorithm. So, if I've accessed things several times in the past, then logically I'll simply be shown more" (Laura, 30, low science knowledge). Some participants also mentioned to receive science content because of channel subscriptions and because social contacts sometimes share science content with them privately or in general with the network. However, IE due to channel subscriptions and social recommendations were rather an exception in this sample.

4.2 ▪ *Attention to and cognitive processing of science content*

Concerning *RQ2a* and *b*, almost all participants mentioned personal interest and relevance as the main reason why they pay attention to and engage in thorough cognitive processing of scientific content. The following quote by Marcus (62, medium science knowledge) illustrates this aspect: "That depends on the specific content. Well, if it's content that interests me thematically, then I'll definitely look through it, sometimes quite intensively. But if it's topics that don't really interest me, then I'll just keep scrolling". Sophie (20, high science knowledge) describes the relationship between personal interest and cognitive processing as a continuum rather than a black-and-white decision: "I do pay attention to these posts, but how much attention I pay to them depends on how interesting I find them". Finally, the design of the posting was mentioned several times as being able to arouse one's interest: "Of course, it depends on how the headline or image is designed, whether it catches my interest or not" (Miriam, 49, medium science knowledge).

Additionally, most participants mentioned further reasons for (not) paying attention to science content. Several participants stated that whether the source of the posting is reliable, familiar, or trustworthy is important for their decision to engage with the content cognitively or keep scrolling to other articles. "So, if I consider it to be a more reputable source and it is possible to judge that, then I am certainly more inclined to take a look" (Marcus, 62, medium science knowledge). Additional reasons for engaging in more thorough cognitive processing of science content, mentioned by either one or two participants, included the comprehensibility and clear presentation of the content, societal relevance of the topic, personal motivation and cognitive capacities, and sufficient time to engage in more thorough processing.

4.3 ▪ *Engaging with science content*

With regard to *RQ3a* and *b*, nearly all participants described themselves as rather passive social media users, thus barely engaging with science content. The most frequently mentioned type of interaction was passive reading or watching the content. Many participants described their engagement behaviour like Lucas (27, medium science knowledge): "So I read through it, then I've read it and that's it. I don't usually interact with the posts or with all that stuff". Several participants also stated that they sometimes share science posts with their friends and colleagues, but mostly in private chats rather than publicly.

> If it's a topic I've already talked about with my friends, or something that affects us in some way, I might share it — but only in private chats. I wouldn't comment on or share anything publicly; I almost never do that. (Laura, 30, low science knowledge).

Moreover, several participants said that they occasionally like science postings. "And I simply leave a like if I found it interesting. So, when it comes to liking things, I'm actually quite quick to do so, I enjoy doing that" (Phil, 26, high science knowledge). Besides sharing and liking content, quite a few participants mentioned to engage in another form of passive engagement, that is reading the comments of other users. This appears to be a confirmation strategy of users to see if the posting's content is true or whether they find some critical comments that contradict the original content.

> When I see a post that interests me, I would say the most likely thing is that I read the comments to see what other people who may also be familiar with the topic have to say about it, what their opinion is. (Toby, 27, medium science knowledge).

Finally, a minority said that they would save postings to read or watch them later or to click on links which are associated with a posting to receive further information. Only one participant stated that he would occasionally comment on science posts, when he sees wrong comments by other users to correct them. As these examples show, participants' engagement with incidentally encountered science content can be characterized as passive (e.g., reading) and low threshold engagement (e.g., liking).

Participants engage with science content for very similar reasons they also engage in more thorough processing. A reliable, familiar, and trustworthy source turned out to be the number one reason why participants decide to like or share a posting. "If I already know the source and fundamentally trust it, it is definitely more likely that I will interact with it in some way" (Michael, 26, medium science knowledge). Moreover, there were several mentions that the likelihood of engagement would be higher when a posting was shared, liked, or (re)posted by a social contact, when the topic of the post was personally interesting or relevant, and when the topic of the post was recent.

4.4 ▪ *Trusting and believing science content*

To answer *RQ4a* and *b*, participants were asked how much they trust science content they incidentally see on social media and how they deal with it. The dominant response was that they generally have low trust in science content on social media and are rather sceptical of it.

> We saw this very clearly with COVID-19 and the vaccination, for example. Everyone had their say and claimed something that, in the end, wasn't actually scientifically proven. That's why I think you have to be a little careful about what you really believe. (Anna, 24, medium science knowledge)

Many also said that their trust heavily depended on the source of a science posting: "If it [the science content] comes from reputable news agencies, then I fully trust it. But if it's from, well, less familiar sources, I usually look for a second opinion" (Miriam, 49, medium science knowledge).

Regarding the question of how participants judge the credibility of incidentally encountered science information, the responses were again consistent. As before, many participants said

they are rather sceptical and that the source is important in determining whether they believe content. Additionally, most participants said that they would verify the content's accuracy with alternative sources.

> If it's really important, fundamental information — and again, I can't think of anything better to say — on the subject of vaccination, then if I do come across a post from a channel, I think I would still look it up again somehow. (Sebastian, 26, medium science knowledge)

Although not part of the interview guide, several participants either implicitly or explicitly mentioned misinformation as one reason for being careful to believe or have reduced levels of trust in science content on social media: "So I would definitely say the source, I would again go by whether it is an authentic source that I can rely on, that does not spread fake news" (Laura, 30, low science knowledge).

4.5 ▪ *Perceived consequences of IE to science content*

The next set of questions focused on the experience of consequences of IE to scientific information (*RQ5*). For many participants, IE to scientific content had rather minor consequences, such as learning new things or becoming familiar with new topics.

> It doesn't always have such a huge impact, but it's often the case that you become aware of a certain topic and then start to think about it more consciously. I would say that it definitely happens quite often that I then do more research on the topic myself afterwards, yes. (Lena, 25, high science knowledge)

Besides learning, many participants also stated that they would discuss the newly acquired knowledge in conversations with friends, family members, or colleagues.

> Let's assume I read a scientific article that I find interesting and I engage with it. I acquire knowledge about it and then, let's say, talk about it with my colleagues, which also affects my social environment because I interact with them. (Jonas, 23, low science knowledge)

For several participants, however, IE to science content does not have any noticeable or durable consequences: "I usually read through it and keep it in mind for a while, but then I never need it again. And then it's just gone" (Lucas, 27, medium science knowledge). However, a few participants also mentioned that they changed their behaviour or opinion after incidentally seeing science content, that IE to science content affected their personal interests and even political decision.

> If I happen to see a post about some scientific topic, for example, let's just take global warming or climate change in general, then it's more likely that I'll be influenced by it to believe that it is definitely man-made, that it is definitely something bad, and that it is definitely something that needs to be addressed and prevented. It influences me in that I am more likely to vote for a party that reproduces exactly the same message and says exactly the same thing, that we want to stop global warming, we want to fight climate change, rather than a party that says, hey, climate change is caused by the sun and it's not our fault and we should sue the sun, then I'm probably less likely to vote for them. (Sophie, 20, high science knowledge)

4.6 ▪ *Changes in consuming science content*

The next question focused on whether participants have the impression that IE to science content on social media would change their usual consumption behaviour of science content (*RQ6*). Participants' responses to this question were pretty heterogenous. A couple of participants stated that they were exposed to a broader set of science topics than before, that they had more contact to science information in general, or that they would consume more science content than before. "Yes, of course it changes me in the sense that I then read articles that I would never have thought of looking at before" (Lucas, 27, medium science knowledge). Some participants also mentioned that IE would trigger more thorough searches for a specific topic.

> Well, when I think about it now, if you hear something on TV or the radio, it's more like, okay, you hear it briefly, you take it in briefly, and then it's gone again. And that's when you have a post or something like that, you have immediate opportunities to further interact, to find out more. I don't know, if something interests me, I'm quick to google it or something. (Lena, 25, high science knowledge)

However, some participants mentioned that their consumption of science information has not changed at all, while others also mentioned aspects such as exposure to shorter content or lowered active searches for science content outside social media.

> Yes, because algorithms often suggest such things to me, I would say that I am less actively informing myself about these things. In fact, much less so, because you usually don't have to and you only find out about these things through them [social media platforms]. (Andre, 26, high science knowledge)

4.7 ▪ *IE to science content vs. political content*

In the final part of the interview, participants were asked about their personal impression of whether science or politics was more prominent on social media and whether they can think of any reasons why this might be the case (*RQ7*). The great majority of participants said that they are more frequently exposed to political than to science information. Several

participants assumed this is because they are personally more interested in politics than in science, because they had interacted more frequently with political posts in the past, or because political topics are more current and, thus, more frequently reported in the news media or recommended through algorithms.

> But actually, there's always something political going on. Whether it's the increase in tariffs or someone giving their two cents on what Trump has done again, there are also many opinion bloggers. That's probably how you come into contact with politics more. (Daniel, 22, medium science knowledge)

Few participants, however, also reported seeing more science than political content, supposably because they are less interested in politics than in science, or because they only see political content when certain events, such as elections, are about to happen.

> I think it depends entirely on when you use social media or such a platform in general. With the elections coming up, I think it's clear that all the algorithms will automatically show you more political posts. But basically, I would say that I tend to see more scientific posts. (Toby, 27, medium science knowledge)

Most participants stated that political topics are generally more interesting, relevant, and important because politics affects everyone, and people actively participate in political decisions, such as voting in elections. In contrast, scientific information was more relevant to specific groups with a high level of interest and knowledge in the subject.

> Well, I have the feeling that in recent years, politics in particular, especially among the younger generation, has been taking place largely on social media, and science is once again a topic that tends to be interacted with by people who are really actively involved in it. (Michael, 26, medium science knowledge)

Some participants also suspected that political posts arouse more engagement than science posts, which would further promote the algorithmic distribution of political content.

5 ▪ Discussion

The overarching goal of this study was to shed light on incidental exposure (IE) to science content on social media to better understand its process and to learn about any differences or commonalities to IE to political news using a user-centred approach. This approach allowed participants to describe their perceptions, experiences, behaviours, and the perceived consequences of incidentally encountering scientific information in great depth. The results of this study support and extend previous findings about IE and can serve as a foundation for future quantitative research on IE to science content on social media platforms.

5.1 ▪ *IE to science content*

The present study indicates that — based on participants' perceptions — algorithms may play the biggest part in incidentally exposing social media users to science content. Almost all participants explicitly or implicitly described algorithms as the major cause why they see science information on social media without searching for it. Many were also aware that their engagement with these postings drives future algorithmic encounters [see also Rousseau, 2024]. Only few participants mentioned that they had subscribed to science channels or that their social contacts would occasionally share science information with them. These results suggest that automated, algorithmic decisions are perceived as the primary cause to incidentally encounter scientific content, whereas conscious decisions, such as subscribing to channels, play a significantly lesser role. This is plausible given that algorithmic filtering also plays a significant role in exposing users to political news [Sabir et al., 2022; Thorson et al., 2021], although not all platforms algorithmically privilege news content [Hagar & Diakopoulos, 2025]. Future studies should aim to quantify the proportion of IE to science content that is either due to algorithmic decisions, channel subscriptions, and social contacts [see also Thorson & Wells, 2016]. Whereas users are on average only rarely exposed to science information on social media [Mede et al., 2025], most participants of this study reported a high frequency of IE to science content. This indicates that the sample was not representative of the general population with regards to variables like interest in science or engagement with science content which can influence IE to science content.

5.2 ▪ *Processing and engagement*

A central question of the present study was how social media users cognitively process science content they see incidentally following the propositions of the PINE model. The results of the present study indicate that users switch from passive scanning to more thorough content processing when they evaluate science content as personally relevant and interesting. This suggests that a general prediction of the PINE model which was developed to explain IE to political news [Matthes et al., 2020] also applies to science content. In line with the propositions of PINE, it seems that when users incidentally encounter science content, they evaluate whether this content is personally relevant and interesting. If this is the case, their processing goal changes and the content is processed more intensely. These findings support the central role of personal relevance and interest in initiating more thorough content processing which has also been found in previous studies focusing on political news [Dreston & Neubaum, 2025; Nanz et al., 2026].

Regarding the question of how users engage with science content they incidentally encounter, one central observation emerged: for most participants, engagement is mostly passive. Hence, they typically only read or watch content, share it with friends and colleagues in private chats, or engage in low-threshold activities such as liking. An interesting observation was that several participants mentioned reading comments by other users to either find out what others think about the content or to evaluate the veracity of the content. As reading comments from other users can affect the perceived credibility of original content both positively and negatively [Nowak & Krämer, 2025], future studies should examine the impact of this verification strategy more thoroughly. This finding is in line with the assumption of the PINE that second-level content processing can result in further (intentional) information seeking behaviors and content evaluation [Matthes et al., 2020].

Only a very small minority reported clicking on further links or writing comments themselves. While these findings appear to be consistent with other studies indicating that social media users have become passive "consumers" rather than active "creators" of content [Masur & Diel, 2024] limited interaction with scientific content may also result in reduced distribution by algorithms and a lower likelihood of IE to similar content in the future [Narayanan, 2023; Rousseau, 2024; Thorson et al., 2021]. Future studies should examine how passive (e.g., reading and watching) and active (e.g., liking and commenting) engagement with science content affect future algorithmic exposure as well as general distribution of such content.

5.3 ▪ *Trust and credibility*

Whereas past studies often found positive relations between trust in social media platforms or trust in news media (including social media) and IE to political news [Goyanes, 2020; Strauß et al., 2020], the present study paints a more complex picture for science information. Most participants generally reported low levels of trust and even scepticism toward the content they encounter, although this heavily depended on the respective source of the information. Reliable and familiar sources were more likely to be trusted and believed which is known from past studies [Metzger et al., 2010; Nowak et al., 2025]. These findings generally align with previous research indicating that individuals who rely heavily on social media for news and trust it are more likely to believe false claims [Xiao et al., 2021]. Accordingly, having low trust in or being sceptical of information on social media seems to protect against believing false information hastily without further confirmation.

Furthermore, many participants reported employing additional verification strategies, such as considering comments of other users to gauge their opinions on the content or conducting additional information searches to evaluate the content. While cross-checking information with alternative sources and verifying the credibility of sources are popular verification strategies in Germany, referring to other users' comments is still less popular [European Parliament, 2025]. Although not being a part of the interview guide, most participants either explicitly or implicitly mentioned their concern not to fall for misinformation as the central reasons to trust only specific sources or to verify the information they encounter. This is partly consistent with recent findings showing that lower trust in social media is associated with higher concerns about misinformation in Germany [Hoffmann & Boulianne, 2025]. This indicates that at least some social media users are cautious about misinformation not only because they believe that misinformation is dangerous for others, but because they do not want to be misled themselves.

5.4 ▪ *Consequences of IE to science content*

Past studies found that IE to political news can positively affect political knowledge, user engagement with political news, or civic engagement [Nanz & Matthes, 2020; Nanz & Matthes, 2022; Valeriani & Vaccari, 2016; Weeks et al., 2022]. The results of the present study imply that IE to science content can be associated with knowledge acquisition and becoming aware of new topics. However, the findings also indicate that the range of possible consequences of IE to science content is very broad. These consequences can range from experiencing no consequences at all to influencing opinions and voting decisions. Accordingly, the particular effect of IE on outcomes such as knowledge acquisition or engagement appears to be highly person-specific. Since the sample is biased toward users

who are frequently incidentally exposed to science, it is questionable how large effects on knowledge are when examining the phenomenon quantitatively with representative samples.

Since IE may affect people's active media consumption behaviours [Strauß et al., 2020], a crucial follow-up question was whether participants thought IE changed the way they consumed scientific information. Participants' responses were very diverse. On the one hand, they reported more frequent and broader contact with science content, increased consumption of science content, and more active searches for science information following IE. On the other hand, some participants reported that IE did not change their science information consumption, while others even felt that it had a negative effect on active searches for science information. Future studies should examine which factors and circumstances determine whether IE leads to more active or less active information searches outside social media.

5.5 ▪ *Perceived differences between science and political content*

The final objective of this study was to examine participants' perceptions and impressions of IE to political and science content, as most IE studies have focused on political news. Most participants reported being more frequently exposed to political content than to science content on social media, potentially due to greater personal interest in politics and higher past engagement with political information. A smaller group, however, indicated seeing science content more often, primarily because they were more interested in science or less engaged with political topics. This pattern again illustrates how social media algorithms foster highly personalized information environments [Thorson et al., 2021]. Moreover, most participants perceived political content as more broadly relevant to the general public, whereas science content was viewed as appealing mainly to smaller, specialized audiences. Accordingly, even though the sample reported comparatively high exposure to science information — substantially above population averages [Mede et al., 2025] — incidental exposure to political news appears to be the more prevalent phenomenon. Although this study did not reveal clear differences in the cognitive processing of political and scientific content, differences in exposure frequency may shape how users evaluate and engage with these types of information. Future experimental research should therefore investigate whether variations in exposure frequency influence attention, recall, and attitude formation across different content domains.

5.6 ▪ *Theoretical and practical implications*

Taken together, the findings suggest that the cognitive processes outlined in the PINE model [Matthes et al., 2020] are applicable to the phenomenon of IE in general, not just political news. Accordingly, the model should be refined by distinguishing content which is more relevant for individual and societal decision-making (e.g., political news and information about socio-scientific issues) from content less relevant for such decisions (e.g., entertainment and science information not informing decision-making).

Moreover, the results contradict the general assumption that IE may narrow interest- and motivation-based knowledge and engagement gaps [Valeriani & Vaccari, 2016; Weeks et al., 2022]. Rather the results imply that those who are already interested in science content are also those who are more frequently exposed to science information. Even if someone

uninterested in science incidentally encounters science content, cognitive processing of its content is unlikely. Therefore, the present study provides further evidence for a "Matthew Effect" through IE, which describes how knowledge- and interest-based gaps either widen or remain stable due to individual differences and systemic factors [Kümpel, 2020].

The participants in this study appeared to possess a high level of digital literacy. They tended to approach information encountered on social media with scepticism, relied on a limited number of trusted and credible sources, and actively employed verification strategies to assess incidentally encountered content. These findings underscore the importance of fostering users' awareness of misinformation on social media and equipping them not only with the critical capacity to reflect on the credibility of content but also with practical skills to verify the information they encounter.

5.7 ▪ *Limitations and future directions*

The present study is subject to several limitations. The sample was composed primarily of highly educated individuals who reported being rather frequently exposed to science content on social media. Although this high level of IE to science content was required by the study design, caution should be exercised when generalizing the results. Future quantitative research should include more diverse samples representing a broader range of educational backgrounds and interest levels. Another limitation is the fact that participants were not explicitly asked what they consider as science information. Future studies should ask participants to share social media content they consider as science information or ask them to identify science information from a controlled feed. Furthermore, as the study was conducted in a context where traditional media remain central to science communication, the findings may not be directly transferable to countries in which social media serve as the dominant channel for encountering science-related content. Finally, the study relies on participants' retrospective self-reported perceptions of the content, of their cognitive processing, and of any consequences which may be biased. Future studies should rely on different more objective assessments of IE to science content to counteract such biases.

5.8 ▪ *Conclusion*

This qualitative study examined IE to science information to (a) shed light on a so-far understudied area and (b) examine the generalizability of the phenomenon of IE independent of specific contexts (like political news). Participants identified algorithmic recommendations as the primary reason of being incidentally exposed to science content. Moreover, for most participants, systematic cognitive processing and active engagement depend strongly on personal interest and the perceived relevance of the encountered content. Nonetheless, participants' engagement with science information on social media appeared to be relatively passive. When evaluating the credibility of such content, participants relied primarily on trust and familiarity with the source as well as on additional verification strategies. Importantly, the study indicates that exposure to scientific information on social media can have far-reaching consequences, potentially shaping users' opinions and even influencing political decisions. While such effects may occur infrequently, they underscore the broader societal relevance of social media and the phenomenon of IE in particular. At the same time, participants reported more frequent incidental exposure to political than to scientific content, suggesting that political news may be more prominent than science content on social media.

In sum, the findings largely support prior research on IE to political news, implying that the underlying mechanisms of processing and engagement are comparable across topic domains. This study provides an important exploratory foundation for future quantitative research on incidental exposure in socially relevant domains such as science and politics.

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