


# Towards a Multi-Level Model of Resilience to Information Disorders: A Systematic Literature Review

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**Abstract:** The article attempts, based on academic sources, to develop a systematic framework of the concepts that define resilience against information disorders – specifically, the factors of resilience and the social practices that support it. To achieve this, a domain-based systematic literature review (SLR) was conducted, drawing on an interdisciplinary selection of articles from peer-reviewed journals. The article describes and categorizes factors that either facilitate or undermine resilience against information disorders, organizing them into a three-dimensional model comprising macro-level, meso-level, and micro-level factors. The findings also emphasize existing academic achievements in recognizing the diverse approaches to enhancing resilience, some of which extend beyond the communication sphere. Given the growing challenges posed by disinformation and information manipulation, this review offers an evidence-based foundation for both theoretical exploration and practical interventions.

**Keywords:** resilience, vulnerability, information disorders, disinformation, systematic literature review

## INTRODUCTION

Resilience has become a prominent concept within the social sciences for the past few decades, describing how societies and individuals cope with crises and disruptions. Earlier theories of social change – evolutionary, cyclical, or structural (Schneider, 1976; Bourdieu & Coleman, 1991; Parsons, 1968) – focused on gradual transformations, whereas resilience draws attention to sudden shocks that can divert societies from their expected developmental paths.

Following Obrist et al. (2010), we view resilience as a value-laden construct shaped by its political and institutional context. In rapidly changing environments, it cannot be separated from structural conditions or power relations. Lorenz (2013) similarly emphasizes that resilience is relational and processual: social systems are continuously changing, and, echoing Heraclitus' assertion that "no man ever steps in the same river twice", they never return to the same state after major shocks. Maclean et al. (2017) and Moya & Goenechea (2022) also argue that resilience is not an end-state but an ongoing adaptive process shaped by learning, governance, and institutional arrangements.

Consequently, resilience should be conceptualized not as a static attribute but as a dynamic interaction between systems and their environments, raising questions about where resilience is constructed: at the micro level through individual and community capacities, or at the macro level through institutions and structures. These questions are particularly relevant in the field of information and communication, where technological change, the attention economy, unmoderated platforms, and advances in AI produce new and unforeseen vulnerabilities. In a world organized through networked communication, many threats stem from information disorders, making societal resilience in this domain an urgent research topic.

Among the plethora of academic and policy papers, there is still a recognizable lack of studies that focus on reducing the impact of false, misleading and manipulative information in real-world environments (Roozenbeek et al., 2022). Some scholars acknowledge the relatively slow pace of research on information disorders in the context of global transformational changes (Kozyreva et al., 2022).

These are the issues we aim to address in the present study. Our goal is to explore the concept of societal resilience within the field of information and communication, focusing on the factors conditioning resilience and vulnerability to information disorders, and the tools used to maintain it. We do not focus on approaches to societal resilience conceptualization, as we find little to no gap in this area. Instead, this review aims to clarify types of vulnerabilities that emerge alongside resilience factors and to assess how these elements can be organized into a multi-level conceptual model. Thus, our research questions are: (1) What factors are identified in the literature as either weakening or strengthening resilience

to information disorders? (2) How do the identified vulnerability factors interact with resilience-enhancing mechanisms across macro-, meso-, and micro-levels? And (3) what social practices are observed for sustaining this type of resilience? The outcome of our research, as we see it, are the frameworks that systematize both the contributing factors and the social practice used when approaching societal resilience against information disorders.

Our approach relies on two complementary bodies of literature: one focused on resilience and the other on vulnerabilities. This dual strategy enables capturing sources that address both the “positive” (resilience) and “negative” (vulnerability) dimensions of adaptive capacity.

The review is designed to serve multiple audiences. For scholars in communication studies, it provides a synthesis of existing research and a conceptual framework that can guide future work. For policymakers, educators, and practitioners, it offers insights into how resilience can be developed and supported in practice. Theoretically, this article contributes to interdisciplinary debates by providing perspectives from politics, technology, and communication.

As this review was being completed, several other attempts to synthesize the field emerged. Rød et al. (2025) offer an interesting framework for combatting disinformation constructed through thematical blocks rather than levels (legal, educational, political and governance, psychological, and technological). Ferraz & Hellal’s (2024) approach resilience from an information-science perspective, yet emphasizing more system robustness and technical safeguards, in their review of informational resilience. Ricard et al. (2025) also engage in the systematic overview of information disorder mechanisms, providing a model of information disorder as a five-stage socio-material process, mapping vulnerabilities, agents, tactics, and impacts across the information environment. These studies confirm the need for conceptual consolidation, yet they remain oriented toward specific disciplinary lenses (security studies, information science, or modelling approaches). The present review complements these efforts by offering a multi-level framework grounded in communication and social-science research.

## **FRAMING THE CHALLENGE: RESILIENCE TO INFORMATION DISORDERS**

Recognizing the relational nature of resilience allows us to examine the specific threats and vulnerabilities within information and communication. In this domain, resilience is shaped by the evolving digital environment, the dynamics of mis- and disinformation, and the structural conditions that enable or constrain adaptive responses. Treating resilience as multi-level, dynamic, and threat-specific (Lorenz, 2013) is therefore essential.

Clarifying what constitutes these threats requires addressing the fragmented terminology surrounding misleading content. The academic vocabulary is highly inconsistent, with overlapping terms shaped by different disciplines and historical contexts, complicating both scholarly and policy efforts (Pantazi et al., 2021). Although resolving these debates lies beyond our scope, a working definition is necessary.

Several attempts to systematize terminology exist. Kapantai et al. (2021) map taxonomies of false or misleading information, drawing on concepts such as “information pollution” (Meel & Vishwakarma, 2019) and “information disorders” (Wardle & Derakhshan, 2017), ultimately adopting the European Commission High-level expert group definition of “disinformation” as false or misleading information intentionally promoted to cause harm or profit (HLEG, 2018). Their taxonomy includes “fake news”, “false information”, and “disinformation”, but notably excludes “misinformation”.

Wardle & Derakhshan (2017), however, argue that “information disorders” offers a broader systemic perspective by shifting attention from content to the wider ecosystem in which it circulates. Given this study’s interdisciplinary scope, we follow Golob et al. (2021) in using “information disorders” as an overarching term, as different forms of misleading content – such as misinformation, disinformation, and propaganda – often operate through similar mechanisms and require comparable resilience strategies.

Before analysing the factors of resilience against information disorders, it is important to clarify how resilience in this field is understood in relation to its dynamics and vector.

When discussing resilience to information disorders in the context of its dynamics, scholars generally identify two macro approaches: paternalistic and adaptive (Moussa et al., 2022; Romanova et al., 2020). The *paternalistic paradigm* assumes a more conservative approach of “bouncing back”, returning to the status quo (Buzzanell, 2010), and the *adaptive* entails “moving forward”, adjusting to information threats, and adapting to those challenges (Köuts-Klemm et al., 2022). The former relies on the involvement of authorities and regulatory development, and the latter emphasizes citizen participation and empowering individuals to prevent the spread of information disorders (Lazer et al., 2018, as cited by Golob et al., 2021).

Resilience to information disorders can also be interpreted through the lens of the “freedom-security dilemma”, a continuum between public security and public freedom. In asymmetric information warfare, this dilemma becomes salient as democracies respond to autocratic influence by balancing *security-oriented physical resilience* measures (such as censorship or blocking sources) with *freedom-oriented cognitive resilience* that is more inclined towards developing critical thinking. Physical and cognitive resilience should not necessarily

be dichotomic; they can complement one another. Nonetheless, policymakers frequently frame them as opposing paradigms, where prioritizing one is seen as jeopardizing the other (Liagusha & Iarovyi, 2025).

Since the paternalistic approach to resilience is typically associated with public security, and the adaptive approach with public freedom (Romanova et al., 2020), it may seem intuitive to align physical resilience with paternalism and cognitive resilience with adaptation, placing both on the freedom-security continuum. However, this categorization oversimplifies their interaction. The freedom-security distinction itself is contradictory: regulatory measures may simultaneously be justified as protecting free speech (Shadmy, 2022) and criticized for restricting it (Kozyreva et al., 2022).

In the next section, resilience is approached from vulnerability perspective, and based on existing studies in information and communication, we outline the levels of its analysis.

## LEVELS OF RESILIENCE

Building on the discussion of resilience and its paradigms, we now turn to the concept of vulnerability as its counterpart. In social sciences, vulnerability can be defined as an internal risk factor within a subject or system exposed to a hazard, reflecting an intrinsic susceptibility to harm (Singh et al., 2014). In this sense, resilience and vulnerability function as opposite ends of a continuum.

To locate vulnerability and resilience analytically, we must also clarify the levels of analysis. Hall and Lamont (2013) distinguish between macro, organisational, and individual resilience. While the organisational level – including actors that deliberately amplify information disorders – remains important, analysing it in depth lies beyond the scope of this article. This dimension has been extensively examined elsewhere (e.g., Dawson & Innes, 2019). In this study, we focus on the macro-societal and individual levels, where information flows, everyday practices, and structural conditions most directly shape societal resilience to information disorders.

At the same time, resilience cannot be reduced to a macro-micro distinction. Research in information and communication consistently shows that these levels are connected through intermediary processes and structures. Bjola & Papadakis (2020) base their findings on Habermas' concept of the public sphere, and regarding the consumption of disinformation, they explain that on the micro level, within everyday use, people act as both producers/distributors of disinformation (often unintentionally) and its consumers. At the macro level, disinformation serves as an incentive for decision-makers. The topics infiltrate

the macrosphere from below, as emotion-driven and algorithmically amplified disinformation undermines the norm-sustaining function of the public sphere.

Moussa et al. (2022) similarly observe that integrating macro variables matter, but do not deterministically shape individual resilience, as people deploy diverse strategies with varying effectiveness. Boulianne et al. (2022) argue that developing resilience requires examining how macro- and micro-level indicators relate to one another, noting methodological distinctions between exposure, awareness, and sharing of disinformation.

An important contribution comes from Humprecht and colleagues, whose comparative studies of online resilience highlight macro-level variation. Humprecht et al. (2020) conceptualize resilience as a collective characteristic with individual-level implications and identify seven key macro indicators: societal polarization, populist communication, trust in news, strength of public media, media fragmentation, advertising market size, and social media use. Their later work stresses that these indicators are context-dependent and shaped by political and informational environments (Humprecht et al., 2023). For instance, consensus-oriented democracies may experience less impact from extreme ideologies, whereas resilience in countries with populist dominance may be negatively affected; the trust in traditional media may have been weakened during the pandemic, and resilience to disinformation may vary depending on the topics being discussed. Thus, strong macro-level strategies do not automatically translate into individual-level resilience (Bjola & Papadakis, 2020, as cited in Köuts-Klemm et al., 2022).

Consequently, the questions arise about how countries and separate individuals become resilient or vulnerable to information disorders, and whether other factors contribute to explaining these variations.

Resilience is also a discursive phenomenon, understood as public power to identify the risk, where public discourses in terms of perceptions of risk and relevant beliefs, knowledge and experiences are of great importance (Obrist et al., 2010).

Recognizing this interplay across levels, this systematic literature review develops a three-dimensional approach to resilience and vulnerability to information disorders. These dimensions encompass macro-level contextual factors, meso-level discursive practices, and micro-level individual characteristics. We propose this model as a useful analytical framework for understanding how resilience operates within the field of information and communication.

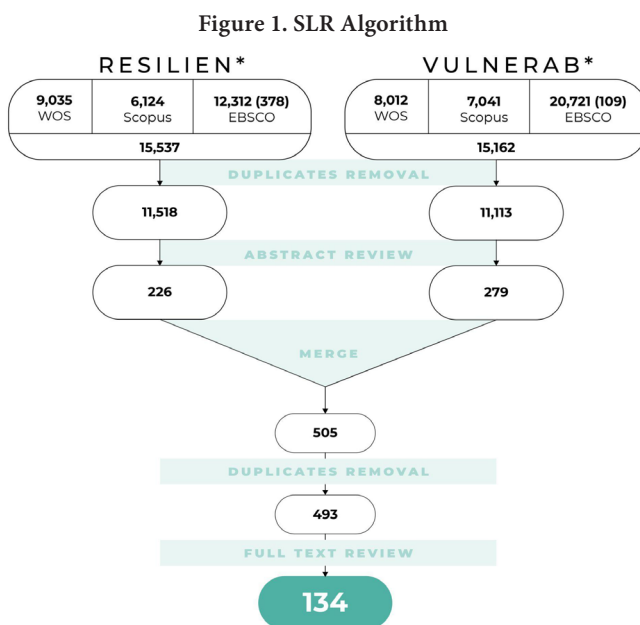
## SYSTEMATIC LITERATURE REVIEW

The choice of the method (a systematic literature review – SLR) was guided by the research team’s recognition that the topic is evolving and requires systematization (Paul & Barari, 2022). This is a domain-based conceptual review focused on developing a conceptual model and proposing future research directions within the field (*ibid.*).

The review timeline covers from 2010 to May 2023, when the article extraction took place. The choice of 2010 as the starting point aimed to capture the most recent findings and served as a precaution, as most articles used for the review were published after the mid-2010s. A search for relevant concepts prior to 2010 found no direct connections to the information and communication field.

Following established qualitative SLR guidelines and prioritising rigor (Paul & Barari, 2022), we included peer-reviewed English-language articles from journals indexed in Web of Science or Scopus, supplemented by EBSCO to ensure strong coverage of the social sciences. To capture the field from multiple angles, we conducted two separate searches using the terms “resilien\*” and “vulnerab\*” combined with keywords related to information disorders. At this stage, we applied only broad exclusions, omitting fields clearly outside social sciences, information, and communication to avoid missing potentially relevant work (see Annex 2, 3 for the details).

This search yielded the following results (see Figure 1).



For the EBSCO results, where field-specific filtering was not possible, we manually selected items relevant to information disorders, yielding 378 articles for “resilien\*” and 109 for “vulnerab\*.”

All retrieved items were then imported into the Rayyan platform (15,537 for “resilien\*” and 15,162 for “vulnerab\*”). After automatic duplicate detection at a 95% similarity threshold and manual verification, the datasets were reduced to 11,518 and 11,113 items, respectively.

We next conducted an abstract screening to remove articles unrelated to resilience or vulnerability in the information and communication domain. Following the approach of Loecherbach et al. (2020), we excluded studies from other fields that use similar terminology but address different conceptual problems. While subjective judgement is inherent to SLRs, the interdisciplinary background of our international team strengthens the reliability and replicability of the selection.

As “resilience” and “vulnerability” generate large cross-disciplinary datasets, we applied structured exclusion criteria to ensure conceptual relevance to information disorders. This step is standard in domain-focused SLRs to reduce false positives arising from overlapping terminology. A full list of excluded subject areas is available upon request. After this screening, 226 “resilien\*” items and 279 “vulnerab\*” items remained.

These sets were merged, with 12 duplicates removed, resulting in 493 articles. Each was independently reviewed by two scholars, and items were excluded only when both reviewers agreed they did not meet the predefined criteria (see Annex 2). The final systematic literature review includes 134 peer-reviewed English-language articles directly addressing resilience and vulnerability to information disorders within the communication field (Annex 1).

## RESULTS

The following section presents the results of our SLR, categorizing the factors across three levels.

### MACRO-LEVEL: CONTEXTUAL FACTORS

For the purposes of the model, we largely draw on the factors identified by Humprecht et al. (2020), which we consider seminal. Since the focus of the SLR extends beyond online disinformation, we have incorporated additional factors into the analysis.

One group of macro-level factors relates to the political environment. Humprecht et al. (2020) measure levels of *political polarization* and *populist communication*, which are conceptually interconnected. Some scholars associate political polarization with *social inequality*, which fosters conflict, damages the information

climate, and exacerbates divisions between elites and the public, as well as within society itself, creating fertile ground for the spread of misleading information (Bargaoanu & Radu, 2018; Loos et al., 2018; Nguyễn et al., 2023; Pottle, 2022; Scheffer et al., 2022). Freedman et al. (2021) also argue that greater *societal equality* promotes solidarity, making it more difficult for information disorders to destabilize society.

Political polarization intensifies during *electoral processes* (Badrinathan, 2021; Filipec, 2019), *through the interventions by external actors* (Bjola & Papadakis, 2020; Cook, 2022; Disha et al., 2023; Dolan, 2022; Manwaring & Holloway, 2023; Rosca, 2018), and *during crises* such as the COVID-19 pandemic (Dunleavy et al., 2022; Vériter et al., 2020).

Humprecht et al. (2020) also emphasize media-related factors, such as *trust in media*, the *strength of public service media*, and *audience fragmentation*. These factors interact with the political environment (e.g., high levels of populism can undermine traditional media credibility and general media trust) and may either bolster or undermine resilience to information disorders (yet the authors note about the possible contradictory effects, considering the exposure to disinformation and its sharing).

Other media-related factors influencing resilience include *the quality of media legislation* aimed at preventing disorders (Filipec, 2019; Rosca, 2018; Vériter et al., 2020), *media market monopolization* (Lebid et al., 2021; Rosca, 2018), *the role of media literacy education and critical thinking* in society (Filipec, 2019; McDougall & Rega, 2022), *the professionalism and training of media and journalism professionals* (Disha & Rustemi, 2022; Rosca, 2018), and the *status (decline or development) of the mainstream media*, including at the local level (Jerónimo & Esparza, 2022).

Trust plays a crucial role in both media and political environments, shaping how individuals engage with information; as McDougall (2019) notes, it is “a key discursive marker” in media literacy. Low trust creates openings for malicious actors and increases vulnerability to disinformation (Bjola & Papadakis, 2020; Disha & Rustemi, 2022; Reeves, 2022; Rožukalne et al., 2022; Wagnsson, 2020), and can prompt individuals to seek negative content about actors they distrust (Klebba & Winter, 2023), while higher trust in news media reduces exposure (Boulianne et al., 2022). Yet excessive trust also carries risks: uncritical acceptance of information heightens susceptibility to misleading content (Collado et al., 2020; Zimmerman et al., 2022) and rumours (Indu & Thampi, 2021), reinforced by truth bias – the tendency to assume claims are true (Claudia, 2022; Drotner, 2020; Deinla et al., 2022). Group-based trust further weakens scrutiny in hostile environments (Reeves, 2022), and longstanding conformity-based trust patterns, established as early as the Neolithic era (Walsh, 2021) may increase vulnerability. Context matters: trust in science can reduce susceptibility

to COVID-19 disinformation (Roozenbeek et al., 2020) but can also heighten receptivity to pseudo-science (Albarracín, 2022; O'Brien et al., 2021).

In summary, macro-level factors are about the context in which the information exists. Moving on to the meso-level, we focus on the discursive practices and patterns, examining *how* information is produced, shared, and consumed.

## MESO-LEVEL: CHARACTERISTICS OF THE ENVIRONMENT

The meso-level factors relate to the characteristics of the information itself and how it is conveyed and disseminated.

The model by Humprecht et al. (2020) highlights the distinct role of social media alongside political and traditional media factors. Because our framework treats discursive practices as a separate level of analysis, we place social media influences at the meso-level. This is particularly relevant in democracies, where media pluralism means that neither traditional nor digital platforms dominate individuals' media diets.

Social media significantly accelerates the spread of information disorders. Humprecht et al. (2021, 2023) highlight social media market size, the volume of malicious content, and repeated exposure to disinformation. Boulianne et al. (2022) note that higher social media use correlates with increased awareness, exposure to, and sharing of misleading content. While greater access to information helps individuals find useful content, it also increases exposure to misleading information (Pérez-Escoda, 2022). These factors contribute significantly to information disorders, extending beyond social media to mainstream media.

Social media platforms, with weaker gatekeeping and lower filtering capabilities, often allow misleading content to go undetected (Badrinathan, 2021; Christiano, 2022; Puebla-Martínez et al., 2021; Yan & Pan, 2023). It happens due to the overwhelming volume of information, which hampers filtering processes (Kirby et al., 2018; Yang & Tian, 2021; Zimmerman et al., 2022) and distracts consumers (Fritts & Cabrera, 2022; Kozyreva et al., 2020). Even a consideration of sharing disinformation can reduce the resilience of individuals to its content (Epstein et al., 2023).

As the "price" of sharing is now lower, the speed of information flow increases (Salvi et al., 2021; Vériter et al., 2020), and misleading content often spreads faster than accurate information (Filipec, 2019; Kyza et al., 2020; et al., 2021). This speed is driven by the desire for novelty, sensation, or entertainment (Caled & Silva, 2022; Kozyreva et al., 2020), and by monetization (Fritts & Cabrera, 2022; Nguyễn et al., 2023). Rapid dissemination reduces the effectiveness of interventions, as disinformation often goes viral before it can be debunked (Stein et al., 2023), and the combination of volume and speed encourages "vertical

reading” (Tripodi et al., 2023) – quick, surface-level processing that amplifies emotional responses and susceptibility to influence (Claudia, 2022; Christiano, 2022; Kozyreva et al., 2020; Petukhov & Chuprakova, 2014; Reeves, 2022). Due to the perceived closeness and immediacy of social media, people may also tend to over-rely on it as an information source, often without engaging in sufficient fact-checking (Caled & Silva, 2022; Zimmerman et al., 2022), which exacerbates the above-mentioned issue of excessive trust.

The repetitive exposure to information, an attribute of social media, has been discussed as far as since the classic studies of Lasswell. Repetitive exposure fosters the creation of echo chambers (Caled & Silva, 2022; Deinla et al., 2022; Di Mascio et al., 2021; Greer et al., 2022), reinforcing what is known as the “*illusory truth effect*”, where repeated statements are perceived as true regardless of their veracity (Loos et al., 2018; Millar, 2022). Another feature of that is the echo-chamber, a place of *continued influence*. Even after disinformation is debunked, it often persists in memory, sometimes more so than the source of the information itself (Millar, 2022; Mlejnková, 2022), especially in online spaces (Millar, 2022; Yang & Tian, 2021).

There are technological advancements that are making information disorders more “efficient”: *algorithmization* of content, which allows for highly targeted dissemination, reaching selective groups (Bjola & Papadakis, 2020; Christiano, 2022; Kertysova, 2018; Humprecht et al., 2020; Mlejnková, 2022), *use of bots and trolls*, or *AI-driven solutions* such as deepfakes, which simplify the information production (Bjola & Papadakis, 2020; Humprecht et al., 2020; Miyamoto, 2021).

Other features making information disorders more believable, include the information being emotionally charged, which contributes to the radicalization (Bjola & Papadakis, 2020), confusing narrative, which creates a sense of frustration (Nagler et al., 2023), and well-elaborated misleading content, which is perceived as more believable (Greer, et al., 2022).

These practices demonstrate how the content and structure of information disorders influence the public and its perception. However, understanding the full scope of resilience also requires examining how individuals process this information.

## **MICRO-LEVEL: INDIVIDUAL CHARACTERISTICS**

Demographic characteristics such as age, education, and gender may appear to be straightforward predictors of resilience or vulnerability. However, although several studies address these factors, we chose not to adopt a strictly demographic approach. Demographics alone do not capture the complexity of individual variability, and generalizations lead to risk oversimplification. Demographic groups

are not homogeneous (Loos et al., 2018; Moussa et al., 2022), and cross-country studies show substantial contextual variation.

Findings on education, for example, are mixed: many studies report a positive correlation between higher education and resilience (Badrinathan, 2021; Golob et al., 2021; Lai et al., 2020; Rodríguez-Pérez & Canel, 2023; Seo et al., 2021), while others find little or no effect (Boulianne et al., 2022; Claudia, 2022).

Similarly, the role of gender is inconsistent – while Boulianne et al. (2022) argue that being female is rarely significant in predicting awareness of, exposure to, and sharing of misinformation, Rodríguez-Pérez & Canel (2023) suggest that women may show weaker resilience. Golob et al. (2021) suggest that despite higher meta-reflexivity, women may have fewer opportunities to fact-check content due to domestic responsibilities.

Age also presents mixed results. Older adults having higher information literacy and lower trust in mainstream media are more mentioned as more affected by fake news (Anspach & Carlson (2022), while younger people may be more vulnerable due to greater exposure to information (Craig & Vijaykumar, 2023; Loos et al., 2018; Miyamoto, 2021). Increased exposure can worsen attitudes toward political institutions (Stankutė-Søsted, 2019) and make younger people more likely to share disinformation (Deinla et al., 2022; Greer et al., 2022; Jo et al., 2022). Conversely, older adults may overestimate their immunity to disinformation, despite weaker media literacy (Boulianne et al., 2022; Claudia, 2022; Golob et al., 2021; Kozyreva et al., 2020; Miyamoto, 2021; Rodríguez-Pérez & Canel, 2023; Moore & Hancock, 2022; Zainab et al., 2022).

Because demographic characteristics rarely act independently and instead intersect with other social factors, we do not treat them as standalone predictors. Our micro-level analysis focuses on individual traits that shape resilience or vulnerability to information disorders, including information-processing capacities, perceptual and evaluative biases, affective dispositions, and value orientations.

The first and most widely discussed group – *information-processing capacities* – can be linked to media and information literacy, though we treat it as a broader construct. It encompasses both cognitive skills and knowledge-based dispositions, forming a coherent set of practices that determine an individual's ability to process information effectively.

*Motivated reasoning (confirmation bias)* leads individuals to seek information that reinforces their prior attitudes (Caled & Silva, 2022; Collado et al., 2020; Humprecht et al., 2023; Klebba & Winter, 2023; Levine, 2022; Millar, 2022; Pantazi et al., 2021; Pehlivanoglu et al., 2022; Pérez-Escoda, 2022; Scherer & Pennycook, 2020; Yan & Pan, 2023). It is often driven by cognitive rigidity and binary thinking – core components of socio-cognitive polarization (Klebba & Winter, 2023; Salve et al., 2021). Experiments show that exposure to diverse

ideological content improves the ability to detect disinformation while ideologically segregated environments reduce it (Stein et al., 2023).

Conversely, *analytical reasoning and critical thinking* strengthen resilience (Bjola & Papadakis, 2020). Epistemic humility supports critical evaluation (Billingsley & Heyes, 2023), and analytical skills improve information processing (Rodríguez-Pérez & Canel, 2023). Critical engagement with media fosters scepticism and detection of manipulative structures (Olariu, 2022; Pehlivanoglu et al., 2022) and encourages fact-checking (Golob et al., 2021; Yan & Pan, 2023). Political knowledge may also enhance resilience (Mader et al., 2022), though findings remain mixed (Nyhan & Zeitzoff, 2018).

*Perceptual and evaluative biases* also undermine resilience. Excessive *self-confidence* creates a false sense of immunity to manipulation (Benková, 2019; Manwaring & Holloway, 2023; McDougall, 2019; Pérez-Escoda, 2022; Rodríguez-Pérez & Canel, 2023), while third-person perception – the belief that others are more vulnerable than oneself – similarly distorts risk assessment (Altay & Acerbi, 2023; Loos et al., 2018; van der Meer et al., 2023; Yang & Tian, 2021). This effect is amplified by social media use (Yang & Tian, 2021) and mobile news consumption (Liu & Huang, 2020).

There are factors that, although do not necessarily affect all individuals in the same way (Pierre, 2020), may hinder the resilience to information disorders: for instance, *paranormal beliefs/magical thinking* (Blanco et al., 2015; March & Springer, 2019), or *conspiracy beliefs* (Mader et al., 2022).

*Feelings and emotions*, though short-lived, significantly shape how individuals engage with information; affective dispositions therefore matter. Therefore, the affective dispositions matter. *Fear and anxiety* limit rational perception (Liu & Huang, 2020; Yang & Tian, 2021), pushing individuals toward information-seeking behaviour and spreading any information they come across (Salvi et al., 2021), which makes them more vulnerable to phishing attacks (Nugraha et al., 2020). The third-person effect is also used as a coping mechanism to manage anxiety (Liu & Huang, 2020). Other factors include *traumatic experiences* (Nguyễn et al., 2023), *high levels of neuroticism or extraversion* (Lai et al., 2020), such personality traits as *Machiavellianism* (March & Springer, 2019), or having *schizotypal, paranoid, or histrionic* personality traits (Escolà-Gascón et al., 2023),

The *value orientations* that can mediate exposure and reaction to information disorders are the political, ideological, or other group-based identities that frame the interpretation.

*Group identity* plays a crucial role in shaping the above-described motivated reasoning. The social congruence in disinformation perception occurs when individuals accept messages aligned with beliefs shared by their social networks, leading to selective exposure (Levine, 2022), encouraging dissatisfied information consumers to seek alternative sources that push specific agendas (Mlejnková,

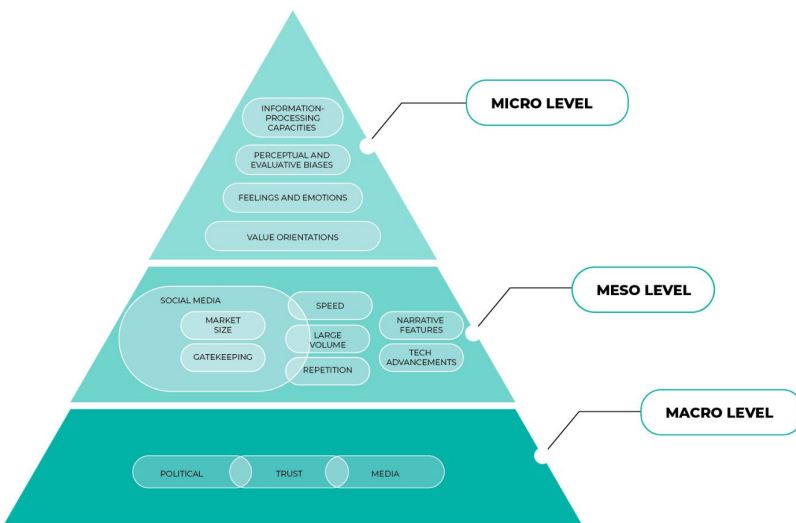
2022). When disinformation is linked to one’s social group, perceived affiliation further increases vulnerability (Bost et al., 2010; Seo et al., 2021).

Vulnerable groups, such as *counterpublics*, with oppositional identities and discourses, are central to understanding resilience to information disorders. They function as parallel discursive spaces where marginalized or oppositional groups construct and amplify alternative narratives that challenge mainstream interpretations (Bjola & Papadakis, 2020). Krishna (2021) writes about the *lacuna publics* – knowledge-deficient, extreme activist groups whose radical views and limited factual grounding make them particularly susceptible to disinformation.

Political attitudes also influence vulnerability. This may stem from strong partisan attachment (Bragarnich, 2022; Disha et al., 2023; Disha & Rustemi, 2022; Kozyreva et al., 2020) or identification with specific parties or leaders (Clementson, 2018). Ideological beliefs shape how macro-level factors affect individuals (Boulianne et al., 2022), and several studies find that right-wing orientations are associated with greater susceptibility to disinformation – through biased information selection (Deinla et al., 2022; Klebba & Winter, 2023; Rodríguez-Pérez & Canel, 2023), scepticism toward fact-checking (Çömlekçi, 2022; Lyons et al., 2020), or reduced concern about disinformation (Rodríguez-Virgili et al., 2021). However, this relationship is not universal: some research finds no consistent ideological effect (Altay et al., 2023), and Baptista & Gradim (2022) argue that motivated reasoning occurs across the political spectrum.

Also, as a result, there has been an effort to group the factors of vulnerability listed above in a three-dimensional model (see Figure 2).

Figure 2. Factors of Vulnerability/Resilience to Information Disorders



## SOCIAL PRACTICES OF RESILIENCE TO INFORMATION DISORDERS

Resilience emerges from the interaction of multi-level dynamics. Macro-level structures – political regimes, regulations, and media – shape information flows while continuously evolving through societal action. At the meso-level, changing modes of information circulation can either strengthen resilience or amplify vulnerabilities. Micro-level resilience is reflected in individual habits and patterns, yet these are shaped by the surrounding environment; even well-equipped individuals are influenced by social norms.

The choice of strategy for addressing information disorders is determined by context, resources, and vulnerable groups targeted by the interventions (Janmohamed et al., 2021; Klebba & Winter, 2023; Mader et al., 2022; Melo-Pfeifer & Gertz, 2022).

The fundamental recommendation for sustaining resilience is using the *proactive approach* – acting in advance to prevent the spread of disinformation, for instance through sustained exposure to counterevidence (Scheffer et al., 2022). It may take the form of inoculation, or prebunking rather than debunking (Kozyreva et al., 2022; Roozenbeek et al., 2022), to equip individuals with reliable sources, introduce well-crafted facts, and provide alternative narratives instead of merely refuting false claims (Bjola & Papadakis, 2020). It allows incorporating warning messages that trigger threat perception and is particularly effective when individuals are actively engaged in generating their own counterarguments (Habro et al., 2020; Lewandowsky & Van Der Linden, 2021; Roozenbeek et al., 2022). *Participatory practices* are useful in general, as content co-creation also improves mental health (Bruinenberg et al., 2021) which allows people to integrate knowledge into daily activities (Drotner (2020), decreases polarization and established common ground (Leurs et al., 2018).

The macro-level efforts are accomplished through the *regulatory and policy-based instruments* that address disinformation through the rule of law, such as banning the sources of disinformation (Albarracín, 2022; Hall, 2017). While some perspectives suggest that focusing solely on preventing exposure is not effective, and that resilience should instead concentrate on minimizing the impact of information disorders (Boulianne et al., 2022), we do not witness an academic consensus on the “unnecessity” of such interventions. These practices remain reasonable, especially in situations of crises, such as war, pandemics, or the public’s low capacity for critical information analysis (Golob et al., 2021).

The *cooperative practices* include citizen-led initiatives (Hall, 2017), or government-established anti-disinformation bodies and regulators (Lebid et al., 2021; Rosca, 2018). The joint efforts of multiple actors is essential to achieve full potential (Buzzanell, 2010; Rosca, 2018). Cooperation takes on the forms of promoting justice, equality, and fairness, fostering an ethos of inquiry in society (Pottle, 2022), addressing divisions between groups through dialogue (Nguyễn et al.,

2023), enabling diverse representation to address injustice (Christiano, 2022), or fostering a motivated interest in civic affairs (Golob et al., 2021; Filipec, 2019).

One challenge is reaching *vulnerable groups* who are mistrustful of government, science, and media. Engaging them requires identifying relatable role models from different social groups who can resonate with these communities (Rožukalne et al., 2021). Building trust can also involve bringing in individuals with shared identities (Reeves, 2022) or offering information in the native languages of minority communities (Nguyễn et al., 2023; Rosca, 2018). Crowdsourcing, using a “wisdom of crowds”, can serve as an effective tool for fact-checking through applications where users assess the accuracy of information (Claudia, 2022). There are limitations related to these groups: while fact-checking is a widely used tool to combat information disorders (Caled & Silva, 2022; Claudia, 2022; Çömlekçi, 2022; Fritts & Cabrera, 2022; Rožukalne et al., 2021; Rodríguez-Pérez & Canel, 2022; Yang & Tian, 2021), some studies suggest that if scepticism is linked to low trust (Reeves, 2022), strong pre-existing beliefs (Kyza et al., 2020; Millar, 2022), or ideological biases (Fritts & Cabrera, 2022; Lyons et al., 2020), fact-checking can reinforce, rather than diminish, those beliefs.

When discussing citizen engagement in resilience to information disorders, *educational practices* are closely linked to cognitive resilience, emphasizing the development of attitudes rather than merely providing information. These approaches focus on “teaching to fish” rather than “giving a fish” (McDougall, 2019), fostering self-organization, adaptability, trust development, and an emphasis on education (Romanova et al., 2020).

Starting from early education, media and information literacy enhances the individuals’ ability to respond to manipulative tactics (Christiano, 2022; De Leyn et al., 2022; Dumitru, 2020; Frolova et al., 2022), raise awareness of vulnerabilities in distinguishing truth from falsehood (Rodríguez-Pérez & Canel, 2023), address biases, and promote critical content evaluation (Caled & Silva, 2022). They also encourage values that diminish the impact of malicious actors (Bjola & Papadakis, 2020), empowering individuals to make informed decisions and take active roles in society (Golob et al., 2021; McDougall, 2019).

For media and information literacy to be effective, it must be integrated into the general curriculum and reflect real-world contexts (Burns et al., 2023; Golob et al., 2021; McDougall, 2019; Moussa et al., 2022). Programs should adopt a multifaceted approach, including emotional resilience, behavioral vigilance, and cognitive skills (Nugraha et al., 2020). These efforts should extend beyond younger generations and be tailored to diverse audiences (Lee, 2018; Loos et al., 2018; McDougall, 2019; Pérez-Escoda, 2022; Yang & Tian, 2021). The backfire effect remains a potential challenge – while people are vulnerable to misleading content, they can also be resistant to accurate information or corrections (Pantazi et al., 2021) – in the process of training some people may increase distrust in both

false and truthful news, leading to misidentification of true information as false (Moore & Hancock, 2022).

Finally, the development of *high-quality journalism and media* is another crucial component (Caled & Silva, 2022; Vériter et al., 2020; Yang & Tian, 2021). Journalism reinforces its gatekeeping role to better manage the spread of “deviant information” (Hopp & Ferrucci, 2020). This responsibility underscores the need for intermedia cooperation, interaction, and experience exchange among journalists and media outlets (Çömlekçi, 2022; Golob et al., 2021; Jerónimo & Esparza, 2022; Kyza et al., 2020; McDougall, 2019; Rosca, 2018; Tan, 2022).

## DISCUSSION AND FUTURE OUTLOOK

Considering factors of resilience and vulnerability to information disorders, we developed a three-dimensional model addressing macro, meso and micro levels.

The model is not claimed to be holistic or universally comprehensive in systematizing factors of resilience or vulnerability to information disorders. Nevertheless, this model would facilitate further efforts in framing and analysing resilience to information disorders in the social sciences, offering an overview of the measures used to sustain such resilience.

Building on the findings of this review, several avenues for future research emerge. First, the three-dimensional model requires empirical validation: future studies should reveal which of these factors exert the strongest predictive weight in real-world settings. Second, cross-national research is needed to determine how different social and political environments condition resilience and vulnerability, and which indicators are transferable across contexts. Third, experimental designs could assess the durability of specific interventions and evaluate how these tools operate within different population groups. Addressing these questions would allow the model presented in this review to evolve into an analytical toolkit for communication research and policy design.

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## ANNEX 1. SOURCES USED FOR THE SYSTEMATIC LITERATURE REVIEW

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## ANNEX 2. SEARCH PROTOCOL AND INCLUSION/EXCLUSION CRITERIA

- Timeline: from 2010 to May 2023.
- Sources: peer-reviewed articles in English within the Web of Science, Scopus, and EBSCO databases. Articles from fields unrelated to social science were excluded.

### “RESILIENCE” SEARCH

- A total of 9,035 articles were found in Web of Science, 6,124 in Scopus, and 12,312 in EBSCO.
- For EBSCO, manual selection was further applied to include only articles related to the information and communication field within the context of media literacy, disinformation, and other forms of deviant information. This narrowed it down to 378 articles in the dataset.
- 15,537 articles uploaded to Rayyan, where automatic duplicate detection was applied with a threshold of 95% similarity.
- Manual removal of duplicates resulted in 4,019 duplicates removed and the identification of 2 non-duplicates, leaving 11,518 articles for further analysis.
- 10,870 were deemed irrelevant to the topic of resilience to disinformation and other information disorders, leaving 226 articles for further study.
- Articles were excluded if their subject classification belonged to domains where resilience and vulnerability refer to physical, biological, ecological, medical, or engineering processes rather than information flows, communication practices, or socio-political dynamics. Thus, records from engineering, computer science hardware/software, environmental and life sciences, medicine and clinical research, physics, chemistry, agriculture, and related technical fields were filtered out.

### “VULNERABILITY” SEARCH

- A total of 8,012 articles were found in Web of Science, 7,041 in Scopus, and 20,721 in EBSCO.
- For EBSCO to include only articles related to the information and communication field within the context of media literacy, disinformation, and other forms of deviant information, resulting in 109 articles in the dataset.
- 15,162 articles were uploaded to Rayyan, where automatic duplicate detection was applied with a 95% similarity threshold.

- Manual removal of duplicates resulted in 4,007 duplicates removed and the identification of 2 non-duplicates, leaving 11,113 articles for further analysis.
- 10,834 were deemed irrelevant to the topic of resilience to disinformation and other information disorders, leaving 279 articles for further study.
- Articles were excluded if their subject classification belonged to domains where resilience and vulnerability refer to physical, biological, ecological, medical, or engineering processes rather than information flows, communication practices, or socio-political dynamics. Thus, records from engineering, computer science hardware/software, environmental and life sciences, medicine and clinical research, physics, chemistry, agriculture, and related technical fields were filtered out.

#### MERGING THE SUBSETS AND REMOVING THE IRRELEVANT ARTICLES

- 505 articles were placed in the dataset.
- 12 removed as duplicates (present in both the “resilience” and “vulnerability” datasets).
- 493 articles in the dataset subsequently studied by the research team.
- The aim was to focus on two sets of articles:
- Vulnerabilities – articles that describe and categorize factors contributing to susceptibility to information disorders.
- Resilience – articles that explore measures or social practices aimed at bolstering resistance against information disorders.

To achieve that, each article was reviewed by two scholars to make a decision, and if both independently decided to exclude it based on certain criteria, the article was excluded.

- the items are not from peer-reviewed journals (16);
- language is other than English (7);
- not accessible (2);
- different focus: education, digital skills and digital divide, personal development with no impact on resilience to information disorders (87);
- different focus: articles on the mental health issues with no impact on resilience to information disorders (58);
- different focus: health care communication, attitude to vaccination, health literacy with no impact on resilience to information disorders (39);
- different focus: political and security issues with no impact on resilience to information disorders (39);

- different focus: technological issues with no impact on resilience to information disorders (34);
- different focus: economics and marketing (19);
- different focus: philosophical and ethical issues with no impact on resilience to information disorders (15);
- different focus: journalism profession and personality with no impact on resilience to information disorders (14);
- too narrow: electoral risks (7), censorship (6), natural science (3), popular culture (1), online terrorism (3), comparison of the platforms (2), legal context for deep fakes (1), critique in social media (1), experts' map (1), questionable content (1), scepticism to the science (1), detection of disinformation (1), scam studies (1).

### ANNEX 3. KEY WORDS FOR THE SEARCH

- “resil\*” OR “vulnerab\*”

#### AND

- disinformation
- misinformation
- malinformation
- propagand\*
- communicat\*
- narrative\*
- media
- “deviant information”
- “information disorder\*”
- hoax\*
- rumor\*
- rumour\*
- fals\*
- “false information”
- “false claim\*”
- “false news”
- “fake information”
- “fake claim\*”
- “fake news”
- “artificial fact\*”
- manipulat\*
- deceiv\*
- decept\*
- obfuscat\*
- distort\*
- disrupt\*
- “information litera\*”
- “information educat\*”
- “information skill\*”
- “media litera\*”
- “media educat\*”
- “media skill\*”
- “digital\* litera\*”
- “digital educat\*”
- “digital skill\*”
- “critical thinking”
- “critical skill\*”
- “fact check\*”
- “fact-check\*”
- “information threat\*”
- “media threat\*”
- “digital threat\*”
- “information risk\*”
- “media risk\*”
- “digital risk\*”
- “information challeng\*”
- “media challeng\*”
- “digital challeng\*”