Introducing the Epistemic Vulnerability Index: A Comparative Study of the Health of News Environments in 20 Western Democracies

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Abstract

Problems facing democracy around the world are multidimensional. This paper studies the less theorized epistemic challenges of an information-saturated world and investigates the degradation of news environments and its impact on democratic health. I introduce the Epistemic Vulnerability index as a measurable indicator to capture this phenomenon in a comparative manner. Using a custom dataset and three OLS models, I hypothesize and test the relationship between epistemic vulnerability and structural characteristics of political and media systems, such as affective and ideological polarization, party system size, strength of populism, audience polarization and duplication, and public broadcasting (PBS) viewership. The findings reveal that Scandinavian countries exhibit greater epistemic resilience, while the US, Spain, and Eastern Europe are more vulnerable. The study offers strong evidence that populism and newspaper parallelism contribute to epistemic vulnerability, and suggest that ideological and affective polarization are also important predictors. Conversely, PBS viewership makes news environments more resilient.

Keywords: political news; media systems; disinformation; trust in the media; democratic health

Introduction

Problems with the state of democracy are multidimensional, reflecting intersections and interactions among several phenomena. Among these are the increasingly tumultuous relationship between citizens of many countries and their own democratic institutions, the resurgence of far right and populist voices, the various forms of partisan and societal polarization, and the ongoing erosion of democratic norms. Practices that erode broad public confidence in institutions and put
into question the legitimacy or fairness of the electoral process have received much scholarly attention.

There is an important dimension that is frequently the subject of comment and study, but which is less well theorized than problems in norms, polarization, and institutional practices. This involves the epistemic challenges of our information-saturated world. These challenges include problems in news quality and journalistic norms, exposure to disinformation and conspiracy theories, growing distrust towards the news media, and individual feelings of disorientation or confusion regarding the nature of facts and falsehoods.

Scholarly understanding of this epistemic dimension is yet incomplete and patchy. Many studies have focused on one or another element, such as exposure to disinformation online. While the flow of falsehoods through social media is part of the problem, there is more to the picture. Professional news media are important in their own right and in conjunction with social media, since journalists can debunk falsehoods, promote them, or simply ignore them. Professional news media also generally enjoy a reputation of greater reliability than online media. An important line of work in this area consists in identifying the predictors for the growing distrust towards the news media, perceptions of exposure to disinformation, and perceptions of news quality.

Research has tended to treat these concepts as separate but related: as studies of news, or of social media, or of disinformation, or of trust in information. What connects them is epistemic in nature. Perceived exposure to disinformation, distrust in the professional news media, and feelings of disorientation regarding which news messages are true or false all signal the level of degradation of a news environment. In this paper, I take on the problem of developing a
measurable concept that can capture this three-part epistemic phenomenon, which I call “epistemic vulnerability.”

I approach this task from a comparative perspective. Understanding these problems comparatively enables exploitation of what is only context in single-country studies: how the structure of a country’s media and political systems affects epistemic vulnerability across the whole polity. Methodological hurdles associated with studying relationships between variables across levels of analysis, and doing so cross-nationally, are the main empirical challenges I take on here.

First, I introduce the Epistemic Vulnerability (EV) index to measure the overall level of degradation of a news environment. This additive index relies on three components derived from individual survey responses: average perceived exposure to disinformation, average level of distrust towards the professional news media, and average feelings of disorientation, i.e., individuals’ perceived ability to distinguish falsehoods from facts. I ask the following questions. How do levels of epistemic vulnerability vary across Western democracies? What is the relationship between the structure of political and media systems and levels of epistemic vulnerability?

Using a custom country-level dataset and three OLS regression models, I test whether a country’s level of epistemic vulnerability is predicted by the size of its party system, levels of ideological and affective polarization, the electoral strength of populist parties, press-party parallelism, and public television viewership. The results show that Scandinavian countries are more epistemically resilient while the United States, Spain, and Eastern European countries are more epistemically vulnerable. I also find that public television viewership is strongly and inversely related to epistemic vulnerability, and I offer empirical evidence that newspaper parallelism and populism are linked to the degradation of news environments. Finally, the models offer some
support for the notion that ideological and affective polarization have a bearing on levels of epistemically vulnerable.

**Integrating the Literature on Epistemic Dimensions**

*Exposure to Disinformation & Its Limits*

The spread of disinformation is the most obvious dimension of the epistemic challenge facing modern democratic societies. From many perspectives, a healthy public sphere requires that citizens have access to a shared set of facts. In consequence, the level of exposure to falsehoods is an essential indicator of the health of news environments. Disinformation travels faster, further, is more easily recalled than truthful messages, has lingering effects that are resistant to correction, and impedes problem-solving (Ecker et al., 2022; Thorson, 2016; Vosoughi et al., 2018). Frequent exposure can also lead to illusory truth effects (Pillai & Fazio, 2021) and is predictive of phenomena that are corrosive to democracy such as distrust in institutions and experts, political polarization, populism, and ideological extremism.

Exposure to disinformation is notoriously difficult to measure due to confounds and problems with self-reporting that are difficult to account for outside of strictly controlled experimental designs. Several measures relying on different forms of data are in use, e.g., frequency of exposure, perceived exposure, actual exposure, or ratio of false versus true content. Accurate recall poses enormous problems for many survey measures, and findings are often contingent on domestic and temporal contexts. These difficulties have greatly limited the comparative literature on disinformation. A few studies focus on system-level resilience to online disinformation (Humphrechts et al., 2020) or its sharing (Humphrechts et al., 2021). These comparative reports are
useful, and they suggest that the structure of media systems and the political environment play a significant role in facilitating or impeding the spread of disinformation.

Yet, the problem of disinformation represents only one dimension of the epistemic challenge facing democracies. Citizens may or may not recognize false claims, and they may accept or reject messages in either case. Disinformation may also come from clearly identified sources, unidentified sources, or be more pervasive across sources and news brands. Source as well as content can elicit more or less motivated reasoning about messages. The epistemic implications of disinformation are contingent on all these parameters. In that way, public attitudes toward media systems are shaped by more considerations than just perceptions of news quality. A robust measure of epistemic vulnerability needs to consider the relationship the public has with the media system itself, and also their level of confidence in navigating the wealth of messages, both true and false, that circulate in the public sphere.

(Dis)Trust in the Media

Scholars of democracy generally agree that some degree of trust—in the political process, in institutions, and in one another—is a requirement for healthy democracy. Trust has been researched and debated extensively (for a thorough review, see Fawzi et al., 2021), but trust in the media remains under-conceptualized. The potential sources for distrust in the professional news media are numerous at the individual level, making inferences about the aggregate state of journalism or the health of a media system difficult. Trust is associated with many characteristics relating to audience attributes and perceived media performance (Livio & Cohen, 2018). Prominent among these are ideology (Gronke & Cook, 2007; Lee, 2010), political extremism (Stroud & Lee, 2013) and populist attitudes (Fawzi, 2019; Hanitzsch et al., 2018; Livio & Cohen, 2018).
Trust may also be confounded by individual news diets and discrepancies in the evaluation of individual outlets as opposed to the media in general (Arceneaux et al., 2012; Daniller et al., 2017), ideological selectivity in news consumption (Arceneaux et al., 2012), the ever-growing partisan and propaganda outlets, or trust in individual journalists versus media companies. Measures of trust are typically most valid and reliable when used to understand public perceptions of media systems as a whole (Kohring & Matthes, 2007).

Studies about democracy and democratic attitudes regularly include variants of institutional trust and trust in the media as indicators of a broader trust concept associated with the health of democracies. In comparison, most studies about news environments treat trust either as a predictor for some other behavior, as an outcome variable of its own, or seek to compare the evolution of trust across countries, thereby overlooking its value as an indicator of the fragility of news environments and the broader epistemic problem facing democracies (Hanitzsch et al., 2018).

Another way in which an improved conceptualization of trust in media is possible concerns news quality. Several studies treat perceptions of news quality and trust in the media as interchangeable (Fawzi et al., 2021). Thus, despite some evidence that both actual and perceived exposure to disinformation are associated with reduced trust in the news media and television news (Hameleers et al., 2022), little is known about their interaction. This begs the question of whether perception of news quality and trust in the media are equivalent concepts, or whether they capture different dimensions of a single epistemic problem. In line with third-person perception, individuals who distrust the news media may actually feel adequately sheltered from disinformation in their own lives. The source of distrust may be perceived ideological slant and the hostile media phenomenon—something a measure of exposure to disinformation would likely
not capture. No matter the source, lack of trust in the news media is toxic to democracy. From a normative standpoint, the role of the news media is to inform the public and to sanction that the information provided was verified or obtained following widely accepted journalistic norms. Distrust in the professional news media corrodes the epistemic foundation of politics.

**Going Beyond Disinformation and Distrust: Disorientation**

Disinformation and distrust in the media are related but distinct components of epistemic health. A third component is also necessary for a robust way to understand epistemic vulnerability across countries. This component addresses the internal mental state of citizens that is associated with their perceptions of what is happening externally to them – the flows of disinformation and the trustworthiness of news businesses. As citizens perceive the existence of true and false claims in circulation, and as they attend more or less to news businesses about which they have varying degrees of trust, they may vary in the extent to which they feel confident or disoriented. Some people could report frequent exposure to disinformation and low trust in the professional news media, but feel relatively confident in their own epistemic state for any of a number of reasons: high political sophistication, third-person perception, ego-defense mechanisms, or over-confidence associated with low political sophistication, as in the Dunning-Kruger effect. Some may react to perceptions of ubiquitous falsehoods and untrustworthy media with disorientation, but others exposed to reliable information from trustworthy sources may doubt it and experience disorientation nonetheless.

A robust measure of epistemic vulnerability should include people’s cognitive reactions to the state of news and disinformation. This idea is captured in “disorientation,” which refers to the condition in which citizens have lost the capacity to distinguish facts and falsehoods (Benkler
et al., 2018; Humprecht et al., 2020; Nielsen & Graves, 2017). Sixty-four percent of US adults say that false news stories cause “a great deal of confusion about the basic facts of current issues and events” (Barthel et al., 2016; Rainie et al., 2017, p. 2). Disorientation is not only measurable in surveys but also at the cognitive level. Reading false or inconsistent information has been shown to subsequently slow down cognitive processing of correct information (Jacovina et al., 2014; Rapp, 2008; Rapp & Salovich, 2018). While having basic knowledge about political institutions certainly helps engage in the public sphere, having what Lupia and McCubbins (1986) call “trusted speakers” who citizens can take cue from to understand day-to-day public affairs is arguably more useful. This should be the role of the professional news media. The fact that a large proportion of the population reports being skeptical of their own capacity to determine whether a news story is true or false in spite of the abundance of channels available is alarming, and it highlights the importance of understanding not only the state of disinformation and the state of news, but the state of people’s minds about their ability to comprehend politics accurately.

**Theoretical Links With Epistemic Vulnerability**

To my knowledge, no study has brought together the three dimensions of epistemic vulnerability into a single concept, or explored the relationship of this kind of comprehensive epistemic measure to other variables common in the comparative study of media and democracy. One of the challenges has been the difficulty moving from one level of analysis to another—partly because individual-level observations are usually extremely noisy. In terms of levels of analysis, the best way to understand epistemic vulnerability is as hybrid. By initially examining individual-level measures of the three components, one can compute country-level averages on each, and then
combine these additively into a single country-level measure of epistemic vulnerability. This allows theorizing and analyzing the relationship between country-level epistemic vulnerability and many important comparative measures, without being hindered by critical individual-level confounds.

The Political Environment

Polarization should be associated with epistemic vulnerability, as it is evidently predictive of the three dimensions the concept is built from. The dominant framework for studying polarization consists of distinguishing between ideological and affective forms. Many scholars agree that high polarization of both kinds makes a society more prone to experiencing epistemic failures (Allcott & Gentzkow, 2017; Benkler et al., 2018; Humprechts et al., 2020). A polarized environment exacerbates the contamination of the news environment with partisan propaganda, whether its dissemination seeks to advance ideological goals or to score points against a demonized adversary (Benkler et al., 2018). This should increase perceived exposure to disinformation, a good proportion of which may be caused by the hostile media phenomenon. Finally, citizens who find that the news they consume is polluted by slanted, polarized content may report feeling disoriented regarding the veracity of the news they receive and less trusting of the news media (Newman & Fletcher, 2017). This phenomenon may be especially true for those citizens most disengaged from partisan politics.

The second characteristic of political systems that should be associated with epistemic vulnerability is concomitant to the role of polarization: the size of party systems. A small party system clarifies ideological divides and encourages citizens to process the political environment in terms of simple in-group and out-group perceptions. Majoritarian two-party systems like the
US are fertile ground for party polarization (Layman et al., 2006; Prior, 2013) as they are more likely to offer citizens a clean and sharp cleavage between two distant ideological alternatives.

The third characteristic that should predict epistemic vulnerability is the strength of populist organizations. Populist rhetoric strips down political stories of their nuance, by conflating the factual and normative dimensions of political issues and boiling them down to a simple dichotomy between right and wrong (Rosenberg, 2022). Connections between populism and disinformation has been widely observed (Bennett & Livingston, 2018; Humprecht et al., 2020; Marwick & Lewis, 2017). By blurring the frontier between “claims of truth” and “claims of right,” populists redefine knowledge in terms of affective and normative evaluations—so long as these are sanctioned by the populist leader (Rosenberg, 2022, p. 11). In addition, populist rhetoric is based on a consistent denunciation of knowledge-producing bodies such as scientific institutions and the professional news media (Krange et al., 2021; Ross & Rivers, 2018; Schulz et al., 2018), and a paranoid worldview that encourages the promotion of various conspiracy theories (Bergman, 2018; Christner, 2022; Imhoff et al., 2022). Populism therefore likely contributes to the ambient distrust and disorientation felt by citizens, especially those most disengaged with politics, regarding the quality of the information they receive about public affairs.

The Structure of Media Systems

Recent studies converge on the key role of media systems in the dissemination of disinformation, trust, and perceptions of journalism quality. The first aspect of media systems is audience polarization, which is the ideological spread of news audiences within a media system (Fletcher et al., 2020). The concept can be interpreted as the system-level translation of patterns of selective exposure observed at the individual-level (Mangold & Scharkow, 2022). The more extreme
members of the public seek ideologically congenial outlets, the more news audiences will appear polarized at the system-level. Thus, highly polarized news audiences suggest that the media system provides citizens with access to identity-conforming content, which is detrimental to the overall quality of information (Benkler et al., 2018; Bennett & Iyengar, 2008; Van Aelst et al., 2017). This may in turn lead to low trust in the professional news media in general and an over-reliance on either pro-attitudinal outlets or alternative sources that may be even less reliable.

The second aspect of media systems that should be associated with epistemic vulnerability is audience duplication, also known by the inverse label of audience fragmentation. Audience duplication refers to the degree of overlap, or news sharing, across news audiences. It is the system-level translation of cross-cutting exposure at the individual level. Taken together, audience polarization and duplication reflect opportunity structures for selective exposure within a news environment, and the extent to which individuals choose to use those opportunities. More fragmented news audiences means that citizens are less exposed to challenging perspectives that may help them assess the quality of the news they consume (Fletcher & Nielsen, 2017; Shin et al., 2017). The result can be feelings of distrust and disorientation. Survey data show citizens now largely condition their trust in the media to the process of comparing information across sources (Newman & Fletcher, 2017, p. 16).

The third characteristic that should be associated with epistemic vulnerability is the relative weight of public broadcasting (PBS) in the news environment. Numerous studies demonstrate a strong positive correlation between a well-established PBS system and higher levels of political knowledge (Aalberg & Curran, 2012; Curran et al., 2009) as well as higher exposure to cross-cutting content (Aalberg et al., 2010; Castro-Herrero et al., 2019; Esser et al., 2012; Wessler & Rinke, 2014). Public broadcasters also exert an ‘ecological’ influence on private outlets
that leads to an increase in news quality across the entire news environment, an influence that Humprecht, Esser and van Aelst (2020, p. 10) call ‘market conditioning.’ This virtuous competition slows the dissemination of falsehoods, notably on television, and may contribute to improving trust in the news media; Tsfati and Ariely (2014) find a positive and significant effect of state ownership of press and television outlets on trust in the media in democratic societies.

Finally, the fourth characteristic of media systems that should matter for epistemic vulnerability is media-party parallelism: the extent that media outlets engage in policy advocacy and retain attachments to partisan organizations. Sometimes, parallelism includes a measure of how aware the public is of the political orientation of journalists. The concept is frequently disaggregated for television and print news. Theoretically, the perception that certain outlets are engaging in partisan advocacy should generate more distrust toward the news media in general. Surprisingly, Ariely (2015) finds a small positive correlation between media parallelism and media trust. However, Newman and Fletcher (2017) find that perceived bias in news media is largely cited by respondents as a justification for the decline in trust in the news media. Their respondents also attribute the blurring of facts and fiction to political advocacy in the media. Parallelism is also linked lower levels of cross-cutting exposure (Goldman & Mutz, 2011).

All of these considerations can be summarized in a set of seven hypotheses.

**H1**: Countries where ideological polarization is higher will exhibit higher levels of epistemic vulnerability.

**H2**: Countries where affective polarization is higher will exhibit higher levels of vulnerability.

**H3**: The effective number of parties in a given country is inversely correlated with levels of epistemic vulnerability.

**H4**: Epistemic vulnerability will be higher in countries where populist organizations are stronger.

**H5**: Audience polarization is correlated with epistemic vulnerability.
**H6:** Audience duplication is inversely correlated with epistemic vulnerability.

**H7:** Countries with larger PBS viewership will have lower levels of epistemic vulnerability.

**METHODS**

Testing these hypotheses required developing a custom multi-country dataset containing a range of country-level indicators. A list of the data sources used to build the custom dataset is included in the online appendix (see Appendix 2). Following is an overview of how each measure is built.

*The Epistemic Vulnerability Index*

I calculate each of 20 countries’ Epistemic Vulnerability (EV) score using questions about respondents’ perceived frequency of exposure to falsehoods, respondents’ distrust in the news media, and respondents’ feelings of disorientation, drawing on three survey datasets: Flash Eurobarometer 464, and American Trends Panels (ATP) W45 and W91 (combined N= 36,775). The three dimensions of the EV index are well correlated at the country level. Pearson’s correlation coefficients are displayed in Figure 1. Cronbach’s alpha was .81, indicating good internal reliability and suggesting that the dimensions are tapping into the same construct.

*Predictors*

*Affective Polarization*

I measure affective polarization as the average affective distance of out-parties from one’s in-party, using survey data from CSES modules III-V. For each respondent in each country, I sum up the distances between respondents’ in-party evaluation and evaluations for all the out-parties. It is important when summing up these distances to weight them by the share of the vote won by each party after discounting the vote share of the in-party. Failing to subtract the in-party from
the overall vote when weighting distances will underestimate the average distance between in-party and out-parties. Country scores are in the online appendix (see Appendix 3.A.).

**Ideological Polarization**

My measure of ideological polarization also relies on CSES modules III-V. For every country, I calculate the ideological center of gravity by taking the average position of all the parties on the left-right scale, weighted by the electoral size of each party. Then, for each party, I calculate its distance from the center of gravity by subtracting its left-right score from the latter. I then tally up all the squared distances of all the parties from the center of gravity, again weighted by the electoral size of each party. I used parliamentary elections for most countries and used presidential elections (first round when applicable) for presidential systems. Country scores and additional details regarding the measure can be found in the online appendix (see Appendix 3.B.).

**Effective Number of Parties**

This measure was originally proposed by Laakso and Taagepera (1979) and reflects the number of parties in a given election, weighted by their relative electoral size. Data for this variable come from the National-Level Party Systems dataset for the US, and WhoGoverns.eu for EU countries.

**Strength of Populism**

I estimate the strength of left and right-wing populist organizations in a given country using the vote share won by all populist parties on the left and on the right in the election closest to 2018. The data come primarily from the Timbro Authoritarian Populism (TAP) index, which is unfortunately limited to legislative elections. Populist movements being often highly personalized, one
can expect populist movements to perform better in more candidate-centered elections, e.g., presidential elections. Comparatively, party-centered elections might demobilize populist voters. For this reason, I calculate observations for presidential and semi-presidential systems (FR, PL, PT, RO) using presidential election results.

The US case require further consideration. US elections are inconsistent in their use of party primaries, and the participation of a populist candidate in one of the two parties’ primaries does not guarantee a place on the presidential ticket. I employ a hybrid, conservative approach that considers the share of the votes won by Bernie Sanders out of all the votes cast in the 2016 primaries of both parties combined with the share of the vote won by Donald Trump in the 2016 general election. The US data come from The Green Papers. A lengthier methodological discussion and country scores are included in the online appendix (see Appendices 4.A. and 4.B.).

**Audience Polarization (Cross-Platform)**

Audience polarization scores are calculated using survey data from the 2020 Reuters Digital News Report measuring individual respondents’ media usage in the week prior to the survey, as well as their self-placement on a 7-point ideology scale. For each country, I calculate the partisan lean of each outlet’s audience by taking the average position of its users on the left-right scale. The audience polarization score for a given country is then calculated as the standard deviation of all outlets’ left-right position, weighted by audience size, itself operationalized as the percentage of respondents having used the outlet in the past week.

**Audience Duplication (Cross-Platform)**

Audience duplication scores are calculated using survey data from the 2020 Reuters Digital News Report. The survey asks respondents about their news media consumption in the week
prior to the interview. I operationalize audience duplication as the network density score for a given country’s media system. This approach is based on Tukey’s (1977) and Luke’s (2015) five-number summary network analysis method. Density scores are comprised between 0 and 1 where 1 means the network is fully connected. The existence of links between outlets is determined using simple chi-square tests. To yield figures that can be compared cross-nationally, the number of outlets considered in each country must be the same as larger networks will reduce the relative weight of each node in the network. The survey only let Finnish respondents choose from 14 outlets. I therefore selected the 14 outlets with the largest weekly reach both online and offline in every country. The list of outlets considered for each country, along with both audience polarization and duplication country scores, can be found in the online appendix (see Appendices 5.A. and 5.B. for country scores and 8.A. through 8.J. for outlets).

Daily PBS Viewership

Measures of daily viewership of PBS come from the European Audiovisual Observatory Yearbook 2019/20. For the US, the data come from a custom survey I conducted with collaborators [name withheld] in which respondents were asked to say how often they use each of a list of news sources. Daily viewership scores are included in the online appendix (see Appendix 6).

Media-Party Parallelism

The data for media-party parallelism come from the European Media Systems Survey 2010. National experts rank the degree to which news outlets engage in policy advocacy, and the degree to which their coverage is influenced by a specific party. The variable is an aggregated score of the measures of the different outlets weighted by their readership. The measures are only
available for European countries; therefore media-party parallelism is not included in model 1, which features the US.

**Results**

I begin by considering country scores on the EV Index. The radar charts in Figure 1 depict overall EV score, ranked in ascending order, as well as the three constituent parts for each country. Scandinavian countries are the most epistemically resilient, while the US, Spain, and Eastern European countries are more epistemically vulnerable.

To test my hypotheses about how variation in EV is associated with the structure of political and media systems, I relied on OLS at the country level. Because populism can reasonably be conceptualized as a single concept or as distinct right-wing and left-wing versions, I ran separate models using each. Also, because I did not have a measure of media-party parallelism in the US comparable to that for other countries, I wanted to estimate models with and without the US. This led to a set of three models, as shown in Figure 2. Model 1 includes the US but not parallelism. Model 2 and 3 include parallelism but exclude the US, with Model 2 disaggregating left- and right-wing populism and Model 3 collapsing these together. I conducted thorough model diagnostics and found all three models to be BLUE (best linear unbiased estimator). Goodness-of-fit statistics show all three models explain a remarkable proportion of the variance, between 66 percent for Model 1 and 82 percent for Model 2. Because interpreting index scores in a substantive manner can be difficult, I discuss each predictor in terms of its effect on the EV country rankings. Scaled estimates from the three models are displayed in Figure 2. Regression tables are available in the online appendix (see Appendices 7.A. through 7.C.).
Figure 1. Internal Validity and EV Index Scores Ranked in Ascending Order

Perceived frequency of exposure to disinformation (country average)

α = .811

.463* Disorientation (country average) .489* Distrust in news media (country average) .814**

<table>
<thead>
<tr>
<th>Country</th>
<th>Disorientation</th>
<th>Distrust</th>
<th>Disinfo</th>
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<tr>
<td>Finland</td>
<td>-5.19 disorient</td>
<td>distrust</td>
<td>disinfo</td>
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<tr>
<td>Denmark</td>
<td>-4.72 disorient</td>
<td>distrust</td>
<td>disinfo</td>
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<td>distrust</td>
<td>disinfo</td>
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<td>disinfo</td>
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<td>-1.22 disorient</td>
<td>distrust</td>
<td>disinfo</td>
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<td>distrust</td>
<td>disinfo</td>
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<tr>
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<td>3.92 disorient</td>
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Note: dimensions are Z-standardized.

* correlation is significant at the 0.05 level (2-tailed)  ** correlation is significant at the 0.01 level (2-tailed)
Hypothesis 1 postulated that countries with high ideological polarization would experience higher levels of epistemic vulnerability. The three models provide only tentative support, with coefficients in the expected direction but not quite significant. With Ns of only 19 and 20, I interpret this as suggestive that ideological polarization and epistemic vulnerability move together. Consider the UK, which experiences very high levels of ideological polarization (ideopol=8.09). Model 2 predicts that, everything else constant, its EV score would decrease by 1.83, making it the fifth most epistemically resilient country (EV=−2.31) as opposed to its current eighth position (EV=−0.48) if the UK had the same level of ideological polarization as Ireland (ideopol=2.76). If its level of ideological polarization dropped down to Poland’s very low levels (ideopol=1.65), the UK would actually overtake the Netherlands as third most resilient country (EV=−2.68). This finding does not hold when the model does not control for parallelism (see Figure 2. Comparison of Scaled Estimates From Models 1, 2 and 3. Model 1: includes US, does not control for parallelism. Model 2: without US, controls for parallelism, separates left- and right-wing populism. Model 3: without US, controls for parallelism, collapses left and right-wing populism.)
Hypothesis 3 posited that levels of epistemic vulnerability would be inversely correlated with the effective number of parties in a given country. Model 1 finds that the larger the party-system, the more a country is epistemically resilient; the smaller the party-system, the more epistemically vulnerable the country becomes. Consider the US, which has an EV score of 2.47 and ranks as the fourth most epistemically vulnerable country. If the US had the same number of parties as the Netherlands (8.5), model 1 predicts that, ceteris paribus, the US would see its EV score go down to -0.39, becoming the twelfth most vulnerable country, just behind Romania (EV=-0.33) and ahead of the UK (EV=-0.48). However, this large effect is only marginally significant at the 0.1 level (p-value=0.063), which may be due to the small N. The effect also loses statistical significance when controlling for parallelism (see Model 2 and 3). Thus, the evidence to support hypothesis 3 is not very strong and requires further investigation.
Hypothesis 4 proposed that epistemic vulnerability would be higher in countries where populists are electorally stronger. The hypothesis is generally supported by the three models, though with nuances. Model 1 finds a substantial, positive effect of left-wing populism on epistemic vulnerability, significant at the 0.05 level, but no significant effect for right-wing populism. Controlling for parallelism, Model 2 finds a substantial positive effect of right-wing populism on epistemic vulnerability that is significant at the 0.05 level, but no significant effect for left-wing populism. Model 3, which collapses left- and right-wing populism into one variable, shows that for every additional percentage point of the vote earned by populists in a given country, its EV score increases by 0.044 (p=0.038). Consider further illustrations. The EU average vote share for populists in individual countries stands at 28.5%. In terms of electoral results, Romania has the weakest populist organizations (0.36%) and currently is the twelfth most epistemically vulnerable country. Model 3 predicts that if Romania’s populist organizations had the average electoral strength of EU populists, Romania would become the eighth most vulnerable country (EV=0.92), holding everything else constant. In Hungary, populists won 68.9% of the vote in 2018. If the vote share of Hungarian populists fell to EU average levels, Hungary would go from most epistemically vulnerable country (EV=3.92) to fifth place (EV=2.12). Maps comparing the geographical distribution of EV scores and populist strongholds are available in the online appendix (see Appendices 1.A. and 1.B.). Overall, hypothesis 4 is supported by the models, though the findings are contingent on controlling for parallelism and on whether left- and right-wing populism are aggregated.

Hypothesis 5 expected audience polarization to be positively correlated with epistemic vulnerability. The hypothesis is not supported across the three models, with none of the
coefficients different from zero. Likewise, hypothesis 6 proposed that audience duplication would be inversely correlated with epistemic vulnerability, and none of the models provide support.

Hypothesis 7 predicted that countries with larger PBS viewership would be more epistemically resilient. Model 1, 2 and 3 all find a large negative effect of PBS viewership on epistemic vulnerability. This finding is statistically significant at the 0.05 level for model 1 and 3 and approaches significance at the 0.1 level for model 2 (p-value=0.076). The finding holds with and without controlling for parallelism, and when retaining different measures for left- and right-wing populism, as well as when collapsing them into a single measure, making this one of the most robust findings. Italy currently ranks eighth in epistemic vulnerability. Italy’s daily audience of public television amounts to 36.2% of the population. Model 3 predicts that if the daily audience of Italian public television dropped to US levels, i.e., 9.6%, Italy would rise to be the sixth most epistemically vulnerable country (EV=2.36). In the UK, if the daily audience for PBS went down from its current levels (46.3%) to US levels, it would fall from the eighth most resilient country (EV= -0.48) to fifteenth, or put the other way, from twelfth most vulnerable to sixth.

Model 2 and 3 yield a particularly interesting finding regarding the effect of parallelism in newspapers. While I anticipated media-parallelism to play a direct role in epistemic vulnerability, I did not formulate any hypothesis on that matter. I also did not suspect newspaper parallelism would have an effect of the magnitude that Model 2 and 3 suggest. The UK is the ninth most epistemically resilient country in our sample. It also exhibits the highest levels of newspaper parallelism (15.20). On the other hand, Slovakia exhibits the lowest (7.32). Model 3 predicts that if the UK had the same levels of newspaper parallelism as Slovakia, ceteris paribus, the UK would become the most epistemically resilient country (EV=-5.26). Conversely, Finland, the
most epistemically resilient country in our sample, would collapse to sixth place, with an EV score of -0.95, if it exhibited the same levels of newspaper parallelism as the UK.

**Conclusion**

The political and institutional symptomatology of the decline of democracies is well documented. While the literature on the epistemic challenges of democracy is also quite extensive, it remains rather poorly integrated. Most research has treated epistemic problems in isolation. In that way, research has overlooked the way these issues interact and what they collectively say about the state of the public and the health of news environments. What connects problems such as the spread of disinformation, plummeting levels of trust in the media, or feelings of disorientation, is epistemic in nature. In this study, I discussed how to integrate the literature on epistemic problems that modern democracies currently face and proposed a new metric for studying the health of news environments in a comparative manner.

I aimed to answer the following questions. How do levels of epistemic vulnerability vary across Western democracies? What is the relationship between the structure of political and media systems and levels of epistemic vulnerability? I found that Scandinavian countries are more epistemically resilient while the US, Spain, and Eastern European countries are more epistemically vulnerable. I also found that countries where PBS has a larger audience are less epistemically vulnerable. I reported empirical evidence that newspaper parallelism and populism are strongly associated with the overall degradation of news environments. Finally, the study partly corroborates the relationship between both ideological and affective polarization and epistemic vulnerability.
The EV index can lead to further research into a series of empirical problems. The first set of questions has to do with the longitudinal stability of the indicator itself. For example, how do electoral cycles affect EV scores? Does epistemic vulnerability increase around elections, and how much does that effect linger? Is the effect consistent cross-nationally? The second set has to do with the role of epistemic vulnerability in pathologies of democracy such as polarization. Does epistemic vulnerability cause more polarization? The third may prove to be more challenging methodologically: are EV scores predictive of individual and collective political behaviors?

The specific findings of this study raise additional questions regarding the role of the press in maintaining a healthy news environment. How much of the population consumes public media every day is one of the strongest predictors of epistemic vulnerability. Countries where more people use public media more often are more epistemically resilient. This corroborates the notion of needing to treat information as a public service. It is still unclear whether the effects of PBS on fostering a healthier news environment result from the decoupling of journalistic revenues from readership, from the greater regulations imposed on PBS, or from media ownership itself. Future studies could try to distinguish between the separate effects of license fees, journalistic norms, media regulations and full state ownership, partial ownership or private ownership. Without further evidence on the differentiated effects of these variables, the present study still suggests that decoupling revenues of journalism from readership, encouraging sound regulation and making sure that the news media are in the hands of actors more concerned with providing information than providing entertainment are healthy democratic objectives.

The study also emphasized the role of newspapers in maintaining an epistemically resilient news environment. Studies have hitherto tended to overlook the role of print journalism, which unfortunately makes the literature on the role of newspaper parallelism on the spread of
disinformation, distrust, or feelings of disorientation very limited. I included measures of parallelism in my models guided by studies that show that consumption of partisan news is related to heightened partisan identities, which in turn increases motivated reasoning, selective acceptance, distrust in the news, and exposure to disinformation. The common narrative around newspapers is that news quality tends to be higher in print media, as opposed to broadcast or digital media, and that individuals who seek news in print tend to be more knowledgeable than those who rely on other platforms. This narrative is highly US-centric and reveals what one could call the “Pulitzer Prize Syndrome” of journalism research, i.e., focusing on investigative journalism, highest journalistic norms, and a history of unearthing important political scandals such as Watergate. These represent only one facet of the multiple contributions of print press. This Pulitzer Prize Syndrome overlooks national contexts, path dependency, the structure of media systems, and differences in culture, and the role of partisan newspapers. The British newspaper industry is for instance much more partisan, more frequently engaged in policy advocacy, and is notoriously plagued by the tabloidization of news, and is thus far less authoritative than in the US context. Certainly, future comparative research should investigate the role and influence of partisan newspapers in the spread of disinformation, but also its effects on media literacy and perceptions of news quality, and public attitudes towards the media and institutions.

**Declaration of interest statement:** The author reports there are no competing interests to declare.

**Data availability statement:** The data that support the findings of this study are available from the corresponding author, Julien Labarre, upon reasonable request.
References


Figure Captions

Figure 1. Internal Validity and EV Index Scores Ranked in Ascending Order.

Figure 2. Comparison of Scaled Estimates From Models 1, 2, and 3.