

# Algorithmic News Versus Non-Algorithmic News: Towards a Principle-based Artificial Intelligence (AI) Theoretical Framework of News Media

Rebecca Scheffauer, Homero Gil de Zúñiga, Teresa Correa

Recommended Citation:

Scheffauer, Rebecca; Gil de Zúñiga, Homero; Correa, Teresa (2024). "Algorithmic News Versus Non-Algorithmic News: Towards a Principle-based Artificial Intelligence (AI) Theoretical Framework of News Media". *Profesional de la información*, v. 33, n. 1, e330009.

<https://doi.org/10.3145/epi.2024.0009>

Article received on October 31<sup>th</sup> 2023

Approved on January 3<sup>rd</sup> 2024



**Rebecca Scheffauer**

<https://orcid.org/0000-0003-4545-2062>  
University of Salamanca, College of Law & Public Administration  
Democracy Research Unit Political Science  
Casa del Bedel  
Benedicto XVI, 22. Despacho 26  
37008 Salamanca, Spain  
[r.scheffauer@usal.es](mailto:r.scheffauer@usal.es)



**Homero Gil de Zúñiga**

<https://orcid.org/0000-0002-4187-3604>  
Pennsylvania State University, Donald P. Bellisario College of Communications  
Film Production & Media Studies Department  
Media Effects Research Lab  
University of Salamanca, College of Law & Public Administration  
[hgz@usal.es](mailto:hgz@usal.es)



**Teresa Correa**

<https://orcid.org/0000-0003-0508-7371>  
Universidad Diego Portales, Facultad de Comunicación y Letras  
Centro de Investigación en Comunicación, Literatura, y Observación Social (CICLOS)  
Vergara 210, 8370067 Santiago, Chile  
[teresa.correa@udp.cl](mailto:teresa.correa@udp.cl)

## Abstract

Technological media effects scholarship in the field of journalism and communication is experiencing a reinvigorated blooming due to the role of Artificial Intelligence (AI) and algorithm-based information. From news production to distribution and consumption, the whole journalistic chain of information media ecosystems and the principles that govern them have all been deeply transformed with the advent of AI and algorithmic tools. Drawing from well-established normative principles that have guided the journalistic profession, this paper seeks to synthesize the current state of research on AI and algorithm-based news by providing *a principle-based theoretical framework of news media*. In doing so, the paper organizes a comparison between algorithmic news versus non-algorithmic news according to three foundational pillars sustaining journalism research: news production, selection, and effects thereof.

## Keywords

AI, Artificial Intelligence, Algorithmic News, Non-algorithmic News, AI Theoretical Framework of News Media, Journalism Principles, Ethical Principles.

## 1. Introduction

Artificial Intelligence (AI), or "the tangible real-world capability of non-human machines or artificial entities to perform, task solve, communicate, interact, and act logically as it occurs with biological humans" (Gil de Zúñiga *et al.*, 2023), and algorithm-based information have become integral parts of many areas of life (Latzer *et al.*, 2016; Kappeler *et al.*, 2023; Festic, 2022). From movies suggested by algorithms as applied in Netflix's recommended section to virtual assistants such as Siri or Alexa and to information-seeking tools like Google search engines and its Generative AI aid, these new



technologies have broadly altered our society. The media landscape has not been immune to such profound influence. News production, distribution, as well as consumption have all been deeply transformed with the advent of AI and algorithmic tools (**Kotenidis; Veglis**, 2021). From automated content creation to socially driven news selection, many challenges as well as opportunities have emerged with the rise of AI and algorithms (**Fayyaz et al.**, 2020).

According to Pew Research Center, news consumption on digital devices is on the rise. News websites and apps, social media, podcast and search platforms outrank traditional forms of news consumption such as printed newspapers or radio (**Forman-Katz; Matsa**, 2022).

The majority of online news platforms have something in common: they utilize AI-based algorithms that are shaping the news selection, production and consumption (**Eslami et al.**, 2015; **Napoli**, 2015). Thus, with continuous developments in algorithms, the concepts and principles that guide journalism and news production as well as the role of journalists need to be discussed and adapted in tandem with technological advances.

In spite of these developments, literature shows that users are still to a large degree unaware of algorithmic operations and lack deeper understanding of processes at work, while at the same time being confronted with a range of concerns that legislative frameworks still struggle to fully address (**Blacklaws**, 2018; **Kemper; Kolkman**, 2019).

The challenges and discussions that arise from the continuous changes in journalism and news are not novel. For instance, with the advent of the internet, the concept of “digital news” emerged, which was compared to “traditional news.” (**Bengtsson**, 2022; **Bengtsson; Johansson**, 2021). This division is primarily based on platform support and format. As these constant technological changes in journalism are becoming systematically swift, we must think of new ways to understand how to conceptualize and understand these divisions based on more permanent principles. Currently, algorithm-based news permeates different platforms and formats. Thus, to contribute to its understanding and implications, in this paper we seek to synthesize the current state of research on AI and algorithm-based news –including developments as well as impact and problems. Furthermore, we provide a streamlined and principle-based AI news theoretical framework which distinguishes between algorithmic versus non-algorithmic grounded news, drawing from normative principles that have guided the journalistic profession and news production, and are guiding the current discussion of principled AI development such as accountability, transparency, accuracy, and impartiality/fairness (**Fjeld et al.**, 2020; **Farley et al.**, 2014). We argue that a comparative analysis based on these more permanent principles will facilitate the assessment of algorithm-based news, its theorizing, and discernible media effects revolving around news use and exposure. To do so, we will organize this comparison according to three main pillars sustaining journalism research: news production, selection, and effects thereof.

## 2. News Production

A development in AI applications that has recently gained traction is automated or algorithmic journalism (**Ali; Hassoun**, 2019; **Graefe**, 2016; **Kotenidis; Veglis**, 2021). This allows for “using software or algorithms to automatically generate news stories without human intervention” (**Graefe**, 2016), a practice which has led to debates among scholars and professionals alike (**Kotenidis; Veglis**, 2021). With the possibility of algorithms creating news content autonomously (**Diakopoulos**, 2019) that is almost indistinguishable from human made content (**Clerwall**, 2014), some fear for the future of the journalistic profession (**Carlson**, 2018). Tasks previously entrusted to journalists are taken over by algorithms, including research, data compilation, writing articles, or where to place finished texts (**Kotenidis; Veglis**, 2021; **Ellis**, 2013). Many publications already make use of generated content for certain types of information (**Jung et al.**, 2017), and they even use algorithms for tasks such as editing and selecting which articles will be printed (**Ellis**, 2013). While **Kotenidis and Veglis** (2021) point out that there still are journalistic areas in which algorithms lag far behind traditional journalists, **Jung et al.** (2017) found evidence that both readers and journalists tend to rate algorithmic content more favorable than journalistic information. There are, however, still several aspects brought about by automated journalism and algorithmic news production that remain unclear both in terms of legal and ethical outlines as well as when it comes to information reception by consumers.

To analyze these aspects, we will rely on principles that have historically guided journalism and news production, and which are becoming increasingly relevant in the discussion about AI development. We will focus on the following principles: accountability, transparency, accuracy, and impartiality/fairness (**Farley et al.**, 2014; **Fjeld et al.**, 2020)

Accountability refers to the mechanisms that ensure taking responsibility for actions, choices, and mistakes. While in many professions there are legal outlines as to who is to be held accountable in certain cases, no such fixed legitimate guidelines exist in journalism. As an integral part of a free press is independence from government regulations, it falls to journalists themselves to define accountability of their profession (**Sawant**, 2003; **Newton et al.**, 2004). However, for AI and algorithms news, a redefinition of accountability is needed, with many discussing on whom this burden is to fall (**Shin; Park**, 2019).

The principle of transparency provides mechanisms for overseeing actions and making decisions and operations public. In the case of journalism, this entails explaining decisions to the public and offering the means to trace information back to its origin to verify accuracy and sincerity. There are less frequent exceptions that protect sources' confidentiality when required (Phillips, 2010). In the context of AI, transparency ensures oversight and the revelation of AI's autonomous operations and processes "in intelligible outputs, along with the provision of information about where, when, and how they are being used" (Fjeld et al., 2020).

Accuracy entails providing precise and correct information. In journalism, it involves verifying, updating, and correcting information, as well as maintaining a commitment to avoiding falsehoods (Phillips, 2010; 2009). In AI, the principle of 'accuracy' is defined as the ability to classify information correctly into the right categories or the capacity to make accurate predictions, recommendations, or decisions based on data or models (Fjeld et al., 2020).

Finally, the principle of impartiality entails presenting balanced, fair, and unbiased information. While the idea of objectivity has been questioned in journalism, the concept of impartiality has endured (Ojala, 2021). In AI, this principle centers on fairness by avoiding bias and discrimination in the design, training, and deployment of data and information (Fjeld et al., 2020). For a comparison between algorithmic news and non-algorithmic news based on these principles, see Table 1.

Table 1: Principles of AI and Algorithmic News Opposed to Non-algorithmic News.

AI & Algorithmic News	Non-algorithmic News (Human Journalists)
Used for structured data, routine news	More complex analyses, questions, new phenomena
Excelling at financial or sports reporting	Excelling at interviews, editorial pieces
Cheaper to produce greater quantity of news	Distinct writing quality/style
Potential for on-demand creation	Need to adapt/update current role
<i>Accountability</i>	
No clear responsibility for incorrect information (e.g. not clear whether it is the media outlet, the editor or the person who programmed the algorithm)	Responsibility lies with the journalists
<i>Transparency</i>	
No guidelines on how/if algorithmic news need to be labelled for the reader	Usually, a piece of news is clearly attributed to one or more journalists
<i>Accuracy</i>	
AI news has capabilities to process vast amounts of data AI may crosscheck larger amounts of data points at once	Could be more accurate as humans can spot inconsistencies or incorrect information better
<i>Impartiality</i>	
Could be seen as more objective or impartial – however, can have bias imbued in its code Readers might not instinctively trust an AI	Humans might generally be seen as more subjective Susceptible to political or ideological editorial leanings

As can be seen in Table 1, when taking a closer look at the principles traditionally associated with journalism, new challenges arise with the advent of algorithmic news and AI. One of those issues is, for example, the question of accountability in the event of incorrect information generation and determining responsibility. Moreover, there is no clear guideline regarding whether or how algorithmically generated content should be labeled for the audience. Even understanding of how the audience makes sense of algorithmic operations is still nascent.

As AI is still a comparatively new phenomenon, there is no clear consensus on who performs certain journalistic tasks to a better degree. For example, algorithms might provide content that is potentially more accurate as they cannot get tired (Graefe, 2016), or more diverse, and the AI may rely on larger databases or sources of information. However, there might be biases imbued in the data used to train the algorithms or in the coding process. On the other hand, a journalist's piece might be more accurate as an algorithm may not have detected certain inconsistencies, the trustworthiness value of sources of information or could have misrepresented new factual developments. Moreover, it is still unclear which type of content is regarded better in terms of credibility and impartiality. Readers might not inherently trust AI in contrast to a human journalist. On the other hand, humans might be seen as more subjective in their reporting. This, however, neglects the fact that algorithms can have inherent bias which can stem from the person who programmed them either done deliberately or accidentally.

### 3. News Selection

An important AI field of application lies in news selection. While for traditional, non-algorithmic news content every individual would see the same information, presented in the same way, in the manner that a newspaper has the same sections and articles regardless of who purchases it (Feezell et al., 2021), algorithms tailor what is shown specifically to a user. The gatekeeping role traditionally held by journalists and editors is upended (Calice et al., 2023).

Broadly speaking, selecting content with algorithmic help refers to "the leveraging of user-preference data through AI to provide customized news feeds" (Calice et al., 2023). This can occur on social media sites such as X (Twitter), Facebook, Instagram, TikTok, and

Algorithms can have inherent bias which can stem from the person who programmed them either done deliberately or accidentally

YouTube, as well as on Google or Apple News, which are referred to as news aggregators (Rader; Gray, 2015; Thorson; Wells, 2016), or even on websites of news organizations and newspapers (Bodó, 2019).

While nuances in algorithmic activities are usually hidden from the public eye, mostly for commercial reasons, in general terms customization can either be user- or socially-driven (Feezell *et al.*, 2021).

User-driven customization is based on a user's own preferences (Feezell *et al.*, 2021; Bastian *et al.*, 2019) which in some instances need to be explicitly stated such as unsubscribing from a certain news topic, or are implicitly fed into the algorithm tracing and considering the individual personalization, such as clicking behavior, content engagement, etc. An example of this type of algorithm is YouTube's recommendation system (Covington *et al.*, 2016; Feezell *et al.*, 2021). The choices made are based on user attributes such as demographics, location, and previous behavior on the site like search and watch history. Based on this information, users are then recommended new content to watch.

In contrast, socially driven customization clusters recommendations emphasizing users' personal social network, and what they do in social media. Thus, socially driven algorithms merge input from users themselves as well as their friends, family, acquaintances and other online connections (Feezell *et al.*, 2021). This type of algorithmic selection is mostly associated with social media platforms such as Facebook or X (Twitter) (Feezell *et al.*, 2021; Kabiljo; Ilic, 2015), potentially exposing the user to information they were not actively looking for (Feezell, 2018) and featuring a broader spectrum of opinions as well as topics (Liang, 2018; Wojcieszak; Mutz, 2009).

Table 2: Features of User and Socially Driven Algorithmic News Vs. Non-algorithmic News.

Algorithmic Selection		Non-Algorithmic Selection
Based on user's own preference and past behavior	Based on user's network	Performed by journalists and editors
Active: e.g., clicking to not see a certain topic	Diversity of content dependent on network characteristics	Same content for everybody
Passive: based on user data	Network heterogeneity dependent	Presented in the same order
Data used includes age, location, history, etc	Includes data from friends, acquaintances, contacts	
More representative in YouTube or X (Twitter)	More representative in Facebook, Instagram or TikTok	More representative in traditional newspaper or radio

However, while some algorithmic news options may be controlled by the users themselves, big portions of algorithmic selection cannot be easily altered by users with just a few clicks. Even though users might prefer certain types of algorithmic news selection, ultimately, an obscure and proprietary algorithmic formulation will be dictated by the technology companies and their digital platforms, including socially driven algorithms, as well as other variables designed to monetize the content (Kopf, 2020). This is somewhat reflected in a recent study by Pew Research Center: only 10 % of U.S. adults feel like they have a lot of control over what they see in their newsfeed (Rainie *et al.*, 2022). Whether or not users appreciate algorithmic selection in general or which kind they prefer is, so far, unclear. While Yeomans *et al.* (2019) found evidence for preference of human selection, You *et al.* (2022) present results pointing to algorithmic appreciation. There seems to be an inclination towards user driven instead of socially driven customization (Kantar Media, 2017; Joris *et al.*, 2021), even though users are wary of missing out on alternative viewpoints due to this type of selection (Joris *et al.*, 2021; Monzer *et al.*, 2020).

Another important factor in algorithmic selection revolves around how this algorithmically predicted content might generate ad engagement, so it ultimately translates back into revenue (Narayanan, 2023). Depending on the platform in question, the focus can be on different aspects in this regard. For example, an important factor for YouTube is predicted watch time of a video (Fyfield *et al.*, 2021; Gielen; Rosen, 2016) while Facebook recently mentioned highlighting of "meaningful social interactions" instead (Litt *et al.*, 2020; Mosseri, 2018). Beyond a basic level of engagement with a post, platforms wish to propagate content that becomes viral, thus reaching immense popularity (Cheung *et al.*, 2016). Engagement such as commenting can have a significant impact on the revenue tied to content (Yoon *et al.*, 2018). As opposed to journalistic or informational value, virality means money. It is difficult to predict if and what content might go viral (Cheung *et al.*, 2016), thus platforms make use of a host of information fed into algorithms which might then provide user with tailored content that will not only interest them but might ultimately achieve virality.

## 4. Problems with Algorithms

Literature has shown several problematic aspects of algorithms and news, which will be organized by the aforementioned principles.

### 4.1. Transparency

One of the main issues in regard to algorithms lies in the opacity of how they work. It is difficult for users to understand why they see certain content (Busuioc, 2021), and even attempts to reverse-engineer are challenging (Diakopoulos,

2015). Even if the source code for an algorithm is available, it does not provide enough information on what algorithms learn from the data they gather and how it is weighted (**Blacklaws**, 2018). Thus, while journalistic gatekeeping traditionally followed comprehensible criteria (e.g., news values), this is not necessarily the case for algorithmic news selection. Some of the aspects factoring into algorithmic decisions might overlap with traditional journalistic criteria, however, the input of user data and how it is used to shape the selection process is a lot opaquer. As there is a lack of transparency (**Diakopoulos**, 2015) and controllability, ethical concerns have been raised (**Diakopoulos; Koliska**, 2017) pertaining to different areas including misinformation distribution, data protection, as well as homogeneity of presented content and effects thereof.

Since it is difficult to determine and control what information is collected by algorithms, privacy of data and related issues such as misuse or even loss thereof are also prevalent topics in research (**Boerman et al.**, 2021). While it is already difficult to exercise a certain degree of data restriction for skilled users, those with low levels of literacy feel the least in control over their own data (**Boerman et al.**, 2021). By design, algorithmic data gathering is unobtrusive and even those with higher literacy skills might not always be aware of the constant ongoing collection (**Büchi et al.**, 2021; **Kappeler et al.**, 2023) as they are not *consciously* providing information (**Micheli et al.**, 2018). In order to protect users and their data online, the European Union implemented the General Data Protection Regulation (GDPR). An important feature of this regulation entails the right to information, meaning that every user is able to request information concerning automated/algorithmic processes (**Van Druenen et al.**, 2019), thus trying to increase algorithmic transparency. However, despite these provisions, it is not necessarily easier for users to navigate online. For example, the GDPR requires users to consent to a website's terms and conditions (including the use of algorithms). Users might not read the entire list of terms before consenting or even be able to understand the information laid out and nuances thereof (**Blacklaws**, 2018). This shows that implemented regulations can only go so far in order to protect users. An important issue in this regard is algorithmic transparency with the lingering question of to whom they should be transparent to (**Kemper; Kolkman**, 2019). As demonstrated, users might not be able to fully grasp the mechanisms at work even when presented with social media content and information. Another problem in regard to the internet as well as algorithms lies in the possibility to virtually and seamlessly transpire across country borders (**Hoffmann-Riem**, 2020), making it difficult to issue rules and regulations applicable across the board, which can lead to different laws for the same platform or content depending on the country (**Flew et al.**, 2019).

#### 4.2. Accuracy and Accountability

Many scholars have highlighted the significant role of AI and algorithms in the dissemination of fake news content as well as misinformation (**Shin; Valente**, 2020; **Shao et al.**, 2018). Social media platforms and the algorithms at work have been labelled as spreaders of such information (**Lee**, 2019). Facebook, for example, has in the past been accused of "exposing its users to low-quality and harmful information, including fake news, hate speech, and politically one-sided content" (**Garz; Szucs**, 2023), while YouTube was found to propagate conspiracy theories via its recommendation algorithm (**Daucé; Loveluck**, 2021). Dissemination of misinformation could have dire consequences for democracy. For instance, by distorting information, in the long run the legitimacy of certain elections or politicians could be questioned (**Lee**, 2019). Furthermore, as **Christiano** (2022) points out, it disadvantages particularly those with less knowledge about algorithms and limited AI literacy, as they might not be able to recognize fake news or protect themselves from receiving misleading information (**Head et al.**, 2020), thus threatening political equality, and overall democratic well-being (**Allcott; Gentzkow**, 2017; **Baptista et al.**, 2021).

In a similar vein, another point raised by many voices relates to literacy in terms of algorithmic operations. Oftentimes these processes are conducted in the background without the user noticing or even being aware of what information is collected. In part, this lack of awareness goes hand in hand with lower levels of algorithmic literacy. Studies indicate that often users lack the vocabulary to articulate their experience with algorithms (**Swart**, 2021) and are not able to fully grasp the mechanisms at work (**Swart**, 2021; **Fletcher; Nielsen**, 2019). Moreover, users can have a difficult time differentiating news personalization and commercial targeting (**Monzer et al.**, 2020), which further shows literacy problems in contact with algorithms and AI technologies. Even in spite of almost daily contact with algorithms, many lack 'critical awareness' about how their own actions shape algorithmic personalization (**Schwartz; Mahnke**, 2021). However, as **Fletcher and Nielsen** (2019) point out, despite not being able to fully grasp the mechanisms at work, users by no means accept algorithmic selection across the board either.

While some users exhibit a certain skepticism towards algorithms in general, these kinds of evaluations differ depending on certain characteristics such as gender or education (**Min**, 2019). Especially younger users seem to exhibit more approval for algorithmic interventions (**Fletcher; Nielsen**, 2019). Nevertheless, users seem to share certain concerns when encountering algorithms. Some feel like they are losing control over what content they are exposed to (**Volek et al.**, 2023). Personalization that cannot be actively shaped as for instance, the input drawn from a user's network instead of choosing certain news topics themselves, is especially regarded in that way (**Groot Kormelink; Costera Meijer**, 2014). They are concerned about privacy issues based on the data algorithms (might) collect (**Boerman et al.**, 2021) and are wary of the content (or lack thereof) one is exposed to after algorithmic selection (**Bodó**, 2019).

### 4.3. Impartiality and Fairness

Furthermore, a concern raised by many when this type of selection started to become more prevalent focused on the homogeneity of content users would be confronted with. In traditional media, journalists would typically try to present balanced, unbiased news, which might not be the case with algorithmic filtering. Filter bubbles and echo chambers are terms coined by researchers in order to capture the idea that due to high filtration and customization, users would only be exposed to certain content without experiencing counter attitudinal information (Nguyen *et al.*, 2014; Zimmer *et al.*, 2019). Studies suggest that users are aware of this potential problem and are concerned about missing content contrary to their own viewpoints based on certain types of algorithmic selection (Joris *et al.*, 2021; Monzer *et al.*, 2020). Users and scholars alike are worried about overly homogeneous content leading, for example, to increases in polarization (Calice *et al.*, 2023; Trilling *et al.*, 2017) which could in turn be detrimental to democratic processes.

Not only could the selection based upon a user's implicit or explicit input lead to undesired results, those who created the algorithms might have (un)intentionally imbued their own biases into the code (Mittelstadt, 2016; Kemper; Kolkman, 2019). This could lead to imbalances in political information, enforcement of certain lines of thought or perpetuation of discrimination (Romei; Ruggieri, 2014; Mittelstadt, 2016; Kemper; Kolkman, 2019). However, others have highlighted the potential of fairer and more impartial decision making through algorithms in contrast to humans (Park, 2021) and the possibility of reducing political partisan bias (Calice *et al.*, 2023).

### 5. Impact of Algorithms. Algorithmic Vs. Non-algorithmic News

As AI and algorithms have become more prevalent in many aspects of daily life, understanding their specific influence is challenging, and has only recently become a focus of academic research. Scholars have investigated the effect of algorithmic curation on several outcome variables – many of them pertaining to democratic processes like polarization, mobilization, etc. (Bessi *et al.*, 2016; Calice *et al.*, 2023; Poell; Van Dijck, 2015; Santos *et al.*, 2021; Poell; van Dijck, 2018). Results, however, are not entirely conclusive thus far, especially in a global context.

One important research strand regards the potential threat of echo chambers and filter bubbles – two terms coined by research for constant exposure to homogeneous content in line with one's own opinion. The connection between algorithmic news selection and increased polarization was proposed drawing on the potentially limited variety of opinions users might be confronted with after their news feed was filtered. However, as Fezell *et al.* (2021) recently showed, algorithmic news selection (user- or socially driven) does not contribute to polarization at a significant level – and neither do non-algorithmic news. Contrary to this finding, several studies point to polarization-enhancing effects of self-selective exposure to political or partisan news in particular (Knobloch-Westerwick; Meng, 2011; Stroud, 2010). It should be noted, though, that most studies in this regard are conducted in the United States, a “bipolar political system” (Zuiderveen Borgesius *et al.*, 2016), which means polarization in this context could differ from other countries with more parties (Trilling *et al.*, 2017).

Another research area has concerned itself with the effect of algorithmic news on knowledge. Based on the fact that algorithmic selection allows users to avoid content if they wish to and could expose them to only one-sided information, knowledge gaps might emerge in society (Zuiderveen Borgesius *et al.*, 2016). While decades worth of research have connected traditional news use with political knowledge (Lee; Yang, 2014), social media news consumption (which is strongly associated with algorithmic selection) has produced no significant influence on political learning (Shehata; Strömbäck, 2021). Castro *et al.* (2022) highlight that depending on the (European) country in question, effects and effect sizes can vary substantially. For the Korean context, Park and Kaye (2019) even found a positive effect of social media news use on political knowledge. However, as Zuiderveen Borgesius *et al.* (2016) point out, effects on knowledge tend to be relatively small. Furthermore, there could be great variance based on the vast amount of individualization present, thus many users might not be affected at all (Valkenburg; Peter, 2013). Consequently, there is so far no clear consensus on the impact of algorithmically curated news in this regard.

Similar to the link between traditional news consumption and political knowledge, research has established a connection between this type of news exposure and political participation. Interestingly, two recent studies point instead to the positive influence of algorithmic and social media news consumption while in both studies non-algorithmic/offline news had no significant effect (Fezell *et al.*, 2021; Ohme, 2021). This speaks to the potentially positive influence of algorithmic news selection as it increases participatory behavior in different forms, even though based on results regarding knowledge it might not necessarily be well-informed participation.

Algorithmic news selection has a potentially positive influence by increasing participatory behavior in different ways, even though based on results regarding knowledge it might not necessarily be well-informed participation

## 6. Discussion

With AI and algorithms being present in almost all aspects of daily life, including the news media landscape, the purpose of this paper was to summarize and organize the current state of research on news

production and curation in relation to algorithms and AI. Moreover, we contrast new developments with the most pressing principles pertaining to professional journalism (McBride; Rosenstiel, 2013). To do so, we compare algorithmic versus non-algorithmic news and rely on principles that are guiding the journalistic profession and are currently shaping AI development, performance and level of autonomy (Gil de Zúñiga *et al.*, 2023) such as accountability, transparency, accuracy, and impartiality/fairness (Fjeld *et al.*, 2020; Farley *et al.*, 2014). We also discussed the impact of algorithmic news on participation and knowledge. This comparative approach based on principles facilitates the assessment of AI and algorithm-based news, its theorization, and effects revolving around news use and exposure to public affairs information. Regarding the question whether the influence on society is positive or negative, results are seldom black or white. Research has pointed to both positive as well as negative effects and highlights possibilities as well as challenges for the future of algorithms.

Algorithmic news selection might not necessarily make users smarter, however, they appear to become more participatory

For example, algorithmic news selection could be beneficial to users when navigating the broad media landscape the internet offers (Van der Velden; Loecherbach, 2021). Facing more outlets and information than ever before, users might feel a sense of news overload, of becoming overwhelmed by too much information at hand and being unable to filter out what is relevant to them. Algorithms could be a helpful tool in assisting users in this task.

Algorithmic news selection might not necessarily make users smarter, however, they appear to become more participatory. Thus, there seem to be differences between algorithmic and human news selection, even though research points to gaps smaller than initially assumed in many cases. With new means of political participation offered by the internet (e.g. sharing or commenting on political news, following a politician), it is unsurprising that information consumed on online platforms might aid in fostering this type of engagement. As algorithms are strongly associated with social media platforms, and news content presented there cannot be disentangled from algorithmic selection, it stands to reason that algorithmic news selection positively impacts political participation. However, positive effects on knowledge are scarce which marks a main difference from traditional news consumption. Both might make readers more participatory (Saldaña *et al.*, 2015), but only traditional media seems to increase knowledge. Furthermore, it appears that social media news consumers not only gain less political knowledge, they also overestimate how much they know (Yamamoto; Yang, 2022). This development could have profound effects on democratic processes, and implications of these findings need to be discussed.

The biggest challenges lie in providing legal frameworks for algorithms and in increasing literacy among users. As algorithms tend to be extremely opaque and can vary significantly in their functionalities, it is difficult to introduce regulations that cover every aspect. Furthermore, the border transcending nature of online applications raises more challenges in passing laws that would be applicable to all sites using algorithms. Despite these challenges, it is relevant to promote regulations and policy initiatives that increase the levels of accountability and transparency. Companies and programs that rely on AI and algorithm-based content need to be more careful and transparent concerning the processes and data used to train, code and distribute the algorithmic content to ensure better standards of accuracy and fairness.

Moreover, as was laid out with the example of the GDPR, even when legislation is put in place, it might not adequately be able to protect users due to lack of knowledge on their side. Thus, additional measures to raise both awareness of and literacy about algorithms need to be promoted.

Also, in the case of news, journalism follows ethical principles that should not be disregarded just because the news production and selection is based on AI-algorithms. Literature shows that the problematic areas are lower levels of transparency, accountability, accuracy and impartiality or fairness. Thus, besides the promotion of legal frameworks and users' literacy, news media institutions should empower stakeholders who actively care about the data and processes involved in the use of algorithms in the news production.

Algorithms are omnipresent, permeating every aspect of our daily lives, including the realm of news production and consumption, practically making it nearly impossible to avoid interaction with them. AI algorithmic news is neither inherently good nor bad but provides new grounds for both bright potential and gloomy perils within the news media ecosystem. The only thing that is certain is that algorithms are here to stay and will continue to evolve in the future. It is paramount that both legislation and users understand these features, keep abreast of increasing algorithmic developments, and gain the necessary skills to protect everyone's privacy and data.

## 7. Funding

This work has benefited from the support of the *Spanish National Research Agency's Program for the Generation of Knowledge and the Scientific and Technological Strengthening Research + Development*, Grant PID2020-115562GB-I00.

Teresa Correa was supported by the *National Agency of Research and Development (ANID)* in Chile through the *Millennium Science Initiative Program* (grants NCS2022\_046 and NCS2022\_065).

AI algorithmic news is neither inherently good nor bad but provides new grounds for both bright potential and gloomy perils within the news media ecosystem

## 8. Note

Responsibility for the information and views set out in this study lies entirely with the authors.

## References

- Ali, Waleed; Hassoun, Mohamed** (2019). "Artificial Intelligence and Automated Journalism: Contemporary Challenges and New Opportunities". *International Journal of Media, Journalism and Mass Communications*, v. 5, n. 1, pp. 40-49. <https://doi.org/10.20431/2454-9479.0501004>
- Allcott, Hunt; Gentzkow, Matthew** (2017). "Social Media and Fake News in the 2016 Election". *Journal of Economic Perspectives*, v. 31, n. 2, pp. 211-236. <https://doi.org/10.1257/jep.31.2.211>
- Baptista, João Pedro; Correia, Elisete; Gradim, Anabela; Piñeiro-Naval, Valeriano** (2021). "The influence of political ideology on fake news belief: The Portuguese case". *Publications*, v. 9, n. 2, pp. 23. <https://doi.org/10.3390/publications9020023>
- Bastian, Mariella; Makhortykh, Mykola; Dobber, Tom** (2019). "News personalization for peace: how algorithmic recommendations can impact conflict coverage". *International Journal of Conflict Management*, v. 30, n. 3, pp. 309-328. <https://doi.org/10.1108/IJCM-02-2019-0032>
- Bengtsson, Stina** (2022). "The relevance of digital news: Themes, scales and temporalities". *Digital Journalism*, pp. 1-19. <https://doi.org/10.1080/21670811.2022.2150254>
- Bengtsson, Stina; Johansson, Sofia** (2021). "A phenomenology of news: Understanding news in digital culture". *Journalism*, v. 22, n. 11, pp. 2873-2889. <https://doi.org/10.1177/1464884919901194>
- Bessi, Alessandro; Zollo, Fabiana; Del Vicario, Michela; Puliga, Michelangelo; Scala, Antonio; Caldarelli, Guido; Uzzi, Brian; Quattrociocchi, Walter** (2016). "Users polarization on Facebook and Youtube". *PloS One*, v. 11, n. 8, pp. e0159641. <https://doi.org/10.1371/journal.pone.0159641>
- Blacklaws, Christina** (2018). "Algorithms: transparency and accountability". *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, v. 376, n. 2128, pp. 20170351. <https://doi.org/10.1098/rsta.2017.0351>
- Bodó, Balázs** (2019). "Selling News to Audiences—A Qualitative Inquiry into the Emerging Logics of Algorithmic News Personalization in European Quality News Media". *Digital Journalism*, v. 7, n. 8, pp. 1054-1075. <https://doi.org/10.1080/21670811.2019.1624185>
- Boerman, Sophie C.; Kruikemeier, Sanne; Zuiderveen Borgesius, Frederik J.** (2021). "Exploring Motivations for Online Privacy Protection Behavior: Insights From Panel Data". *Communication Research*, v. 48, n. 7, pp. 953-977. <https://doi.org/10.1177/0093650218800915>
- Büchi, Moritz; Festic, Noemi; Just, Natascha; Latzer, Michael** (2021). "Digital inequalities in online privacy protection: effects of age, education and gender." In: *Handbook of digital inequality*. Hargittai, Eszter (Ed.), pp. 296-310. Edward Elgar Publishing. <https://doi.org/10.4337/9781788116572.00029>
- Busuioac, Madalina** (2021). "Accountable Artificial Intelligence: Holding Algorithms to Account". *Public Administration Review*, v. 81, n. 5, pp. 825-836. <https://doi.org/10.1111/puar.13293>
- Calice, Mikhaila N.; Bao, Luye; Freiling, Isabelle; Howell, Emily; Xenos, Michael A.; Yang, Shiyu; Brossard, Dominique; Newman, Todd P.; Scheufele, Dietram A.** (2023). "Polarized platforms? How partisanship shapes perceptions of "algorithmic news bias"". *New Media & Society*, v. 25, n. 11, pp. 2833-2854. <https://doi.org/10.1177/14614448211034159>
- Carlson, Matt** (2018). "Automating judgment? Algorithmic judgment, news knowledge, and journalistic professionalism". *New Media & Society*, v. 20, n. 5, pp. 1755-1772. <https://doi.org/10.1177/1461444817706684>
- Castro, Laia; Strömbäck, Jesper; Esser, Frank; Van Aelst, Peter; de Vreese, Claes; Aalberg, Toril; Cardenal, Ana S; Corbu, Nicoleta; Hopmann, David Nicolas; Koc-Michalska, Karolina** (2022). "Navigating high-choice European political information environments: A comparative analysis of news user profiles and political knowledge". *The International Journal of Press/Politics*, v. 27, n. 4, pp. 827-859. <https://doi.org/10.1177/19401612211012572>
- Cheung, Ming; She, James; Junus, Alvin; Cao, Lei** (2016). "Prediction of virality timing using cascades in social media". *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)*, v. 13, n. 1, pp. 1-23. <https://doi.org/10.1145/2978771>



- Christiano, Thomas** (2022). "Algorithms, Manipulation, and Democracy". *Canadian Journal of Philosophy*, v. 52, n. 1, pp. 109-124. <https://doi.org/10.1017/can.2021.29>
- Clerwall, Christer** (2014). "Enter the Robot Journalist". *Journalism Practice*, v. 8, n. 5, pp. 519-531. <https://doi.org/10.1080/17512786.2014.883116>
- Covington, Paul; Adams, Jay; Sargin, Emre** (2016). "Deep neural networks for youtube recommendations." In: *Proceedings of the 10th ACM conference on recommender systems*. pp. 191-198. ACM. <https://doi.org/10.1145/2959100.2959190>
- Daucé, Françoise; Loveluck, Benjamin** (2021). "Codes of conduct for algorithmic news recommendation: The Yandex. News controversy in Russia". *First Monday*, v. 26, n. 5. <https://doi.org/10.5210/fm.v26i5.11708>
- Diakopoulos, Nicholas** (2015). "Algorithmic Accountability". *Digital Journalism*, v. 3, n. 3, pp. 398-415. <https://doi.org/10.1080/21670811.2014.976411>
- Diakopoulos, Nicholas** (2019). *Automating the News: How Algorithms Are Rewriting the Media*. Harvard University Press. <https://www.hup.harvard.edu/books/9780674976986>
- Diakopoulos, Nicholas; Koliska, Michael** (2017). "Algorithmic Transparency in the News Media". *Digital Journalism*, v. 5, n. 7, pp. 809-828. <https://doi.org/10.1080/21670811.2016.1208053>
- Ellis, Justin** (2013). "The Guardian experiments with a robot-generated newspaper with The Long Good Read." NiemanLab. Accessed 5.8.23. <https://www.niemanlab.org/2013/12/the-guardian-experiments-with-a-robot-generate-d-newspaper-with-the-long-good-read>
- Eslami, Motahhare; Aleyasen, Amirhossein; Karahalios, Karrie; Hamilton, Kevin; Sandvig, Christian** (2015). "Feedvis: A path for exploring news feed curation algorithms." In: *Proceedings of the 18th acm conference companion on computer supported cooperative work & social computing*. pp. 65-68. ACM. <https://doi.org/10.1145/2685553.2702690>
- Farley, Elizabeth; Grady, Fiona; Miller, Dean S; O'Connor, Rory; Schneider, Howard; Spikes, Michael; Constantinou, Constantia** (2014). "SPJ Code of Ethics". *The Power of Images*. <https://repo.library.stonybrook.edu/xmlui/bitstream/handle/11401/9251/spjethicscode.pdf>
- Fayyaz, Zeshan; Ebrahimian, Mahsa; Nawara, Dina; Ibrahim, Ahmed; Kashef, Rasha** (2020). "Recommendation Systems: Algorithms, Challenges, Metrics, and Business Opportunities". *Applied Sciences*, v. 10, n. 21, pp. 7748. <https://doi.org/10.3390/app10217748>
- Feezell, Jessica T.** (2018). "Agenda Setting through Social Media: The Importance of Incidental News Exposure and Social Filtering in the Digital Era". *Political Research Quarterly*, v. 71, n. 2, pp. 482-494. <https://doi.org/10.1177/1065912917744895>
- Feezell, Jessica T.; Wagner, John K.; Conroy, Meredith** (2021). "Exploring the effects of algorithm-driven news sources on political behavior and polarization". *Computers in Human Behavior*, v. 116, pp. 106626. <https://doi.org/10.1016/j.chb.2020.106626>
- Festic, Noemi** (2022). "Same, same, but different! Qualitative evidence on how algorithmic selection applications govern different life domains". *Regulation & Governance*, v. 16, n. 1, pp. 85-101. <https://doi.org/10.1111/rego.12333>
- Fjeld, Jessica; Achten, Nele; Hilligoss, Hannah; Nagy, Adam; Srikumar, Madhulika** (2020). "Principled artificial intelligence: Mapping consensus in ethical and rights-based approaches to principles for AI". *Berkman Klein Center Research Publication*, n. 2020-1. <https://doi.org/10.2139/ssrn.3518482>
- Fletcher, Richard; Nielsen, Rasmus Kleis** (2019). "Generalised scepticism: how people navigate news on social media". *Information, Communication & Society*, v. 22, n. 12, pp. 1751-1769. <https://doi.org/10.1080/1369118X.2018.1450887>
- Flew, Terry; Martin, Fiona; Suzor, Nicolas** (2019). "Internet regulation as media policy: Rethinking the question of digital communication platform governance". *Journal of Digital Media & Policy*, v. 10, n. 1, pp. 33-50. [https://doi.org/10.1386/jdmp.10.1.33\\_1](https://doi.org/10.1386/jdmp.10.1.33_1)
- Forman-Katz, N.; Matsa, K. E.** (2022). "News Platform Fact Sheet." Pew Research Center's Journalism Project. Accessed 5.8.23. <https://www.pewresearch.org/journalism/fact-sheet/news-platform-fact-sheet>
- Fyfield, Matthew; Henderson, Michael; Phillips, Michael** (2021). "Navigating four billion videos: teacher search strategies and the YouTube algorithm". *Learning, Media and Technology*, v. 46, n. 1, pp. 47-59. <https://doi.org/10.1080/17439884.2020.1781890>
- Garz, Marcel; Szucs, Ferenc** (2023). "Algorithmic selection and supply of political news on Facebook". *Information Economics and Policy*, v. 62, pp. 101020. <https://doi.org/10.1016/j.infoecopol.2023.101020>
- Gielen, M.; Rosen, J.** (2016). "Reverse Engineering The YouTube Algorithm." Tubefilter. Accessed 10.25.23. <https://www.tubefilter.com/2016/06/23/reverse-engineering-youtube-algorithm>

- Gil de Zúñiga, Homero; Goyanes, Manuel; Durotoye, Timilehin** (2023). "A Scholarly Definition of Artificial Intelligence (AI): Advancing AI as a Conceptual Framework in Communication Research". *Political Communication*, v. 41, n. 2, pp. 317-334. <https://doi.org/10.1080/10584609.2023.2290497>
- Graefe, Andreas** (2016). *Guide to Automated Journalism*. Tow Center for Digital Journalism, Columbia University. <https://doi.org/10.7916/D80G3XDJ>
- Groot Kormelink, Tim; Costera Meijer, Irene** (2014). "Tailor-made news: Meeting the demands of news users on mobile and social media". *Journalism Studies*, v. 15, n. 5, pp. 632-641. <https://doi.org/10.1080/1461670X.2014.894367>
- Head, Alison J; Fister, Barbara; MacMillan, Margy** (2020). "Information Literacy in the Age of Algorithms". *Project Information Literacy*, pp. 55. [https://projectinfolit.org/pubs/algorithm-study/pil\\_algorithm-study\\_2020-01-15.pdf](https://projectinfolit.org/pubs/algorithm-study/pil_algorithm-study_2020-01-15.pdf)
- Hoffmann-Riem, Wolfgang** (2020). "Artificial Intelligence as a Challenge for Law and Regulation." In: *Regulating Artificial Intelligence*. Wischmeyer, Thomas; Rademacher, Timo (Eds.), pp. 1-29. Springer International Publishing. [https://doi.org/10.1007/978-3-030-32361-5\\_1](https://doi.org/10.1007/978-3-030-32361-5_1)
- Joris, Glen; Grove, Frederik De; Van Damme, Kristin; De Marez, Lieven** (2021). "Appreciating News Algorithms: Examining Audiences' Perceptions to Different News Selection Mechanisms". *Digital Journalism*, v. 9, n. 5, pp. 589-618. <https://doi.org/10.1080/21670811.2021.1912626>
- Jung, Jaemin; Song, Haeyeop; Kim, Youngju; Im, Hyunsuk; Oh, Sewook** (2017). "Intrusion of software robots into journalism: The public's and journalists' perceptions of news written by algorithms and human journalists". *Computers in Human Behavior*, v. 71, pp. 291-298. <https://doi.org/10.1016/j.chb.2017.02.022>
- Kabiljo, M.; Ilic, A.** (2015). "Recommending Items to More Than a Billion People." *Engineering at Meta*. Accessed 5.9.23. <https://engineering.fb.com/2015/06/02/core-data/recommending-items-to-more-than-a-billion-people>
- Kantar Media** (2017). "Fake News Reinforces Trust in Mainstream News." [WWW Document]. Kantar Media. Accessed 10.8.20. <https://www.kantar.com/inspiration/advertising-media/fake-news-reinforces-trust-in-mainstream-news-brands>
- Kappeler, Kiran; Festic, Noemi; Latzer, Michael; Rüedy, Tanja** (2023). "Coping with Algorithmic Risks". *Journal of Digital Social Research*, v. 5, n. 1, pp. 23-47. <https://doi.org/10.5167/uzh-234617>
- Kemper, Jakko; Kolkman, Daan** (2019). "Transparent to whom? No algorithmic accountability without a critical audience". *Information, Communication & Society*, v. 22, n. 14, pp. 2081-2096. <https://doi.org/10.1080/1369118X.2018.1477967>
- Knobloch-Westerwick, Silvia; Meng, Jingbo** (2011). "Reinforcement of the Political Self Through Selective Exposure to Political Messages". *Journal of Communication*, v. 61, n. 2, pp. 349-368. <https://doi.org/10.1111/j.1460-2466.2011.01543.x>
- Kopf, Susanne** (2020). "'Rewarding good creators': corporate social media discourse on monetization schemes for content creators". *Social Media + Society*, v. 6, n. 4, pp. 2056305120969877. <https://doi.org/10.1177/2056305120969877>
- Kotenidis, Efthimis; Veglis, Andreas** (2021). "Algorithmic Journalism—Current Applications and Future Perspectives". *Journalism and Media*, v. 2, n. 2, pp. 244-257. <https://doi.org/10.3390/journalmedia2020014>
- Latzer, Michael; Hollnbuchner, Katharina; Just, Natascha; Saurwein, Florian** (2016). "The economics of algorithmic selection on the Internet." In: *Handbook on the Economics of the Internet*. Bauer, Johannes M.; Latzer, Michael (Eds.), pp. 395-425. Edward Elgar Publishing. <https://doi.org/10.4337/9780857939852.00028>
- Lee, Hyunwoo; Yang, Jungae** (2014). "Political Knowledge Gaps Among News Consumers With Different News Media Repertoires Across Multiple Platforms". *International Journal of Communication*, v. 8, pp. 597-617. <https://ijoc.org/index.php/ijoc/article/view/2455>
- Lee, Terry** (2019). "The global rise of "fake news" and the threat to democratic elections in the USA". *Public Administration and Policy*, v. 22, n. 1, pp. 15-24. <https://doi.org/10.1108/PAP-04-2019-0008>
- Liang, Hai** (2018). "Broadcast Versus Viral Spreading: The Structure of Diffusion Cascades and Selective Sharing on Social Media". *Journal of Communication*, v. 68, n. 3, pp. 525-546. <https://doi.org/10.1093/joc/jqy006>
- Litt, Eden; Zhao, Siyan; Kraut, Robert; Burke, Moira** (2020). "What Are Meaningful Social Interactions in Today's Media Landscape? A Cross-cultural Survey". *Social Media + Society*, v. 6, n. 3, pp. 2056305120942888. <https://doi.org/10.1177/2056305120942888>
- McBride, Kelly; Rosenstiel, Tom** (2013). *The new ethics of journalism: Principles for the 21st century*. CQ Press. <https://doi.org/10.4135/9781071934098>
- Micheli, Marina; Lutz, Christoph; Büchi, Moritz** (2018). "Digital Footprints: An Emerging Dimension of Digital Inequality". *Journal of Information, Communication and Ethics in Society*, v. 16, n. 3, pp. 242-251. <https://doi.org/10.1108/JICES-02-2018-0014>

- Min, Seong Jae** (2019). "From algorithmic disengagement to algorithmic activism: Charting social media users' responses to news filtering algorithms". *Telematics and Informatics*, v. 43, pp. 101251. <https://doi.org/10.1016/j.tele.2019.101251>
- Mittelstadt, Brent** (2016). "Automation, algorithms, and politics| auditing for transparency in content personalization systems". *International Journal of Communication*, v. 10, pp. 4991–5002. <https://ijoc.org/index.php/ijoc/article/view/6267>
- Monzer, Cristina; Moeller, Judith; Helberger, Natali; Eskens, Sarah** (2020). "User Perspectives on the News Personalisation Process: Agency, Trust and Utility as Building Blocks". *Digital Journalism*, v. 8, n. 9, pp. 1142-1162. <https://doi.org/10.1080/21670811.2020.1773291>
- Mosseri, Adam** (2018). "News Feed FYI: Bringing People Closer Together." [WWW Document]. Meta for Business. Accessed 10.25.23. <https://www.facebook.com/business/news/news-feed-fyi-bringing-people-closer-together>
- Napoli, Philip M** (2015). "Social media and the public interest: Governance of news platforms in the realm of individual and algorithmic gatekeepers". *Telecommunications Policy*, v. 39, n. 9, pp. 751-760. <https://doi.org/10.1016/j.telpol.2014.12.003>
- Narayanan, Arvind** (2023). *Understanding Social Media Recommendation Algorithms*. Knight First Amendment Institute. <https://doi.org/10.7916/khdk-m460>
- Newton, Lisa H; Hodges, Louis; Keith, Susan** (2004). "Accountability in the Professions: Accountability in Journalism". *Journal of Mass Media Ethics*, v. 19, n. 3-4, pp. 166-190. <https://doi.org/10.1080/08900523.2004.9679687>
- Nguyen, Tien T; Hui, Pik-Mai; Harper, F Maxwell; Terveen, Loren; Konstan, Joseph A** (2014). "Exploring the filter bubble: the effect of using recommender systems on content diversity." In: *Proceedings of the 23rd international conference on World wide web*. pp. 677-686. ACM. <https://doi.org/10.1145/2566486.2568012>
- Ohme, Jakob** (2021). "Algorithmic Social Media Use and Its Relationship to Attitude Reinforcement and Issue-specific Political Participation—the Case of the 2015 European Immigration Movements". *Journal of Information Technology & Politics*, v. 18, n. 1, pp. 36-54. <https://doi.org/10.1080/19331681.2020.1805085>
- Ojala, Markus** (2021). "Is the Age of Impartial Journalism Over? The Neutrality Principle and Audience (Dis)trust in Mainstream News". *Journalism Studies*, v. 22, n. 15, pp. 2042-2060. <https://doi.org/10.1080/1461670X.2021.1942150>
- Park, Chang Sup; Kaye, Barbara K** (2019). "Mediating Roles of News Curation and News Elaboration in the Relationship between Social Media Use for News and Political Knowledge". *Journal of Broadcasting & Electronic Media*, v. 63, n. 3, pp. 455-473. <https://doi.org/10.1080/08838151.2019.1653070>
- Park, Yong Jin** (2021). *The future of digital surveillance: Why digital monitoring will never lose its appeal in a world of algorithm-driven AI*. University of Michigan Press. <https://doi.org/10.3998/mpub.10211441>
- Phillips, Angela** (2009). "Old Sources: New Bottles." In: *New Media, Old News: Journalism and Democracy in the Digital Age*. Fenton, Natalie (Ed.), pp. 87-101. SAGE Publications. <https://research.gold.ac.uk/id/eprint/5898>
- Phillips, Angela** (2010). "Transparency and the New Ethics of Journalism". *Journalism Practice*, v. 4, n. 3, pp. 373-382. <https://doi.org/10.1080/17512781003642972>
- Poell, Thomas; Van Dijck, José** (2015). "Social Media and Activist Communication." In: *The Routledge Companion to Alternative and Community Media*. Atton, Chris (Ed.), pp. 527-537. Routledge. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781315717241-53>
- Poell, Thomas; van Dijck, José** (2018). "Social Media and New Protest Movements." In: *The Sage Handbook of Social Media*. Burgess, Jean; Marwick, Alice; Poell, Thomas (Eds.), pp. 546-561. Sage Publications. <https://hdl.handle.net/11245.1/c69e856d-c7c8-4a9a-94e5-899b5b0e8fbb>
- Rader, Emilee; Gray, Rebecca** (2015). "Understanding user beliefs about algorithmic curation in the Facebook news feed." In: *Proceedings of the 33rd annual ACM conference on human factors in computing systems*. pp. 173-182. ACM. <https://doi.org/10.1145/2702123.2702174>
- Rainie, Lee; Funk, Cary; Anderson, Monica; Tyson, Alec** (2022). "3. Mixed Views About Social Media Companies Using Algorithms to Find False Information." Pew Research Center: Internet, Science & Tech. Accessed 5.4.23. <https://www.pewresearch.org/internet/2022/03/17/mixed-views-about-social-media-companies-using-algorithms-to-find-false-information>
- Romei, Andrea; Ruggieri, Salvatore** (2014). "A Multidisciplinary Survey on Discrimination Analysis". *The Knowledge Engineering Review*, v. 29, n. 5, pp. 582-638. <https://doi.org/10.1017/S0269888913000039>
- Saldaña, Magdalena; McGregor, Shannon C; Gil de Zúñiga, Homero** (2015). "Social Media as a Public Space for Politics: Cross-national Comparison of News Consumption and Participatory Behaviors in the United States and the United Kingdom". *International Journal of Communication*, v. 9, n. 1, pp. 3304-3326. <https://ijoc.org/index.php/ijoc/article/view/3238>

- Santos, Fernando P; Lelkes, Yphtach; Levin, Simon A** (2021). "Link recommendation algorithms and dynamics of polarization in online social networks". *Proceedings of the National Academy of Sciences*, v. 118, n. 50, pp. e2102141118. <https://doi.org/10.1073/pnas.2102141118>
- Sawant, P B** (2003). "Accountability in Journalism". *Journal of Mass Media Ethics*, v. 18, n. 1, pp. 16-28. [https://doi.org/10.1207/S15327728JMME1801\\_03](https://doi.org/10.1207/S15327728JMME1801_03)
- Schwartz, Sander Andreas; Mahnke, Martina Skrubbeltrang** (2021). "Facebook use as a communicative relation: exploring the relation between Facebook users and the algorithmic news feed". *Information, Communication & Society*, v. 24, n. 7, pp. 1041-1056. <https://doi.org/10.1080/1369118X.2020.1718179>
- Shao, Chengcheng; Ciampaglia, Giovanni Luca; Varol, Onur; Yang, Kai-Cheng; Flammini, Alessandro; Menczer, Filippo** (2018). "The spread of low-credibility content by social bots". *Nature Communications*, v. 9, n. 1, pp. 4787. <https://doi.org/10.1038/s41467-018-06930-7>
- Shehata, Adam; Strömbäck, Jesper** (2021). "Learning political news from social media: Network media logic and current affairs news learning in a high-choice media environment". *Communication Research*, v. 48, n. 1, pp. 125-147. <https://doi.org/10.1177/0093650217749354>
- Shin, Donghee; Park, Yong Jin** (2019). "Role of fairness, accountability, and transparency in algorithmic affordance". *Computers in Human Behavior*, v. 98, pp. 277-284. <https://doi.org/10.1016/j.chb.2019.04.019>
- Shin, Jieun; Valente, Thomas** (2020). "Algorithms and Health Misinformation: A Case Study of Vaccine Books on Amazon". *Journal of Health Communication*, v. 25, n. 5, pp. 394-401. <https://doi.org/10.1080/10810730.2020.1776423>
- Stroud, Natalie Jomini** (2010). "Polarization and Partisan Selective Exposure". *Journal of Communication*, v. 60, n. 3, pp. 556-576. <https://doi.org/10.1111/j.1460-2466.2010.01497.x>
- Swart, Joëlle** (2021). "Experiencing Algorithms: How Young People Understand, Feel About, and Engage With Algorithmic News Selection on Social Media". *Social Media + Society*, v. 7, n. 2, pp. 20563051211008828. <https://doi.org/10.1177/20563051211008828>
- Thorson, Kjerstin; Wells, Chris** (2016). "Curated Flows: A Framework for Mapping Media Exposure in the Digital Age". *Communication Theory*, v. 26, n. 3, pp. 309-328. <https://doi.org/10.1111/comt.12087>
- Trilling, Damian; Van Klinger, Marijn; Tsfat, Yariv** (2017). "Selective exposure, political polarization, and possible mediators: Evidence from the Netherlands". *International Journal of Public Opinion Research*, v. 29, n. 2, pp. 189-213. <https://doi.org/10.1093/ijpor/edw003>
- Valkenburg, Patti M; Peter, Jochen** (2013). "The Differential Susceptibility to Media Effects Model". *Journal of Communication*, v. 63, n. 2, pp. 221-243. <https://doi.org/10.1111/jcom.12024>
- Van der Velden, Mariken; Loecherbach, Felicia** (2021). "Epistemic Overconfidence in Algorithmic News Selection". *Media and Communication*, v. 9, n. 4, pp. 182-197. <https://doi.org/10.17645/mac.v9i4.4167>
- Van Drunen, Max Z; Helberger, Natali; Bastian, Mariella** (2019). "Know your algorithm: what media organizations need to explain to their users about news personalization". *International Data Privacy Law*, v. 9, n. 4, pp. 220-235. <https://doi.org/10.1093/idpl/ipy011>
- Volek, Jaromír; Krausová, Alžběta; Moravec, Václav** (2023). "Between Benefits and Threats of the Algorithmic News Personalization". *Observatorio (OBS\*)*, v. 17, n. 1, pp. 1-18. <https://doi.org/10.15847/obsOBS17120232063>
- Wojcieszak, Magdalena E; Mutz, Diana C** (2009). "Online groups and political discourse: Do online discussion spaces facilitate exposure to political disagreement?". *Journal of Communication*, v. 59, n. 1, pp. 40-56. <https://doi.org/10.1111/j.1460-2466.2008.01403.x>
- Yamamoto, Masahiro; Yang, Fan** (2022). "Does news help us become knowledgeable or think we are knowledgeable? Examining a linkage of traditional and social media use with political knowledge". *Journal of Information Technology & Politics*, v. 19, n. 3, pp. 269-283. <https://doi.org/10.1080/19331681.2021.1969611>
- Yeomans, Michael; Shah, Anuj; Mullainathan, Sendhil; Kleinberg, Jon** (2019). "Making Sense of Recommendations". *Journal of Behavioral Decision Making*, v. 32, n. 4, pp. 403-414. <https://doi.org/10.1002/bdm.2118>
- Yoon, Gunwoo; Li, Cong; Ji, Yi; North, Michael; Hong, Cheng; Liu, Jiangmeng** (2018). "Attracting Comments: Digital Engagement Metrics on Facebook and Financial Performance". *Journal of Advertising*, v. 47, n. 1, pp. 24-37. <https://doi.org/10.1080/00913367.2017.1405753>

**Zimmer, Franziska; Scheibe, Katrin; Stock, Mechtild; Stock, Wolfgang G** (2019). "Echo Chambers and Filter Bubbles of Fake News in Social Media. Man-made or Produced by Algorithms." In: *8th Annual Arts, Humanities, Social Sciences & Education Conference*. pp. 1-22. <https://huichawaii.org/wp-content/uploads/2018/12/Zimmer-Franziska-2019-AHSE-HUIC.pdf>

**Zuiderveen Borgesius, Frederik; Trilling, Damian; Möller, Judith; Bodó, Balázs; De Vreese, Claes H; Helberger, Natali** (2016). "Should We Worry about Filter Bubbles?". *Internet Policy Review. Journal on Internet Regulation*, v. 5, n. 1, pp. 1-16. <https://doi.org/10.14763/2016.1.401>