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Article

Complicating the Resilience Model: A Four-Country Study About Misinformation

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Abstract

The resilience model to disinformation (Humprecht et al., 2020, 2021) suggests that countries will differ in exposure and reactions to disinformation due to their distinct media, economic, and political environments. In this model, higher media trust and the use of public service broadcasters are expected to build resilience to disinformation, while social media use and political polarization undermine resilience. To further test and develop the resilience model, we draw on a four-country (the US, Canada, the UK, and France) survey conducted in February 2021. We focus on three individual-level indicators of a lack of resilience: awareness of, exposure to, and sharing of misinformation. We find that social media use is associated with higher levels of all three measures, which is consistent with the resilience model. Social media use decreases resilience to misinformation. Contrary to the expectations of the resilience model, trust in national news media does not build resilience. Finally, we consider the use of public broadcasting media (BBC, France Télévisions, and CBC). The use of these sources does not build resilience in the short term. Moving forward, we suggest that awareness of, exposure to, and reactions to misinformation are best understood in terms of social media use and left–right ideology. Furthermore, instead of focusing on the US as the exceptional case of low resilience, we should consider the UK as the exceptional case of high resilience to misinformation. Finally, we identify potential avenues to further develop frameworks to understand and measure resilience to misinformation.

Keywords

Canada; comparative politics; France; misinformation; news media; political ideology; social media; United Kingdom; United States

Issue

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1. Introduction

The malicious promotion of misinformation has become an international concern for researchers and citizens (Freelon & Wells, 2020; Guess & Lyons, 2020; Tenove, 2020), particularly in the 2016 US election and subsequent elections and referendums (Allcott & Gentzkow, 2017; Nisbet et al., 2021). Globally, citizens have expressed significant levels of concern about misinformation and its political and societal effects (Centre

for International Governance Innovation & Ipsos, 2019; Newman et al., 2018). Governments have pursued a wide range of policies to address these risks (Barrett et al., 2021; Tenove, 2020; Yadav et al., 2021). Concerns further intensified with the World Health Organization and researchers identifying an “infodemic” of health misinformation during the global Covid-19 pandemic (Gallotti et al., 2020).

Misinformation is widely understood as “a claim that contradicts or distorts common understandings

of verifiable facts” (Guess & Lyons, 2020, p. 10). Misinformation is sometimes contrasted with disinformation, which refers to false or deceptive claims that are intended “to harm an individual, social group, country or organization” (Wardle & Derakhshan, 2017, p. 20). In this article, we will primarily use the term misinformation, as it is often difficult to know the intent of content disseminators and thus distinguish disinformation from misinformation, though we recognize intentional falsehoods and deception are particularly problematic (Freelon & Wells, 2020; McKay & Tenove, 2021).

Debates persist about when and how misinformation in media environments might be harmful to individuals and democratic societies. Focusing on individual susceptibilities to misinformation, researchers have examined factors that may increase exposure to misinformation, such as their political ideology or age (Guess et al., 2018; Jones-Jang et al., 2020; Ognyanova et al., 2020). They have also proposed factors that influence how people will respond when they do encounter misinformation, including whether they will believe it or further share it (Chadwick & Vaccari, 2019; Valenzuela et al., 2019, 2021; Wagner & Boczkowski, 2019). This research has largely focused on individuals in single countries or experimental settings, rather than comparing cross-national differences. This research also does not consider macro-level factors, such as differing political and media systems, and how they may impact experiences of misinformation.

Humprecht et al. (2020) introduced the resilience model to examine cross-national vulnerability to misinformation. The model draws on previous theoretical and empirical studies to propose a set of political, media, and economic factors that may predispose citizens of a given country to be more or less resilient to the problem of disinformation. They used self-reported exposure as the sole dependent variable and used macro-level factors as predictors. The survey question asked was as follows: “In the last week, which of the following have you personally come across? Stories that are completely made-up for political or commercial reasons?” (Humprecht et al., 2020, p. 511). The data were gathered as part of the *2018 Digital News Report* (Newman et al., 2018). In subsequent work, Humprecht et al. (2021) tested willingness to share, comment, and like false news stories as their dependent variable and used individual-level factors as predictors. The two studies offer discrepant findings regarding the cross-national applicability of the resilience model. For instance, while the 2020 study finds that trust in media increases resilience (lower exposure), the 2021 study partially rejects that hypothesis. We believe these discrepant findings can be partially attributed to the different measures of resilience they use.

We seek to extend this analysis by using four-country survey data and by testing resilience to misinformation using three measures. Scoring high on these three measures would be interpreted as low resilience to misinformation. Two measures are similar to those used by Humprecht et al. (self-assessed exposure to

and sharing of misinformation), while a third measure reveals whether individuals have encountered (perhaps unknowingly) several prominent misinformation narratives. The third measure is important for moving scholarship beyond the subjectivity related to current survey-based measures of misinformation. The first and third measures are focused on Covid-19, whereas Humprecht et al.’s (2020, 2021) work assesses any type of misinformation. The focus on Covid-19 is important given that the *2022 Digital News Report* establishes Covid-19 as the most popular topic for misinformation in Europe and North America (Newman et al., 2022). By comparing four countries, we can investigate whether individual-level factors (e.g., individual trust in news media) have different effects in the context of differing macro-level factors (e.g., the significant role of a public service broadcaster). Our aim was to resolve discrepant findings and distinguish elements of the resilience model that apply generally from elements that may need modification.

2. Literature Review

2.1. Defining Misinformation

Citizens’ poor knowledge of political issues and institutions is a longstanding concern, particularly for democracies. An ignorant citizenry is more likely to vote and act counter to their interests, to be vulnerable to manipulation by powerful actors, and to allow their political norms and institutions to atrophy (Delli Carpini & Keeter, 1996). In recent years, concern has focused on misinformation, generating a vast literature discussing how to conceptualize and operationalize misinformation and its impacts (Ha et al., 2021).

Empirical research on misinformation has used different methods to measure its reach, including self-assessed exposure to misinformation (Chadwick & Vaccari, 2019; Jones-Jang et al., 2020; Koc-Michalska et al., 2020; Newman et al., 2018, 2022), social media user engagement with non-credible or “fake” news sources (Allcott et al., 2019; Guess et al., 2018; Ognyanova et al., 2020), and large-scale computational detection of false news items on social media (Jang et al., 2018). An analysis of US Twitter users found that approximately 1% of accounts are responsible for consuming about 80% of false news on that platform (Grinberg et al., 2019). Exposure to misinformation needs to be considered in conjunction with what people do when they encounter it, such as whether they believe false claims (Anspach & Carlson, 2020; Shin & Thorson, 2017; Valenzuela et al., 2019, 2021) and share them with others (Humprecht et al., 2021; Rossini, Baptista, et al., 2021; Rossini, Stromer-Galley, et al., 2021; Valenzuela et al., 2019, 2021).

2.2. Resilience to Misinformation

What makes some societies more vulnerable or resistant to misinformation? Researchers have identified several

macro-level variables of media systems that might increase susceptibility, including the absence of strong public service media (Aalberg & Cushion, 2016), high political polarization (Allcott & Gentzkow, 2017), low public trust in news media (Nielsen & Graves, 2017), heavy public reliance on social media for news (Shehata & Strömbäck, 2021), and highly fragmented media ecosystems (Shin & Thorson, 2017).

Building on this research, Humprecht et al. (2020) developed a robust framework for examining resilience to disinformation. Resilience to disinformation is defined as “a structural context in which disinformation does not reach a large number of citizens” and, when it does reach citizens, “people will be less inclined to support or further distribute such low-quality information, and in some cases, they will be more able to counter that information” (Humprecht et al., 2020, p. 498). They outline characteristics of the political, media, and economic environments that impact resilience. These structural variables have individual-level correlates, e.g., trust in media or consumption of public service broadcasting (PSB) can be assessed at country and individual levels. They further point out that:

To understand when and why a person is willing to believe or share disinformation, we need to know more about how personal characteristics

and attitudes interact with the structural context in which people receive and consume this kind of low-quality or even false information. (Humprecht et al., 2020, p. 511)

They have tested their model in two different datasets using two measures: They first analyzed self-assessed exposure of individuals aggregated to the country level, focusing on the macro-level analysis of national differences, such as the market share of public television in the country, Varieties of Democracy (V-Dem) scores on societal polarization, and World Bank estimates of the number of online users in a country (Humprecht et al., 2020). Their initial testing found that some hypothesized factors did not predict levels of self-reported misinformation at the country level, including populist communication and the strength of public service broadcasters. Table 1 summarizes their expectations as well as their findings. The second column is the expected relationship to measures of misinformation. All of the media environment factors are expected to build resilience, which means these items should be negatively related to measures of misinformation. For example, a country with high media trust will be resilient to misinformation and, thus, their citizens are less likely to report exposure and willingness to share misinformation. All of the political and economic environment factors are expected to decrease resilience,

Table 1. Summary of resilience model and findings.

	Expected correlations	Findings about resilience regarding exposure (Humprecht et al., 2020)	Findings about resilience regarding willingness to share, like, and comment (Humprecht et al., 2021, Model 3)
<i>Political Environment</i>			
Populist communication	Negative	Not significant	Negative and significant in Germany, Belgium, and the UK; not significant or not tested elsewhere
Societal polarization	Negative	Not significant	Positive and significant in Belgium; negative and significant in France and Germany; not significant elsewhere
Extreme ideology	Negative		
<i>Media Environment</i>			
Trust in news media	Positive	Negative and significant	Negative and significant in the UK; not significant elsewhere
Strength of PSB	Positive	Not significant	Positive and significant in France; not significant elsewhere
Shared media	Positive	Not significant	Positive and significant in Germany and the US; not significant elsewhere
Mainstream news media consumption	Positive		
<i>Economic Environment</i>			
Size of online media market	Negative	Negative and significant	Negative and significant in all models
Social media news consumption	Negative	Negative and significant	

Note: Blanks in the above table indicate the factor was not tested in the regression models.

which means these items should be positively related to measures of misinformation. For example, a country with high social media news consumption will be less resilient to misinformation and, thus, their citizens who use social media are more likely to report exposure and willingness to share misinformation.

To further probe the potential relationship between the individual-level correlates of these structural factors, their second study analyzed individuals' willingness not to like, share, and comment on fake news stories (Humphrecht et al., 2021). In this study, the macro-level factors were changed to individual-level measures. For instance, the market share of public service media in a country may not accurately predict resilience, but the use of public service media at an individual level may do so. They found the direction of the relationships between hypothesized factors and measures of resilience differed across countries (Table 1).

While the findings differed depending on their measures and data source, one finding is clear and consistent: The use of social media for news increases exposure to and sharing of misinformation. In other words, social media use decreases resilience to misinformation. For other factors, the direction of the relationship depends on the country and the measure of exposure versus sharing. For example, in the UK, trust in mainstream news media decreased the willingness to share, like, or comment on misinformation, but the relationship was not significant in other countries. In France, the strength of public service media increased the willingness to share, like, or comment on misinformation, but the relationship was not significant in other countries. This finding is in contrast to their expectation that this relationship would be negative. In other words, they expected PSB would increase the resilience of a country, which would be supported by negative correlations between using PSB media and measures of misinformation. Instead, France shows a positive correlation; in other countries, the relationships are not statistically significant. Comparing exposure to and sharing of misinformation, trust in news media negatively relates to exposure but was not a significant factor for sharing misinformation (except in the UK, as noted above). Their research suggests the findings are country-specific (as noted above). As a further example of country-specific findings, ideological extreme is positive and significant in Belgium, negative and significant in France and Germany, and not statistically significant in Switzerland, the UK, and the US. The findings are discrepant with their theoretical model, which suggests the relationship should be positive, rather than negative. Given the discrepant findings between the two studies and discrepancies between their theory and findings (Table 1), we seek to offer some resolution by studying both measures with the same approach (individual-level characteristics) and same dataset, and testing country-specific models for the UK, the US, France, and Canada. We propose specific hypotheses when prior research establishes factors that may be significant.

2.3. Media Trust and Public Service Usage

Distrust in the news media will increase motivation to use alternative sources, which are more likely to publish misinformation, thus increasing people's exposure to misinformation and decreasing resilience (Humphrecht et al., 2021). In contrast, trust in mainstream media would increase their use of this media and thus increase resilience to disinformation. We account for the level of trust in mainstream news media but, given the findings from prior research (Table 1; see also Valenzuela et al., 2019, 2021), we do not offer a specific hypothesis for this variable. We extend research by exploring the role of media trust in news media in awareness of false news stories about Covid-19.

Previous research also finds that exposure to misinformation varies with the quality of individuals' specific media diets (Benkler et al., 2018). Jamieson and Albarracin (2020), for instance, found that consumption of mainstream US media sources (e.g., NBC News, *The New York Times*) was more likely to be correlated with holding correct beliefs about Covid-19, while consumption of conservative partisan media such as Fox News was correlated with belief in misinformation about the spread and lethality of the virus. Similarly, Guess et al. (2019) find that Americans with the most conservative news diets were significantly more likely to visit fake news websites than those who relied on non-partisan or liberal news sources.

Humphrecht et al. (2021) assess the role of country-specific media outlets in engagement with misinformation, dividing the list into public broadcasters, more established press, and alternative media outlets. We consider the use of public service media in the UK (BBC), France (France TV), and Canada (CBC). According to the *Digital News Report*, 36% of France respondents used France Télévisions (public broadcaster; Newman et al., 2022). In Canada, 31% of respondents used CBC (public broadcaster) and 23% used CBC news online (Newman et al., 2022). For the UK, 50% of respondents used BBC (TV and radio) and 43% used BBC News online. Humphrecht et al. (2020, 2021) look at country-specific public broadcasting sources but, in their multivariate models, the use of these sources is not connected to exposure to and sharing of misinformation. Indeed, in France, the relationship was contrary to the expectations outlined in the resilience model. Given the null findings from prior research (Table 1), we do not offer a specific hypothesis for this variable.

Humphrecht et al. (2020, 2021) find that reliance on social media for news consumption increases exposure to disinformation. This finding is consistent with the argument that social media is a major amplifier of misinformation (Shin & Thorson, 2017). According to Shehata and Strömbäck (2021, p. 140), while "following political news in traditional news media consistently has positive effects on political and current affairs learning," using social media for political news does not have the same

effect. Instead, social media represent a “qualitatively different type of news source—most likely promoting other forms of learning than traditional news media”; with news consumption on social media reflecting more “personalized, issue-specific, and attitude-consistent” learning patterns (Shehata & Strömbäck, 2021, p. 141). We extend their research by exploring awareness of false news stories about Covid-19.

H1: Using social media to follow news organizations will positively relate to (a) awareness of false news stories, (b) exposure to misinformation, and (c) sharing misinformation.

2.4. Political Ideology

Political polarization is an important driver of exposure to misinformation at both the country and individual levels (Allcott & Gentzkow, 2017; Humprrecht et al., 2020). Ordinary users are a major source of the spread of misinformation, leading some to refer to their “participatory” role in disinformation campaigns (Starbird et al., 2019). Along these lines, misinformation is more likely to be distributed by people in an effort to signal their beliefs or group allegiance, rather than because they sincerely believe the claims to be true (Del Vicario et al., 2016; Marwick, 2018; Wardle & Derakhshan, 2017). Indeed, scholars have found that strong partisans are more likely to both selectively share and demand information that is congruent with their ideology (Jennings & Stroud, 2021; Osmundsen et al., 2021; Shin & Thorson, 2017). Guess and Lyons (2020, p. 20) note that while large-scale studies indicate that exposure to misinformation is limited, these findings may obscure “differences between subgroups; people with strongly partisan news consumption habits may be much more likely to encounter and consume pro-attitudinal misinformation.” Sub-group polarization may not be symmetrical in its impacts on resilience. Studies suggest right-wing citizens are more likely to consume and deliberately share misinformation (Chadwick & Vaccari, 2019; Guess et al., 2019).

We consider ideology in terms of right-wing and left-wing, rather than exploring ideological extremes (Humprrecht et al., 2021) or populist communication (Humprrecht et al., 2020), which are complicated concepts to adapt to cross-national contexts. For example, as Humprrecht et al. (2021) note, the US does not have a populist party and ideological polarization may be a greater issue with their two-party system, in contrast to other countries that have a populist party as well as multiple political parties (and citizens have more fluid party allegiances). Canada has a populist party (People’s Party of Canada), but it has never won a seat in Parliament. Reflecting on this complicated phenomenon, Humprrecht et al. (2021) find the relationship between misinformation and ideological extremism pulls in different directions in Belgium compared to France and Germany (Table 1). Other research found an extreme

ideological viewpoint was not a significant predictor of sharing misinformation (Rossini, Stromer-Galley, et al., 2021). As such, we return to the left-right ideological framing (Valenzuela et al., 2019, 2021). Studies suggest right-wing citizens are more likely to consume and deliberately share misinformation in countries including the UK (Chadwick & Vaccari, 2019), the US (Guess et al., 2019), and Brazil (Rossini, Baptista, et al., 2021). We test these relationships in a multi-country sample and extend research by exploring awareness of false news stories.

H2: Right-wing ideological beliefs will be positively correlated to (a) awareness of false news stories, (b) exposure to misinformation, and (c) sharing misinformation.

2.5. Country Differences

Although more cross-national studies are needed, research suggests misinformation is a global problem (Newman et al., 2018, 2022). Nielsen et al. (2020) asked respondents in six countries (Argentina, Germany, South Korea, Spain, the UK, and the US) to report how much Covid-19 misinformation they have seen across different sources and platforms. A significant minority of respondents reported witnessing “a lot” or “a great deal” of Covid-related misinformation, and a third of respondents reported seeing large quantities of “bottom-up” misinformation shared by ordinary users (Nielsen et al., 2020). In a cross-lingual analysis of false articles propagating Covid-19 misinformation in China, the US, India, Germany, and France, Zeng and Chan (2021, p. 14) found only Germany was “not dominated by politically-oriented misinformation during the study period.” In the UK, survey research indicates approximately two-thirds of respondents reported sharing false or misleading information on social media (Chadwick & Vaccari, 2019). On the other hand, some research has found exposure to certain forms of misinformation is limited outside the US. As previously noted, Fletcher et al. (2018) found fake news sites in France and Italy reached less than 5% of the population, with most reaching just 1%.

The US is considered one of the worst countries in the world for misinformation (Benkler et al., 2018; Humprrecht et al., 2020; Newman et al., 2018). Humprrecht et al. (2020, p. 506) outline the case for the US being more vulnerable to disinformation due to “its large advertising market, its weak public service media, and its comparatively fragmented news consumption.” Their follow-up study indeed finds Americans are more likely to react (like, share, and comment) to misinformation (see Humprrecht et al., 2021, p. 8). They explain this finding in terms of greater social media use as well as stronger societal and political polarization. In terms of political polarization, the US is distinctive as a two-party system. As mentioned, existing scholarship establishes the importance of social media in exposure to and spreading of misinformation. Humprrecht et al. (2021)

suggest the US is distinctive in terms of high social media consumption, but they did not include Canada in their study. According to the *Digital News Report* (Newman et al., 2022), Canadians have higher levels of adoption of many social media platforms including Facebook (US: 58%; UK: 62%; France: 61%; Canada: 68%) and YouTube (US: 58%; UK: 54%; France: 56%; Canada: 68%). As such, this would lead to Canadians, rather than Americans, being distinctive. The comparison of Canada and the US will help untangle the explanation of differences in terms of social media use versus political polarization.

Canada, France, and the UK are, when compared to the US, characterized by high levels of shared media use—that is, their media environments are comparatively unfragmented (Newman et al., 2021). These three countries are also characterized by relatively strong support for PSB, though France, similar to the US, has low levels of trust in news media (Newman et al., 2021). Finally, and crucially, France’s media audiences are less culturally and politically polarized than those in the US (Humphrecht et al., 2020; Newman et al., 2021). Following Humphrecht et al. (2020), we expect these factors to strengthen resilience in these three countries (UK, France, and Canada), thereby establishing their classification as a distinct, high-resilience cluster, especially when compared to the US. In their clustering of countries, they are clear about the US distinctiveness but unclear about where France fits into their grouping.

H3: Compared to other countries, the US respondents will report higher levels of (a) awareness of false news stories, (b) exposure to misinformation, and (c) sharing misinformation.

3. Methods

3.1. Sample

Our study draws on the results of a survey administered to an online panel by Lightspeed Kantar Group in February 2021. Our full sample includes 6,068 respondents from four countries: Canada ($n = 1,568$), the UK ($n = 1,500$), France ($n = 1,500$), and the US ($n = 1,500$). We employed quotas to ensure the composition of the online panel matched census data for each country. The survey matches the population characteristics of each country in terms of age, gender, and education. The survey was administered in both English and French. The project was approved (File No. 101856) in accordance with Canada’s *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

3.2. Measures

To measure Awareness, we presented respondents with a set of summaries of false news stories. For each one, we asked respondents to indicate whether they were

aware (1) or not aware (0). The news stories were identified as false by PolitiFact and the French organization AFP Fact Check. We focused on false news stories about Covid-19. The simultaneous global nature of the pandemic makes it an apt study for cross-national comparison. Of the three measures considered in this study (awareness of, exposure to, and sharing of misinformation), this is the strongest because it does not rely on respondents recognizing misinformation as false information. Our awareness measure instead assesses whether respondents encountered a misinformation narrative, regardless of whether they were aware it was misinformation. It is therefore not based on people’s determination of the truth status of information they previously encountered. Of the three measures, this one does not rely on respondents’ subjective diagnosis of information as being fake, false, or misleading. However, the other two measures are more closely related to Humphrecht et al.’s (2020, 2021) measures. We asked:

The following are stories circulated on social media over the past three months. For each story, please specify if you are aware of the story, whether or not you think it is true:

- The Covid-19 vaccines contain toxic material.
- The Covid-19 vaccine causes female sterilization.
- The US Medical Association changed its views on hydroxychloroquine as a Covid-19 treatment.
- Coca-Cola tested positive for Covid-19.
- In December 2020, there was a major protest in Paris about the Covid-19 restrictions.

We added up the number of stories that respondents were aware of, creating a variable with a range of responses between 0 and 5 ($\alpha = 0.595$). Figure 1 outlines the differences by country. The average for all respondents across all countries is 1.47 ($SD = 1.36$). For the US respondents, the average is 1.54 ($SD = 1.45$); for the UK, the average is 1.36 ($SD = 1.38$); for France, the average is 1.61 ($SD = 1.28$); and for Canada, the average is 1.37 ($SD = 1.29$). While we tried to choose stories that were relevant in all countries, the higher awareness in the US and France may relate to some of the false stories’ geographic focus (Paris protests, US Medical Association).

To measure Exposure, we began the question series about misinformation with a definition: “The next questions will be about misinformation on social media. By misinformation, we mean false or misleading information.” Then we asked, “In the past month, how often on social media have you seen someone share misinformation?” This measure assesses self-assessed exposure, rather than awareness of false stories about Covid-19. Finally, we asked whether the topic was the Covid-19 pandemic, US presidential election, another topic, or if they could not remember. Respondents could check all that applied. To complement the analysis of awareness

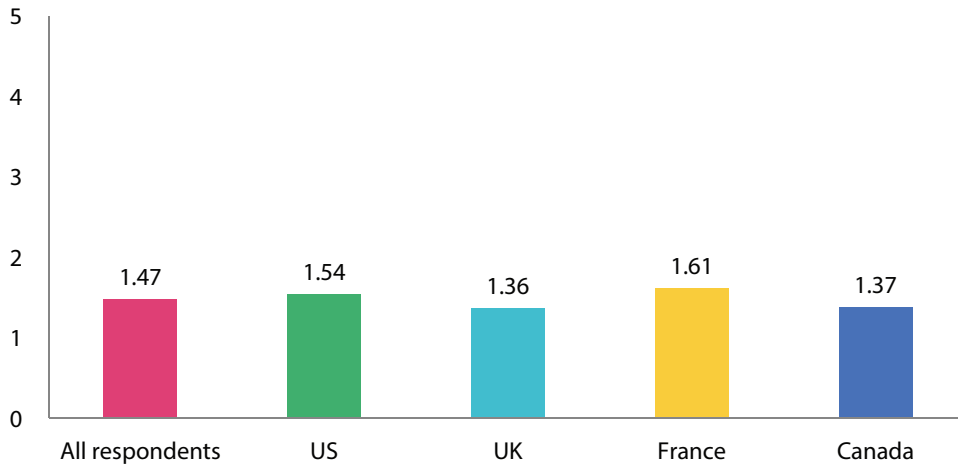


Figure 1. Awareness of false news stories about Covid-19.

of false news stories about Covid-19, we focus on respondents who identified the topic of misinformation as the Covid-19 pandemic. In terms of self-assessed exposure to misinformation about Covid-19, US respondents reported the lowest level of exposure (Figure 2); instead, they were far more likely to report misinformation about the US presidential election.

To measure Sharing, we asked respondents “Thinking about all the information that you have shared on social media, have you ever, even by accident, shared misinformation?” We changed the reference period to “ever” in this question because existing scholarship suggests this activity is very rare. Using the “past month” as a reference might lead to no reported cases. Furthermore, this longer time period enables a process in which people can share information but later, after weeks or months, realize the information was not correct. In other words, the information is vetted by credible news sources and later found to be false or misleading. Figure 3 outlines the differences in sharing of misinformation by country.

The measures of exposure and sharing are similar to Humprecht et al.’s (2020, 2021) measures. These types of measures have their limitations; in particular, they rely on respondents’ ability to correctly identify misinformation as such. There is more subjectivity involved in

this line of questioning. Furthermore, people who have higher media literacy may be more likely to identify misinformation as such, but this does not mean they are less resilient; instead, they have stronger skills at identifying false or misleading information. We offer these measures because they are closely related to Humprecht et al.’s (2020, 2021) work, thus enabling a direct comparison of results. As mentioned, they used a measure of exposure to “stories that are completely made-up for political or commercial reasons” (Humprecht et al., 2020, p. 511). These subjective measures are popular in this field of research. For example, in the 2022 *Digital News Report*, researchers used a (subjective) measure of exposure: “Have you seen false or misleading information about any of the following topics...Covid-19” (Newman et al., 2022, p. 26). Using similar subjective measures allows us to connect with existing scholarship in the field, but our third measure (awareness of false stories) provides an important supplement to move past the subjectivity related to prior measures.

Table 2 offers descriptive statistics and measurement details for predictor variables. The cross-national comparisons reveal significant differences in terms of political interest, identifying as right-wing, education, and confidence in national news media (media trust).

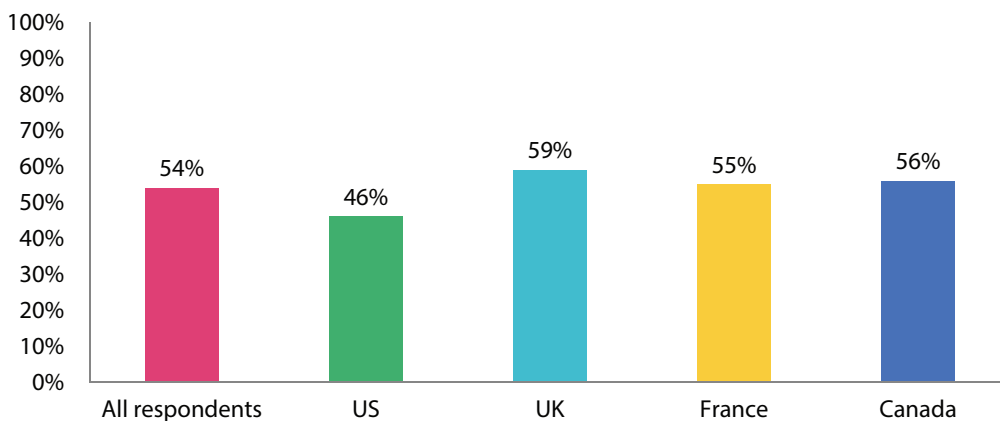


Figure 2. Self-assessed exposure to misinformation about Covid-19.

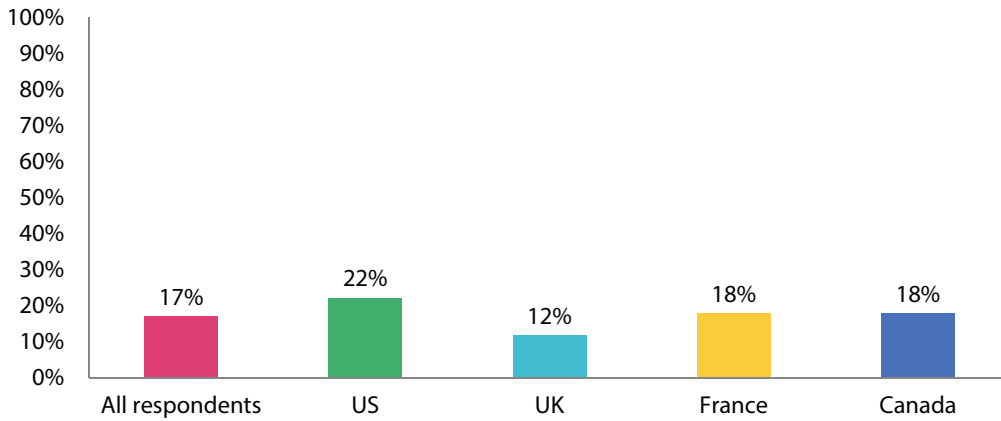


Figure 3. Sharing of misinformation (any topic).

4. Findings

Before discussing the results related to our hypotheses, we outline the results from other variables related to the resilience model. Trust in national news media is positively related to awareness of false news stories (Table 3). However, for self-assessed exposure to misinformation, trust in national news is only significant in the UK; trust in national news media decreases self-assessed exposure to misinformation, as predicted by the resilience model

(Table 4). In terms of sharing misinformation, trust in national news media increases sharing of misinformation in all countries except Canada (Table 5).

Consuming news from a public service media has little influence on awareness of false news stories, self-assessed exposure to misinformation, or sharing of misinformation. However, there are exceptions. In Canada, the use of the CBC increases awareness of false news stories and self-assessed exposure to misinformation about Covid-19. In the UK, use of the BBC increases

Table 2. Descriptive statistics by country.

	Min–Max	All	US	UK	France	Canada
Education (<i>high school or less, some college, bachelor's, more than bachelor's</i>)	1–4	1.93 (1.04)	2.10 (1.09)	1.86 (1.06)	1.77 (0.99)	1.97 (0.99)
Females	0 or 1	51%	51%	49%	51%	52%
Age	18–97	48.33 (17.37)	48.36 (18.69)	48.11 (17.03)	48.50 (16.30)	48.37 (17.40)
In politics, people sometimes talk of left and right. Where would you place yourself on this scale?						
<i>0 to 3 are left-wing</i>	0 or 1	18%	17%	16%	19%	21%
<i>7 to 10 are right-wing</i>	0 or 1	26%	35%	25%	25%	19%
How interested would you say you are in politics? (<i>not at all, not very, fairly, very</i>)	1–4	2.52 (0.96)	2.73 (0.99)	2.51 (0.94)	2.29 (0.97)	2.54 (0.91)
Thinking about all the social media platforms that you use, do you follow news organizations?	0 or 1	21%	22%	18%	19%	25%
In the past year, how often did you use the following news sources, online or offline? (BBC in the UK, France Télévisions in France, CBC in Canada)	1–4	...	—	3.35 (0.91)	2.96 (0.99)	2.57 (1.07)
How much confidence, if any, do you have in [national news media] to act in the best interests of the public? (<i>not at all, a little, a moderate amount, a lot, a great deal</i>)	1–5	2.29 (1.14)	2.35 (1.26)	2.25 (1.10)	2.12 (1.06)	2.44 (1.12)

Table 3. Ordinary least squares (OLS) regression of awareness of fake news stories about Covid-19.

	All		US		UK		France		Canada	
	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>
Trust in national news media	0.111	< 0.001	0.178	< 0.001	0.130	< 0.001	0.056	0.037	0.054	0.039
BBC News/France TV/CBC	—		—		-0.037	0.167	0.032	0.244	0.090	0.001
Follow news organizations on social media	0.113	< 0.001	0.086	0.001	0.089	< 0.001	0.132	< 0.001	0.119	< 0.001
Political interest	0.202	< 0.001	0.196	< 0.001	0.248	< 0.001	0.147	< 0.001	0.197	< 0.001
Left-wing	-0.021	0.104	-0.073	0.005	-0.018	0.479	0.045	0.096	-0.031	0.233
Right-wing	0.103	< 0.001	0.170	< 0.001	0.048	0.068	0.084	0.002	0.102	< 0.001
Age	-0.049	< 0.001	-0.114	< 0.001	0.001	0.980	-0.054	0.050	-0.022	0.388
Females	0.023	0.068	-0.007	0.777	0.025	0.316	0.061	0.018	0.032	0.199
Education	0.028	0.024	0.037	0.123	0.058	0.022	0.001	0.979	0.009	0.729
UK	-0.018	0.236								
France	0.089	< 0.001								
Canada	-0.026	0.087								
<i>R-square</i>	0.125		0.189		0.132		0.078		0.121	
<i>n</i>	6,035		1,491		1,490		1,494		1,557	

Note: The reference groups are males, those in the centre or reporting no ideological leanings, and the US.

Table 4. Logistic regression of self-assessed exposure to misinformation about Covid-19.

	All		US		UK		France		Canada	
	Exp(<i>B</i>)	<i>p</i>	Exp(<i>B</i>)	<i>p</i>	Exp(<i>B</i>)	<i>p</i>	Exp(<i>B</i>)	<i>p</i>	Exp(<i>B</i>)	<i>p</i>
Trust in national news media	0.985	0.612	1.032	0.554	0.852	0.017	0.987	0.850	0.952	0.410
BBC News/France TV/CBC	—		—		1.237	0.009	1.116	0.167	1.228	0.001
Follow news organizations on social media	1.655	< 0.001	1.679	< 0.001	1.494	0.017	1.706	0.002	1.705	< 0.001
Political interest	1.293	< 0.001	1.153	0.062	1.210	0.025	1.612	< 0.001	1.177	0.040
Left-wing	1.175	0.060	1.354	0.089	1.587	0.016	0.710	0.058	1.129	0.442
Right-wing	1.157	0.065	0.916	0.547	1.502	0.014	1.253	0.183	1.221	0.233
Age	0.990	< 0.001	0.982	< 0.001	0.998	0.603	0.990	0.025	0.989	0.002
Females	0.942	0.357	0.867	0.270	1.046	0.743	0.972	0.841	0.925	0.536
Education	1.073	0.026	1.068	0.271	1.227	0.002	1.030	0.670	0.978	0.724
UK	1.953	< 0.001								
France	1.794	< 0.001								
Canada	1.699	< 0.001								
<i>Cox & Snell R-square</i>	0.055		0.061		0.058		0.086		0.049	
<i>n</i>	4,226		1,087		1,001		979		1,159	

Notes: The reference groups are males, those in the centre or reporting no ideological leanings, and the US; the analysis only includes those who reported seeing any type of misinformation on social media during the past month.

Table 5. Logistic regression of sharing misinformation (any topic).

	All		US		UK		France		Canada	
	Exp(B)	<i>p</i>	Exp(B)	<i>p</i>	Exp(B)	<i>p</i>	Exp(B)	<i>p</i>	Exp(B)	<i>p</i>
Trust in national news media	1.178	< 0.001	1.236	< 0.001	1.257	0.004	1.248	0.001	0.983	0.800
BBC News/France TV/CBC	—		—		0.977	0.819	1.047	0.561	0.945	0.429
Follow news organizations on social media	1.705	< 0.001	1.534	0.006	1.249	0.286	2.042	< 0.001	2.111	< 0.001
Political interest	1.165	< 0.001	1.142	0.096	1.241	0.051	1.109	0.211	1.228	0.023
Left-wing	1.035	0.731	1.082	0.686	1.026	0.923	1.085	0.677	0.954	0.790
Right-wing	1.588	< 0.001	1.919	< 0.001	2.361	< 0.001	1.484	0.018	0.901	0.577
Age	0.967	< 0.001	0.963	< 0.001	0.942	< 0.001	0.978	< 0.001	0.974	< 0.001
Females	1.123	0.112	1.005	0.972	0.876	0.463	1.219	0.171	1.370	0.028
Education	0.915	0.012	0.984	0.796	0.950	0.546	0.754	< 0.001	1.019	0.792
UK	0.515	< 0.001								
France	0.911	0.347								
Canada	0.825	0.048								
<i>Cox & Snell R-square</i>	0.084		0.122		0.110		0.061		0.057	
<i>n</i>	6,038		1,491		1,491		1,495		1,561	

Note: The reference groups are males, those in the centre or reporting no ideological leanings, and the US.

self-assessed exposure to misinformation. Public service media use does not build resilience to misinformation based on our three measures.

For the first set of hypotheses, we find following news organizations on social media increases awareness of false news stories (H1a), self-assessed exposure to misinformation (H1b), and sharing of misinformation (H1c). This relationship is tested in the four countries as well as the pooled sample. For one case, the UK, the positive relationship was not statistically significant (Table 5); the UK is also distinctive in a low incidence rate of following news organizations on social media (Table 2).

We also consider political ideology as a predictor. Regarding awareness of misinformation, right-wing ideology is associated with being more aware of false news stories about Covid-19 (H2a; Table 3). Right-wing ideology does not predict self-assessed exposure to misinformation related to Covid-19 except in the UK (H2b; Table 4). Right-wing ideology is associated with sharing misinformation on social media in the US, the UK, and France (H2c; Table 5), but this is not the case in Canada. Canada is distinctive in that right-wing status is only significant for one of the three measures of misinformation.

The US is expected to be distinctive in terms of misinformation. The US is the reference group for the regression analysis presented in Tables 3, 4, and 5 (see first models in all tables). After accounting for a variety of other predictors, no significant differences are found between the US, the UK, and Canada (H3a; Table 3)

in terms of awareness of false news. However, France reports higher levels of awareness of false news stories compared to the US. As previously noted, these patterns may be explained by the choice of false stories. The US is distinctive in reporting lower levels of self-reported exposure to misinformation about Covid-19 (H3b; Table 4); as mentioned, this is related to the relative popularity of exposure to misinformation about the US presidential election. In relation to sharing misinformation, US respondents are more likely to share misinformation than respondents from the UK and Canada (H3c; Table 5). Results for France are similar to those for the US (H3c; Table 5).

Our models account for the role of age, gender, and education. Older people are less likely to be aware of fake news, report exposure to misinformation, and share misinformation. Being female is rarely significant as a factor in predicting awareness of, exposure to, and sharing of misinformation. Education has a small effect. Political interest is a significant predictor of awareness of fake news stories about Covid-19, self-assessed exposure to misinformation about Covid-19, and sharing of misinformation.

5. Conclusion

In summary, we studied key predictors of awareness of, exposure to, and sharing of misinformation as identified by the resilience model (Humprecht et al., 2020,

2021). Media trust increases awareness and sharing of misinformation, which is *contrary* to theoretical expectations from the resilience model. However, the empirical model matches the theoretical claims in the UK in relation to self-assessed exposure to misinformation about Covid-19. Trust in the UK media decreases self-assessed exposure to misinformation. Humprecht et al. (2020, 2021) also find this variable has contradictory effects when considering exposure to and sharing of misinformation.

Building on the theoretical framework of the resilience model, we examine the role of public service media. Use of the BBC does not significantly correlate with awareness of fake news stories and sharing of misinformation in the UK but does increase self-assessed exposure to misinformation. In France, watching France TV does not relate to awareness of, exposure to, or sharing of misinformation. In Canada, consuming CBC news increases awareness of fake news stories and self-assessed exposure to misinformation but does not influence the likelihood of sharing misinformation. While the resilience model suggests PSB contributes to resilience, we find it does not. Further research should examine the content of these public service media to try to understand their different relationships to misinformation. For instance, does the CBC cover misinformation on social media, leading to heightened awareness and exposure (see related discussion in Tsftati et al., 2020)?

We *replicate* findings about the role of social media news as a predictor of exposure to and sharing of misinformation (Humprecht et al., 2020, 2021). We extend research by pointing out the relevance of social media news on awareness of false news stories. Given our findings and those from Humprecht et al. (2020, 2021), we argue this variable is the most important factor in determining the resilience of societies to misinformation. Further research should consider which social media platforms have greater or less exposure as well as how the affordances of each platform enable or limit the sharing of misinformation.

While the resilience model points to societal polarization and populist discourses as macro predictors of cross-national differences, we focus on ideology as a personal attribute that could impact the role of macro factors on awareness of fake news stories and sharing of misinformation. We found right-wing ideology is associated with greater levels of awareness and sharing of misinformation in three of the four countries considered here. In terms of self-assessed exposure to misinformation about Covid-19, right-wing ideology was only significant in the UK. This factor of the resilience model should be retained but measured as an individual attribute with a left-right dimensionality.

Future cross-national work would benefit from more countries and multi-level modelling. This type of modelling could help understand macro-factors such as the measures used in Humprecht et al. (2020) alongside individual factors, such as political ideology. Four coun-

tries do not comprise a sufficiently large sample to complete this analysis. Also, we have used a theory about macro-level characteristics to study individuals, which runs the risk of ecological fallacy—assuming claims about the aggregate would apply to the individual. This is also an issue with Humprecht et al.’s work that focused on macro factors in the 2020 publication but assessed individual factors in the 2021 publication. Again, with a greater number of countries, we could examine a combination of macro-level indicators alongside individual-level factors.

The resilience model suggests the US would have higher levels of awareness of, exposure to, and sharing of misinformation due to greater societal polarization, the size of its online market, greater social media use, and fragmentation of the media system. We did not find this pattern; instead, we find the UK is a distinctive society compared to the other three countries. Respondents from the UK are far less likely to share misinformation than respondents from other countries (Table 5). The UK is the only country in which the use of social media for news did not increase the likelihood of sharing misinformation. Rather than focusing on the US as a case study of low resilience, comparative work should consider the UK as a case study of high resilience. The UK may offer a model for other countries to follow in building resilience to disinformation. In particular, the UK’s strong public broadcasting system might explain its resilience. In addition, the UK distinctiveness might relate to lower social media use. As mentioned, the role of social media in sharing misinformation is different in the UK than in other countries. Yet, at the macro level, the UK does not differ much in terms of social media platform adoption (Newman et al., 2021, 2022). As such, a cultural, rather than structural, element may be at play. Sharing misinformation can be provocative and incite uncivil discussion among citizens. Perhaps UK respondents resist sharing this type of misinformation in part to avoid these provocative and uncivil discussions.

We also note that while limiting exposure to misinformation is important, exposure may also be something of a *fait accompli*. In other words, non-exposure to misinformation may no longer be a real-world scenario. Measuring resilience may therefore require a more nuanced examination of the relationship between exposure, awareness, and sharing than we have presented here. While high levels of exposure, awareness, and sharing can suggest reduced resilience, this is not necessarily the case. For example, individuals may report high levels of exposure to misinformation because they perceive legitimate news as false, but they may also report high levels of exposure because they have high-quality information diets and regularly encounter corrective reporting of misinformation. In some national contexts, large segments of the population may exhibit high levels of exposure *and* high levels of awareness. Rather than classifying these systems as low resilience, we may instead see frequently occurring conjunctions of high awareness

and high exposure as an indicator of high levels of digital media literacy. Examining how such individuals share misinformation, such as whether they do so accidentally or along with commentary to alert others to its falsity, would be revealing. In other words, studying how exposure, awareness, and sharing intersect is necessary to make sense of *how* individuals engage with misinformation when they encounter it. Future research could explore the relationships between awareness, exposure, and sharing, which may reveal mechanisms of resilience obscured by focusing on these variables in isolation.

We argue, therefore, that a richer conception of resilience requires additional theoretical work investigating the relationships (a) between macro-level covariates and micro-level indicators of resilience and (b) between variables within these analytic categories. This broader agenda can identify resilience with less focus on the overarching goal of preventing exposure to misinformation and more focus on a larger set of individual- and system-level capacities required for minimizing its impact. Such research could help policymakers determine the viability of different resilience strategies, such as efforts to minimize the spread of “bad information” or, alternately, to “equip citizens with critical literacy skills” they might need to address ubiquitous misinformation themselves (Barrett et al., 2021, p. 18).

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Replication and data files are available at: <https://doi.org/10.6084/m9.figshare.20324790.v1>

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