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*Research Article*

## Who is afraid of fake news? Modeling risk perceptions of misinformation in 142 countries

*Using survey data from 154,195 respondents in 142 countries, we investigate internet user perceptions of the risks associated with being exposed to misinformation. We find that: 1) The majority of regular internet users globally (58.5%) worry about misinformation, and young and low-income groups are most likely to be concerned. 2) Risk perception among internet users varies starkly across regions whereby concern is highest in Latin America and the Caribbean (74.2%), and lowest in South Asia (31.2%). 3) Differences are unrelated to the prevalence of misinformation, yet concern is highest in countries with liberal democratic governments. We discuss implications for successful policy and platform interventions.*

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### Research questions

- RQ1: In which parts of the world do people worry about online misinformation?
- RQ2: How do age, education, and other socioeconomic variables affect concern about online misinformation?
- RQ3: How do the prevalence of misinformation and country-level institutions change misinformation risk perception?

### Essay summary

- We made use of representative survey data from a sample of 154,195 respondents representing 142 countries retrieved from the 2019 World Risk Poll powered by Gallup to study public perceptions about the harms of false information on the Internet. We combined this data with country-level data from the Varieties of Democracy Project and Freedom House's Press Freedom Index to understand how local political and media contexts shape public concern about misinformation.
- 58.5% of regular internet and social media users worldwide express concern about encountering

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misinformation online. Young people and people in low-income tiers feel significantly more vulnerable to misinformation. People in countries with liberal democratic governments express more concern about misinformation than closed autocracies.

- There are distinct geographic differences: concern about the risk of false information is highest in Latin America and the Caribbean (74.2% of internet users), far lower in South Asia (32.2%) as well as Central Asia (38.1%).
- The actual prevalence of misinformation and the levels of press freedom in national contexts do not have a discernible effect on risk perceptions about misinformation.
- Our findings show that there are countries with relatively high prevalence of misinformation but low concern about it, suggesting that public awareness campaigns are required. Low concern also means that people are less motivated to adopt preventative actions against misinformation, such as triangulating information sources. This should be taken into account when prioritizing or targeting policy interventions.

## Implications

While there is some level of consensus about the dangers related to misinformation amongst experts and policymakers, relatively little research focuses on how the wider public perceives the threat of misinformation. Our study is among the first to examine risk perception related to misinformation using comparative data from around the world.

In this paper, we focus on people's concerns about misinformation, that is whether they state that they worry about encountering false information on the Internet when asked about it. We made use of survey data from the 2019 World Risk Poll, a survey conducted with a representative sample of 154,195 respondents from 142 countries. We combined the World Risk Poll data with other data sources describing the political and media context of different countries. Our study describes large-scale patterns of misinformation risk perception in terms of geography and demographic variables. It also examines potential drivers for misinformation risk perception by comparing countries based on the prevalence of misinformation, their type of government, and whether they have a free press.

Misinformation risk perception has been studied with surveys, but typically only with a focus on specific regions or a relatively small sets of countries. Surveys in this area have frequently focused on North America or Europe (Kuo & Marwick, 2021). These surveys have found higher concern about misinformation among women and those interested in politics (Rodríguez-Virgili et al., 2020), while the results about the effect of age have been mixed (Hameleers et al., 2021; Reuter et al., 2019). Humprecht et al. (2020) found that low trust in media institutions, weak public service media, and high social media use are associated with lower resilience towards misinformation. We would hence expect misinformation risk perception to be high in countries where press freedoms are limited or the prevalence of misinformation is high. Some research suggests that risk perceptions in democratic countries are lower, possibly due to a sense of control, but the effect is not straightforward (Echavarren et al., 2019; Slovic 1993). High or low levels of misinformation risk perception are not in themselves desirable, as their behavioral consequences are context-dependent (Hameleers et al., 2021). Understanding risk perceptions can, however, be important for designing communications (Krause et al., 2020) and to create interventions that are sensitive to people's attitudes (Weil & Wolfe, 2021).

*There are significant cross-country differences in misinformation perception*

On average, most internet users globally (58.5% of respondents that use the Internet regularly) are concerned about digital misinformation. However, we find large differences in public risk perception

between different parts of the world. In all regions around the world, concern about misinformation is more common than concern about abuse or fraud in digital spaces (Knuutila et al., 2020). In Eastern Europe and Central and South Asia, concern about misinformation is low, with South Asia having the lowest share of internet users who feel vulnerable to misinformation (32.2%). In contrast, in the Americas, Africa, and Western Europe the majority of internet users feel concerned. The highest numbers are in Latin America, where an average of 74.2% of internet users report feeling vulnerable.

#### *Institutional variables*

Our model shows that people living in countries with liberal democratic governments are more likely to worry about misinformation than people in countries without or with limited democratic institutions. With our data, we can't conclusively explain this connection. One reason might be that misinformation has in recent years been an exceptionally prominent topic in public debates in Europe and North America (Van Duyn & Collier, 2019). Contrary to expectations, the model shows that the prevalence of misinformation has no effect on whether individuals feel vulnerable to misinformation. Surprisingly, we also find that the levels of press freedoms within a country also bear no relation to risk perceptions.

#### *Socioeconomic groups that feel concerned about online misinformation*

Our analysis reveals that gender, age, and education have a statistically significant but relatively small effect on whether people feel vulnerable to misinformation. Younger people, those between 15-29, are most concerned about encountering false information online, with concern decreasing with age. One notable finding is that concern for misinformation was also higher among people with higher education levels. Young and educated people typically have greater digital literacy skills, but also spend more time online and on social media. These findings point to people who can be assumed to have greater media literacy (the young and the educated) in fact feeling more vulnerable to misinformation.

#### *Practical implications*

The results suggest that risk perception often doesn't reflect the actual risk of encountering misinformation. The data we used shows surprisingly low levels of concern about misinformation in some regions, such as parts of Central Asia and Eastern Europe, where the freedom of the press is in part curtailed. This suggests the need for new and innovative awareness campaigns that would help people in these regions and elsewhere understand the potential risks related to misinformation.

Studies have found links between risk perception and motivation for preventative action (Ferrer & Klei, 2015). This link is relevant also when prioritizing interventions against misinformation. Lazer et al. (2018) suggest that interventions against misinformation can be divided into two categories: "(i) those aimed at empowering individuals to evaluate the fake news they encounter, and (ii) structural changes aimed at preventing exposure of individuals to fake news in the first instance." The former includes, among other things, triangulating information sources and looking up fact-checks (Wagner & Boczkowski, 2019). If certain groups of people don't perceive misinformation to be a threat, they may be less responsive to interventions that encourage them to change their behaviors. It is hence important for policymakers to not exclusively rely on interventions that empower individuals, but also to work to reduce the supply of misinformation. Moreover, it may be necessary to explain the risks related to consuming and sharing misinformation before attempting to empower individuals to evaluate or respond to misinformation, particularly where concern for misinformation is low. Some public health practitioners have, for instance, suggested campaigns that raise awareness about susceptibility to health misinformation and the consequences of being exposed to it (Houlden et al., 2021).

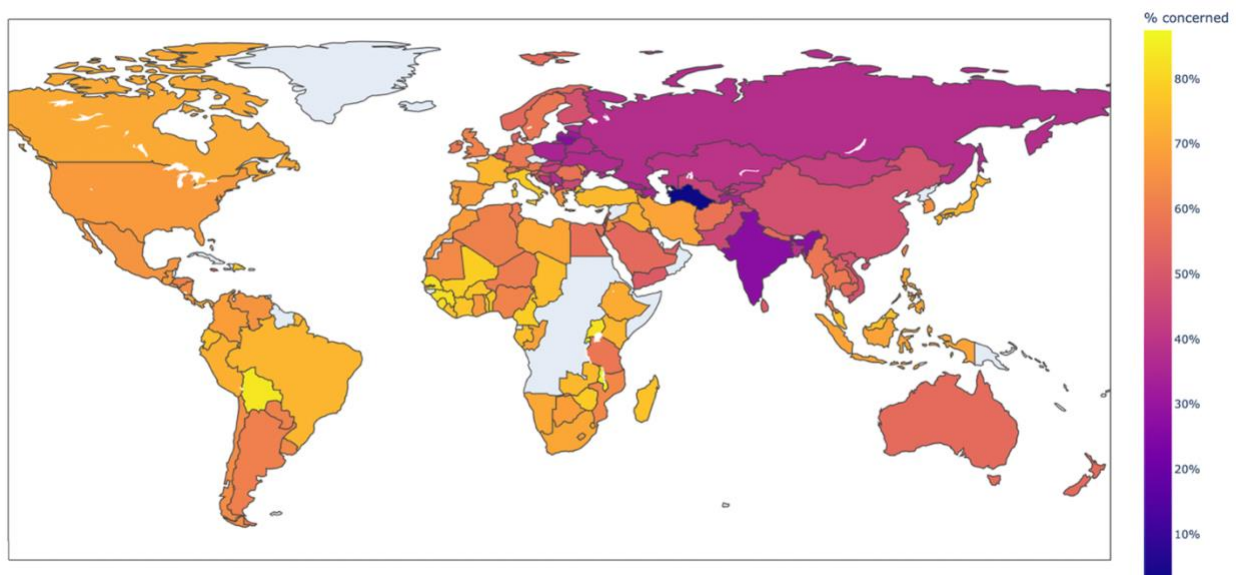
## Findings

*Finding 1: Fear of false information varies greatly across different geographic contexts.*

2019 World Risk Poll participants in 142 countries were surveyed on the following questions: “When using the internet or social media, do you worry about any of the following things happening to you?” The question specific to misinformation was “receiving false information, such as news or information which is not true.” The question was posed only to respondents who had used the Internet in the past 30 days. Overall, 58.8% of these respondents were concerned about misinformation.

Next, we compared how widespread concern about false information online is across different geographic contexts. On the country level, differences between individual countries are large. In Malawi, 87.4% of internet users worry about misinformation. This is the highest proportion of all countries globally, but respondents in South-Eastern African countries express similarly high levels of concern. In contrast, only 26.4% of people in Lithuania say the same about misinformation, the lowest proportion out of all countries.

Figure 1 displays the share of internet users who worry about misinformation across 142 countries. The figure reveals distinct regional patterns. People in Eastern Europe—with Lithuania leading the pack—and Central Asia express low levels of concern. It is common to see misinformation as a threat across Western and Northern Europe, where 64.5% of internet users think it is an issue (including the first fifteen countries to join the EU, Norway, and Switzerland). Conversely, in Eastern Europe only 46.9% of respondents express concern (including the eleven Eastern European countries that joined the EU later). Similarly, Central Asian countries tend to have slightly lower concern for misinformation, with an average of 38.1% across the region. Notably, in India only 28.9% of the population are concerned. With 50.9% of people expressing concern, China falls slightly below the global average. The Americas stand out as regions where concern for misinformation is relatively high. In the United States and Canada, 67.4% of people worry about misinformation, while the same figure is 74.2% for Latin American and Caribbean countries.

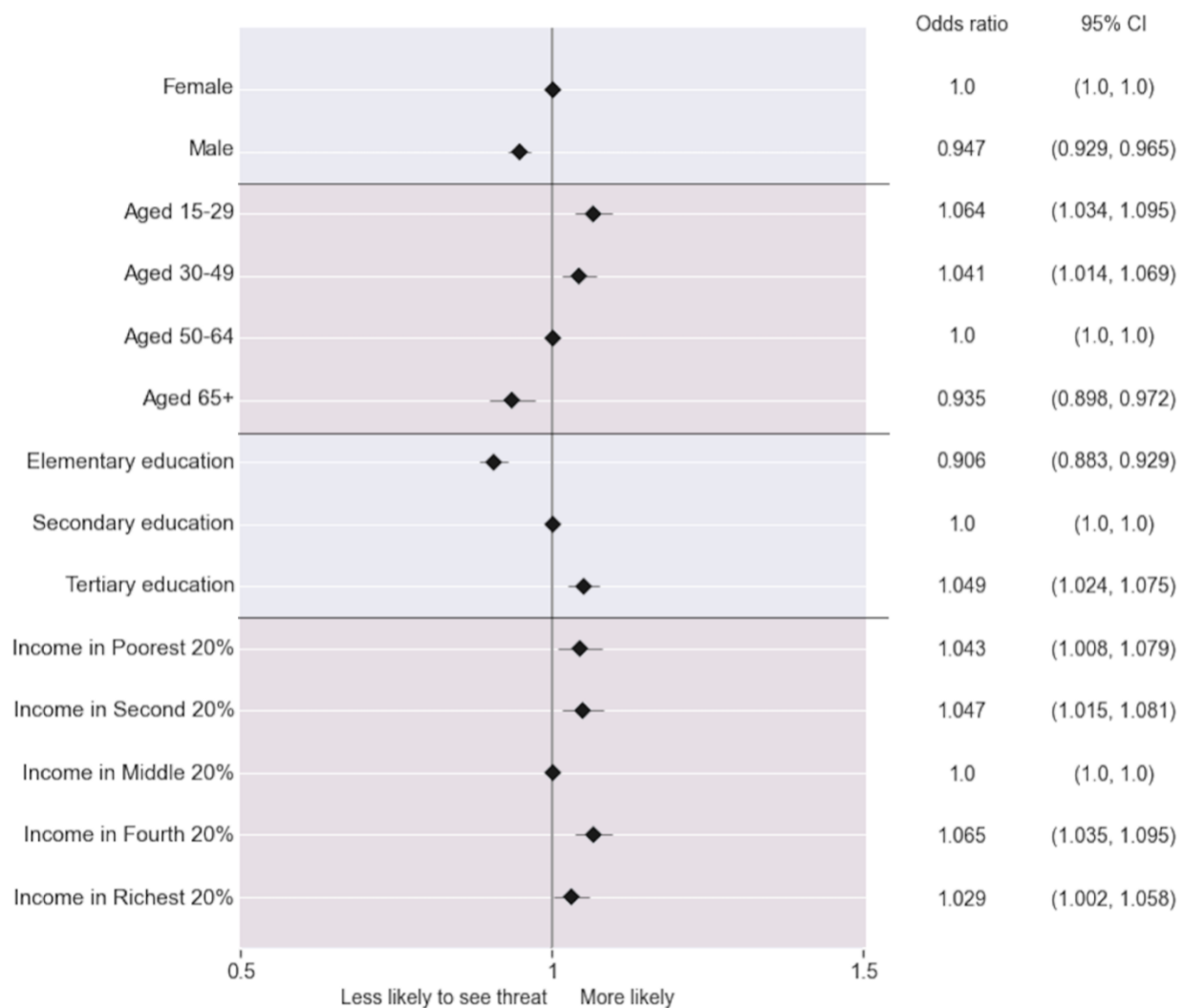


**Figure 1. Choropleth map of share of internet users who see misinformation on the Internet as a threat.**

*Finding 2: Young people and educated people worry most about false information online.*

We used a logistical regression model to study whether there are differences between demographic and socioeconomic groups in terms of how likely they are to perceive misinformation as a threat. The model draws from individual-level variables using data from individual participants from all regions and their responses to the World Risk Poll survey. In the same model, we include institutional variables on the presence and quality of national institutions in different countries from other datasets. The effects of demographic variables relating to individual respondents are described in Figure 1. Our model finds that education has the largest effect on people's attitude towards misinformation. People with higher education are more likely to see misinformation as a threat. Respondents who have completed elementary education or less are about 9.4% less likely to see misinformation as a threat as compared to people who have completed at least secondary education.

The difference between genders is small but statistically significant: men are 5.3% less likely to worry about misinformation. The differences in age groups are statistically significant, with the older age groups being less likely to recognize misinformation as a threat.



**Figure 2. Results from a logistic regression model describing the effect of individual-level demographic variables on the likelihood of expressing concern about misinformation.**

*Finding 3: Levels of misinformation and press freedom have no impact on misinformation risk perception.*

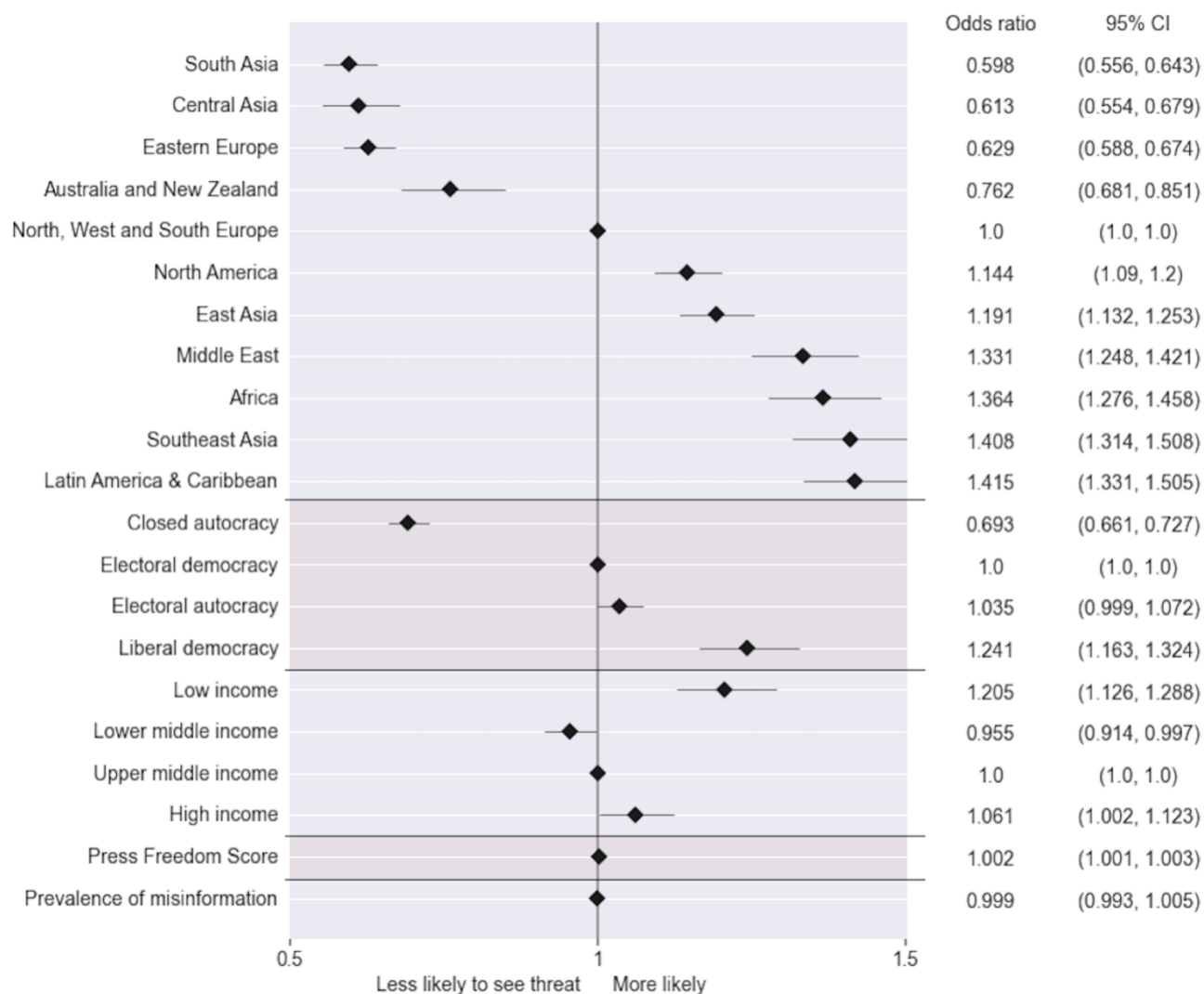
Lastly, we investigated the impact of different geopolitical variables on people's risk perception. The geopolitical variables describe details such as press freedoms and are evaluated on a country-by-country basis by expert surveys. The effect of institutional variables on risk perception is larger than the effect of individual-level variables. This means that the national contexts tend to better predict respondents' risk perception as compared to, for instance, their gender or income level.

According to the model, country contexts have a large effect on people's attitudes (see Figure 3). These effects hold even when the model includes variables on, for instance, political institutions and income levels. The results suggests that the differences between countries are cultural and cannot be explained based on demographic or socioeconomic differences alone (for instance the fact that people would be more educated or wealthier in certain parts of the world).

We then assessed the impact of political and media contexts on risk perception. First, we investigated the impact of regime type. The V-DEM dataset distinguishes between four different "regime types," based on the quality of political institutions (see methods section for definition). The model shows that people in closed autocracies, such as many Central Asian countries, respondents are much less likely to worry about misinformation (30% less likely in comparison to electoral autocracies). People in liberal democratic countries, in contrast, are more likely to perceive misinformation as a risk (24% more likely).

Second, we use the Digital Society Project's (DSP) dataset as a measure of the prevalence of misinformation. DSP has surveyed experts concerning the prevalence of misinformation from foreign and domestic governments and parties. Notably, the variables in the DSP dataset are not connected in a statistically significant way to people's risk perceptions. This means that the prevalence or absence of misinformation in a country does not appear to affect people's risk perceptions.

Finally, we assessed whether the wider media environment affects people's attitudes towards misinformation, using Freedom House's Freedom of the Press data. This dataset measures the freedom of the press worldwide based on the legal, political, and economic status of journalists and media outlets (see methods section for details). This freedom of the press variable also could not be connected with risk perception.



**Figure 3. Results from a logistic regression model describing the effect of national-level variables on the likelihood of expressing concern about misinformation.**

## Methods

In this study we used and combined data from four different open-source data sets: the 2019 World Risk Poll, the 2020 Varieties of Democracy data, 2021 Digital Society Project data, and the 2017 Freedom House's Freedom of the Press data.

The 2019 World Risk Poll included 154,195 respondents living in 142 countries. The survey design, participant recruitment, and interviews were conducted by Lloyd's Register Foundation and Gallup. The results presented here focus exclusively on people who had used the Internet in the past 30 days at the time of the survey. This includes 56% of all the respondents to the survey, a total of 89,613 people. As a survey instrument, the 2019 World Risk Poll employed an interview-based survey design using both face-to-face and telephone interviews. The final survey consisted of ninety-five questions including background and demographic information. The questionnaire was translated into the major conversational languages of each country. Interviews for the 2019 World Risk Poll were conducted between May 8, 2019 and January 17, 2020.

At least 1,000 respondents were surveyed in each country. All samples were probability-based and nationally representative of the resident adult population—as defined in-country. The coverage area included the entire country, and the sampling population represents the entire population aged fifteen and older. The response rates varied from 7% in Northern/Western Europe to 79% in Southern Africa. Table 1 describes the response rates on a regional basis. Additional information about national sample sizes, population weights, error margins, confidence intervals, and other country-specific sampling details is available in the 2019 World Risk Poll methodology appendix (Lloyd’s Register Foundation, 2020).

**Table 1.** Share of internet users concerned about misinformation, the response rate, and the number of countries in every region.

Region	% Concerned about misinformation	Number of countries	Response rate
Australia & New Zealand	57.2%	2	9%
Central Asia	38.1%	8	63%
Central/Western Africa	50.6%	18	80%
Eastern Asia	53.4%	6	14%
Eastern Africa	61.3%	11	79%
Eastern Europe	42.7%	10	47%
Latin America & Caribbean	74.2%	19	38%
Middle East	61.9%	12	45%
Northern Africa	62.2%	5	36%
Northern/Western Europe	61.4%	16	7%
Northern America	67.4%	2	6%
Southeastern Asia	68.3%	9	48%
Southern Asia	32.2%	6	64%
Southern Africa	69.4%	5	79%
Southern Europe	66.9%	13	34%

*Note: % concerned about misinformation is based on authors’ calculations. The response rate is from the The Lloyd’s Register Foundation World Risk Poll methodology appendix.*

The World Risk Poll data includes weights to ensure that samples were nationally representative for each country. The weights were also used in this article when describing national figures or aggregating between countries. When calculating averages for regions, the averages for individual countries in the region were weighted proportionally to the population size of the respective countries. The results presented in this article make use of the weights calculated for the 2019 World Risk Poll.

The Varieties of Democracy (V-DEM) dataset includes hundreds of indicators about elections, governments, and civil society worldwide (Coppedge et al., 2020). It follows an expert coding methodology whereby local domain experts provide assessment of the media environment. V-DEM has a network of several thousand experts around the world (Pemstein et al., 2020). These experts annually answer a series of questions on a Likert scale, that is, multiple-choice questions with five qualitative options. The experts’ answers are combined using a model that checks intercoder reliability and cross-country comparability. The dataset distinguishes between four different regime types (closed and



electoral autocracies; electoral and liberal democracies). These distinctions are based on a set of criteria, including whether there are de-facto multiparty elections and a rule of law (Lührmann et al., 2018).

The 2021 Digital Society Project is a dataset of 35 indicators on media environments and politics that follows the same methodological approach as V-DEM (Mechkova et al., 2020). The survey related to misinformation included questions such as “How often do the government and its agents use social media to disseminate misleading viewpoints or false information to influence its own population?” with a Likert scale ranging from “Never, or almost never” to “Extremely often.” The answers to the indicators related to the Digital Society Project were given by media scholars in each country studied.

The 2017 Freedom House’s Freedom of the Press Global Survey covers 192 countries (Freedom House, 2021) to assess whether each nation's legal and political conditions support or inhibit the freedom of the press. Freedom House's methodology is based on their own scoring system, which is applied by their own staff familiar with individual countries. The organization's analysts compile reports on individual countries to support the evaluation. Each country is graded based on a 23-item questionnaire with questions on legal, political, and economic conditions.

We used a logistic regression model to model which variables predict risk perception of misinformation. For reference, the level of misinformation risk perception in different socioeconomic groups without independent of the logistic regression model is given in Table 2. In the logistic regression model, we represent all dependent variables as categorical variables, even when the variables could have been represented as numerical or ordinal scales (for instance, the variable representing educational attainment). The categorical values were represented as distinct variables with one-hot encoding (either 1 or 0 depending on whether an observation fell into that category or not). We chose one value of the categorical variables to be the baseline, so the coefficients of the other values in the model represent the change relative to these baseline values. Where the variables represented a range (e.g., with educational attainment), we chose the middle point of the range as the baseline. Where there was no range (e.g., with the variable representing the regional location of respondents), we chose as the baseline the category for which the values of the dependent variable were closest to the overall mean. For the modeling, we used a logistic regression model with frequency weights provided in the LRF dataset. In Figures 2 and 3 we report the coefficients of the logistic regression model in the form of odd ratios as well as the 95% confidence intervals of the odds ratios. Where the odds ratio lies outside of this confidence interval, the p-value for statistical significance of that variable is less than 0.05. We calculated McFadden’s pseudo-R<sup>2</sup> to describe the overall fit of the model. Though demographic variables have strong predictive power, the pseudo-R<sup>2</sup> of the model as a whole is 0.03, indicating a relatively weak goodness of fit. Both demographic and institutional variables are included in a single model, even though for readability these variables are described in two separate graphs (Figures 2 and 3).

**Table 2.** Share of internet users who see misinformation on the Internet as a threat.

Category	Group	Yes	No	No answer	Sample size
All internet users	All internet users	58.5%	40.0%	1.5%	89613
Gender	Female	59.6%	38.8%	1.6%	45549
	Male	57.4%	41.3%	1.3%	44064
Age group	15-29	61.1%	37.7%	1.2%	30706
	30-49	57.8%	40.8%	1.4%	34377
	50-64	55.6%	42.4%	2.0%	16088
	65+	53.8%	44.4%	1.9%	8111
Education	Up to 8 years of education	57.5%	40.9%	1.6%	11245
	9-15 years of education	58.8%	39.7%	1.4%	53911
	Completed tertiary education	58.5%	40.2%	1.3%	24083
Individual income level	Low income	68.3%	30.6%	1.1%	5213
	Lower middle income	60.4%	38.5%	1.1%	16394
	Upper middle income	56.9%	41.6%	1.5%	30825
	High income	57.9%	40.5%	1.6%	37181
Country income level	Poorest 20%	58.7%	39.7%	1.6%	11767
	Second 20%	58.8%	39.6%	1.5%	14051
	Middle 20%	58.0%	40.4%	1.6%	16676
	Fourth 20%	58.2%	40.5%	1.3%	19842
	Richest 20%	58.5%	40.1%	1.4%	26636

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### **Competing interests**

None.

### **Ethics**

Project activities were approved by the University of Oxford's Research Ethics Committee.

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### **Data availability**

All materials needed to replicate this study are available via the UK Data Service: <https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8739>