



*Research Article*

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## Hide and seek: The connection between false beliefs and perceptions of government transparency

*This research examines how false beliefs shape perceptions of government transparency in times of crisis. Measuring transparency perceptions using both closed- and open-ended questions drawn from a Canadian panel survey, we show that individuals holding false beliefs about COVID-19 are more likely to have negative perceptions of government transparency. They also tend to rely on their false beliefs when asked to justify why they think governments are not being transparent about the pandemic. Our findings suggest that the inability to successfully debunk misinformation could worsen perceptions of government transparency, further eroding political support and contributing to non-compliance with public health directives.*

Authors: Mathieu Lavigne (1), Éric Bélanger (1), Richard Nadeau (2), Jean-François Daoust (3), Erick Lachapelle (2)  
Affiliations: (1) Department of Political Science, McGill University, Canada, (2) Department of Political Science, Université de Montréal, Canada, (3) School of Social and Political Science, University of Edinburgh, United Kingdom  
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### Research question

- How do false beliefs shape perceptions of government transparency?

### Essay summary

- We evaluated the association between false beliefs and perceptions of government transparency by analyzing responses to both closed- and open-ended questions from a panel survey conducted on a representative sample of Canadians in April 2020, June 2020, and January 2021.
- We found that respondents who hold false beliefs about the COVID-19 pandemic are more likely to report that governments lack transparency about what influences their decisions and are hiding information about the pandemic. False beliefs are also associated with changes in perceptions of transparency over time, even when controlling for changes in trust in government and general government evaluations.
- We further show that many citizens refer to the false beliefs they hold when asked to explain their negative perceptions of transparency.

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- Our findings (1) demonstrate that misinformation can affect political attitudes and contribute to the erosion of political support that is necessary for compliance with public health directives in times of crisis, (2) show that beliefs about government transparency are influenced by individual-level characteristics, and (3) provide insights about how to fight misinformation and improve transparency perceptions in the future.

## Implications

Concerns over government transparency (the quantity and quality of information made available to the public by governments and the relevance of that information for evaluating government performance [Williams, 2015]) have gained global currency over the past few decades, with more than half of United Nations members now having access to information laws (McIntosh, 2014). Transparency has come to be considered a norm of democratic governance, an essential ingredient for making informed political decisions and holding governments accountable. In this context, transparency has been offered as a solution to fight misinformation and increase trust in government (OECD, 2020). Yet, the operation of power still appears opaque for many citizens (West & Sanders, 2003) and the current era continues to be described as “the misinformation age” (O’Connor & Weatherall, 2019). We argue that researchers should pay more attention to citizens’ perceptions of transparency and get a better understanding of how these perceptions are related to false beliefs citizens may hold.

Transparency perceptions are shaped by actual government transparency about the decision-making process, policy content, and policy outcomes. If we take the example of stay-at-home orders, a government being transparent could provide information about (1) the rationale behind the decision to implement this measure (e.g., by making available projections of cases and deaths with and without the measure); (2) what stay-at-home orders mean exactly and how they will be enforced; and (3) how effective they were and other consequences they might have had. However, perceived transparency can be very different from actual transparency because of citizens’ media consumption behaviors and underlying opinions about the governing party or the issue in question. Many studies demonstrate the importance of source credibility [the perceived expertise or trustworthiness of a source of information] on the acceptance of a message (Pornpitakpan, 2004), with citizens who trust the government being more likely to believe that they provide complete and accurate information (Mabillard & Pasquier, 2015). For instance, generalized political mistrust was a common reason for questioning the truthfulness of information provided by governments during the COVID-19 pandemic (Enria et al., 2021). Therefore, it is striking that government transparency is presented as one of the principal ways of fighting misinformation (OECD, 2020) when those holding false and conspiratorial beliefs are the most likely to reject information coming from government agencies (Motta et al., 2020), and information disclosure can increase distrust among already skeptical citizens (Crepaz & Arian, 2021).

We define *false beliefs* as beliefs that are inconsistent with the available evidence (O’Connor & Weatherall, 2019). *Conspiratorial beliefs* constitute one type of false beliefs. Conspiracy theories are based on the idea that powerful organizations are involved in a secret plan that would have negative consequences for everyday people. As such, citizens holding conspiratorial beliefs tend to perceive powerful groups, including the government, as fundamentally deceptive (Wood et al., 2012). Individuals tend to turn to conspiracy theories when they experience uncertainty or a lack of control, making conspiracy theories particularly salient during crises like a pandemic (van Prooijen, 2018). False and conspiratorial beliefs may lead to more negative perceptions of transparency because they undermine authoritative information and call into question the institutions that spread this information (Connolly et al., 2019; Marietta & Barker, 2018). For example, believing that governments impose lockdowns “when COVID-19 is no worse than the flu” casts doubt on the actions and information disseminated by

governments and other authoritative agencies (e.g., health agencies), with negative consequences for perceptions of transparency, trust, and the acceptance of official information. The erosion of these kinds of transparency perceptions, in turn, weakens motivation to comply with public health recommendations (Quinn et al., 2013).

The relationship between false beliefs and perceptions of transparency is often simply assumed or relegated to the background (with the focus being on trust in government) but rarely demonstrated empirically. Using both closed and open-ended questions from a Canadian panel survey, we show that greater endorsement of COVID-19 false beliefs (1) increases the likelihood of having negative perceptions of government transparency; (2) is strongly connected to changes in perceptions of transparency over time; and (3) influences how citizens explain their negative perceptions of transparency. Lastly, we demonstrate the importance of these findings by showing that negative transparency perceptions are associated with a decline in voting intentions, trust in government, and satisfaction with democracy.

The results have important implications for research on the consequences of misinformation and highlight the need (and provide indications) for improving perceptions of government communication. First, we contribute to existing scholarship by showing that false beliefs can influence government evaluations and, by so doing, can reduce political support. This dynamic is not conducive to effective accountability. Indeed, if transparency perceptions are distorted by misinformation, then governments could be misguidedly punished or rewarded for actions they did not commit. For instance, we find evidence that false beliefs and negative perceptions of transparency are associated with a decline in voting intentions for the governing provincial party.

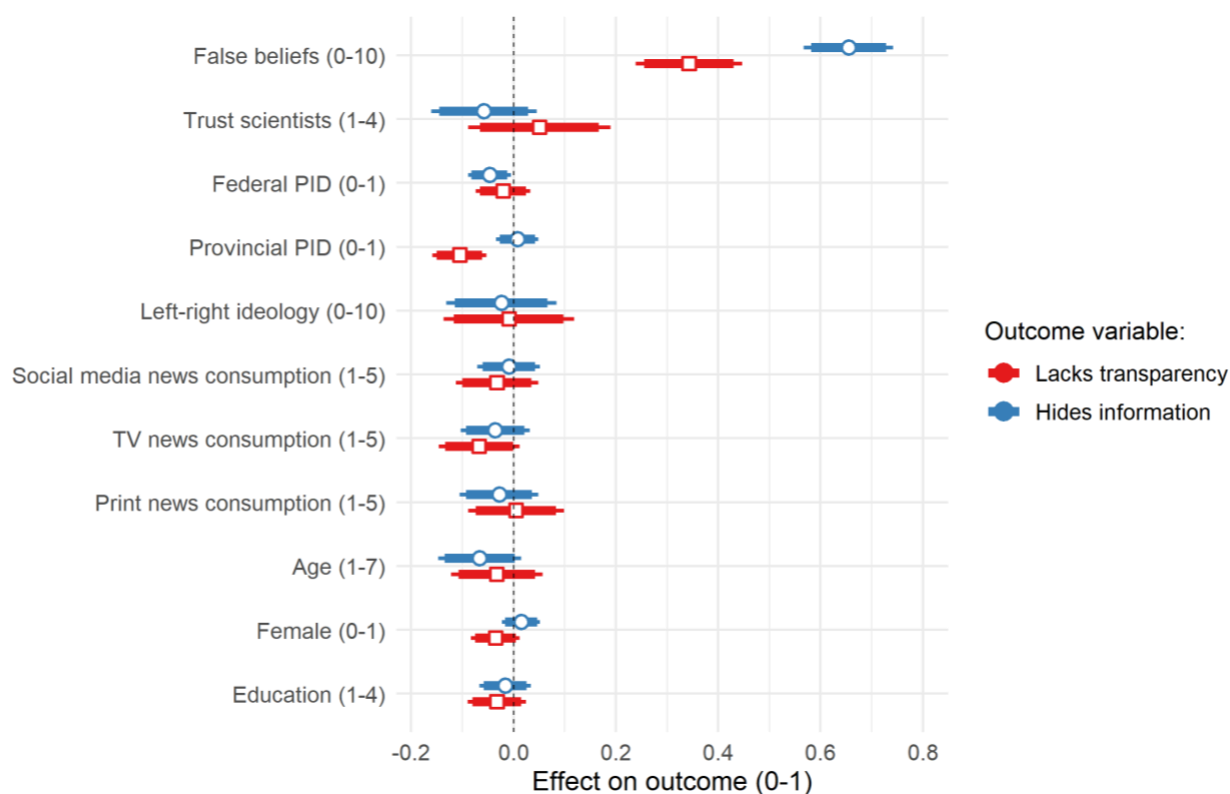
Second, our results imply that governments need to do more to attain the desirable result of having a population that believes that their decisions are made transparently and in an informed way. Perceptions of government transparency are particularly important because those who believe the government is acting transparently are more likely to trust government actions and feel empowered to act, increasing the likelihood that they adopt preventive health behaviors during major crises like a pandemic (Lieberoth et al., 2021; Quinn et al., 2013). The high prevalence of false beliefs (see Appendix A for descriptive statistics on belief in COVID-19 misinformation) and the fact that citizens with low levels of trust and high levels of conspiratorial thinking are inclined to selectively look for information that confirms their beliefs (Romer & Jamieson, 2021) make the task of improving perceptions of transparency harder but no less important. To effectively reach the misinformed public, fight misinformation, and bolster trust in government, an effective communication strategy needs to consider both the framing and delivery of messages. In terms of framing, clear and empowering messages might be particularly effective in transforming the negative emotions that often cause conspiratorial beliefs, such as uncertainty and a lost sense of control, into a more constructive mindset (van Prooijen, 2018). Because misinformed populations are more likely to reject any information coming from authorities, delivering messages or engaging in counter speech with a diversity of sources that are trusted among populations vulnerable to misinformation, including officials who share group characteristics, scientists, co-partisans, community leaders, or even social media influencers, makes it more likely the message will be encountered, be accepted, and increase trust in government actions (Connolly et al., 2019).

## Findings

*Finding 1: COVID-19 false beliefs increase the likelihood of having negative perceptions of government transparency.*

Using ordinary least squares regression, we examined the association between the average perceived truthfulness of six COVID-19 false statements (e.g., “hydroxychloroquine is an effective treatment against

COVID-19”), grouped into a false beliefs index, and two outcome variables measuring perceptions of transparency. The two regression models control for trust in scientists, partisan identification, ideology, news consumption, and socio-demographic characteristics (age, gender, education, region). The stronger one held COVID-19 false beliefs, the more likely they were to report that the government is not transparent about what influences its decisions ( $\beta = .34$ , 95% CI = [.24, .45],  $p < .001$ ) and governments are hiding information about the pandemic ( $\beta = .65$ , 95% CI = [.57, .74],  $p < .001$ ) (see Figure 1). The stronger connection between false beliefs and perceptions that governments are hiding information could be explained by the fact that hiding information is more clearly intentional than a lack of transparency, which can be caused by negligence or a deficient communication strategy. Citizens thus seem to draw a distinction in their evaluations between lack of transparency and information hiding, a more extreme form of non-transparency. These results have important implications for political support, given that false beliefs and negative transparency perceptions are associated with a decline in voting intentions for the provincial governing party, political trust, and satisfaction with democracy over time (see Appendix B for more information about these supplementary analyses).



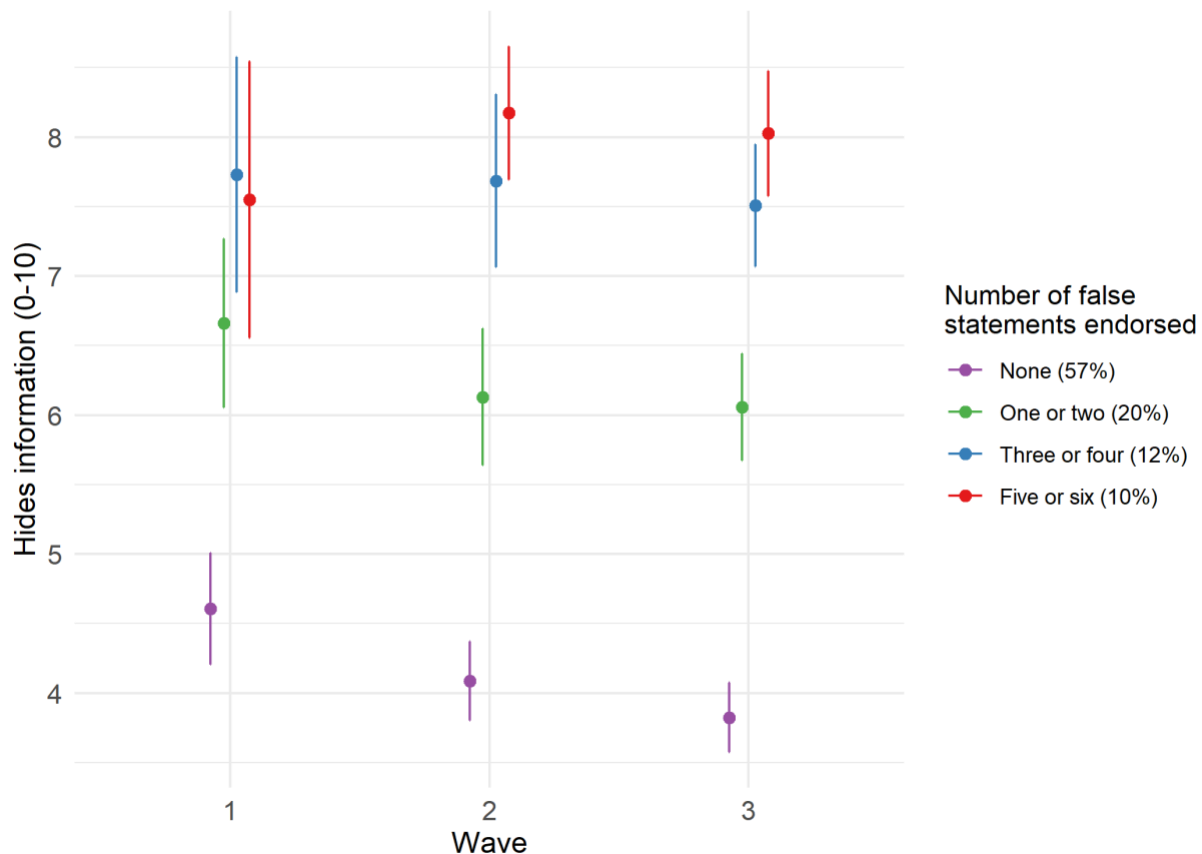
**Figure 1. False beliefs and perceptions of transparency.** Unstandardized coefficients from two OLS regression models are shown with 90% (thick lines) and 95% (thin lines) confidence intervals. All measures are scaled from 0-1, so effects can be interpreted as going from the minimum to the maximum of explanatory variables on the 0-1 scale of each outcome. Original scales are shown in parentheses. Regional fixed effects not plotted. The regression table is presented in Appendix B.

It is likely that those who believe the information provided by governments is insufficient or not truthful will seek alternative information sources and be more susceptible to misinformation, especially in a context of uncertainty like a pandemic. Consequently, the relationship between false beliefs and negative perceptions of transparency could be mutually reinforcing over time. To increase our confidence in the findings, we examined how false beliefs are associated with changes in perceptions of transparency (next

subsection) and used entropy balancing to estimate the effect of holding false beliefs among people comparable on the relevant covariates. Doing so does not alter our conclusions, as shown in Appendix C.

*Finding 2: COVID-19 false beliefs are associated with changes in perceptions of transparency over time.*

While perceptions of transparency have slightly improved during the pandemic, those endorsing three or more false statements out of six consistently believed that information is being hidden (Figure 2), contributing to the polarization of perceptions of government transparency over time. Using OLS regression, we examined the relationship between the average perceived truthfulness of COVID-19 false statements and changes in perceptions that governments are hiding information between June 2020 and January 2021, controlling for the same set of variables as above (with trust, partisan identification, and ideology measured at t-1). We find that individuals holding false beliefs were significantly more likely to start or continue to believe that governments are hiding information throughout the pandemic ( $\beta = 4.13$ , 95% CI = [3.10, 5.16],  $p < .001$ ). The model explains 28% of the variance ( $R^2 = .28$ ,  $F(16,518) = 8.25$ ,  $p < .001$ ), almost twice as much as the same model without the false beliefs index ( $R = .17$ ,  $F(15,519) = 5.25$ ,  $p < .001$ ). The relationship between false beliefs and changes in perceptions of transparency holds when controlling for changes in political trust or in evaluations of governments' pandemic response (Appendix B). Perceptions of transparency thus seem to be distinct from trust and general government evaluations and to be associated with false beliefs citizens hold about the pandemic.

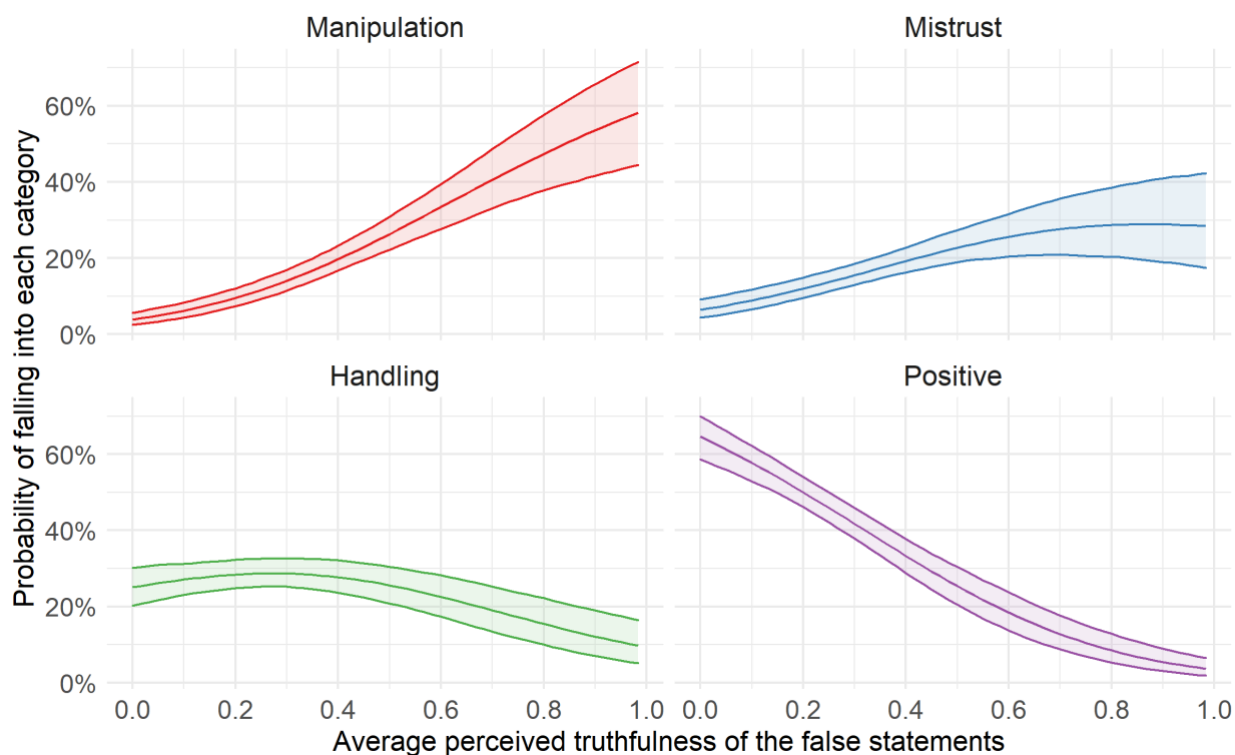


**Figure 2. Average perceived likelihood (0-10) that governments are hiding information about the pandemic in each survey wave based on the number of false statements endorsed (measured in the third wave). Weighted means are shown with 95% confidence intervals. The number of false statements endorsed represents the number of false statements to which a respondent assigned a perceived level of truthfulness of 6 or more on a 0 (not likely at all to be true) to 10 (extremely likely to be true) scale.**

*Finding 3: Citizens use their false beliefs to justify their negative perceptions of transparency.*

We used a multinomial logistic regression to examine how the average perceived truthfulness of COVID-19 false statements predicts the type of answers that respondents provided to the following open-ended question “Can you briefly explain what you think governments are hiding about the coronavirus pandemic?”. Responses were coded into four categories: positive perceptions of transparency, the handling of the pandemic, a general mistrust of government, and government manipulation of the public. Respondents who fell into the “manipulation” category mostly provided explanations that contained misinformation, including: (1) COVID-19 was planned or purposely created in a laboratory; (2) the coronavirus does not exist, is benign, or severely exaggerated; or (3) the pandemic is a means for elites to make money, control the population, or impose an agenda on the general population.

The results suggest that false beliefs shape how respondents rationalize their perception that governments are hiding information. As shown in Figure 3, a change from being certain that all false statements are false (score of 0 on the perceived truthfulness index) to being certain that all the false statements are true (score of 1) increases by 55.06 percentage points (95% CI = [39.65, 69.27],  $p < .001$ ) the predicted probability of providing an answer that falls into the manipulation category. As explained, that category mostly included misinformation-based explanations, showing that those who confidently endorse COVID-19 false statements tend to justify their negative perceptions of transparency based on the false beliefs they hold.



**Figure 3. Predicted probability of falling into each coded response category to an open-ended question asking respondents to explain what governments are hiding about the pandemic, based on the average perceived truthfulness of COVID-19 false statements.** Predicted probabilities are generated from a multinomial logistic regression, with 95% confidence intervals, using an observed value approach (MNL\_pred package in R). The model controls for trust in scientists, identification with the federal and provincial governing party, ideology, news consumption, and socio-demographic variables (age, gender, education, region).

### *Robustness*

Some of the findings might seem tautological, given that the idea that elites have a secret agenda is core to the definition of a conspiracy theory. However, complementary results presented in Appendix C suggest that some items that are not expressly conspiratorial are independently associated with perceptions that governments are hiding information about the pandemic. We also show that our items contribute differently to different subdimensions (origin vs. severity of the pandemic), each of which significantly contributes to negative perceptions of transparency. When asking respondents about the perceived truthfulness of statements, we also included true statements to avoid the bias associated with only asking about false statements. The results hold when including these statements and measuring false beliefs in terms of the difference between the perceived truthfulness of true and false statements (i.e., when considering the acceptance or rejection of true information, see Appendix C). They also hold when using the number of false beliefs held as our main independent variable and when accounting for uncertainty (number of statements with a perceived truthfulness of 5/10). Changing how we measure perceptions of transparency, by coding perceptions that governments are hiding information into “yes,” “no,” and “unsure” categories, for example, also does not alter our conclusions.

Given that there exist many defensible ways to analyze the same data, we used specification curve analysis to make sure that our results would have been similar had we made different analytical choices. Specifically, we tested whether the relationship between false beliefs and perceptions of transparency depends on the variables included in the model by simulating the results of 50,000 linear regressions of perceptions that governments are hiding information on false beliefs and a subset of control variables randomly drawn from the controls presented in Figure 1, plus trust in government, identification with opposition parties, generalized social trust, perceived threat of becoming unemployed, life satisfaction, and emotions caused by COVID-19 (fear, anger). The regression coefficients for false beliefs range from 0.56 to 0.77, showing that, across all specifications, there is a strong positive relationship between false beliefs and perceptions that governments are hiding information (Appendix C).

Our research design does not allow to completely rule out the possibility that the main relationship goes in the other direction (i.e., that perceptions of transparency cause false beliefs) or that an omitted variable might explain the results. The analysis is correlational in nature, and the statistical techniques we use to better isolate the effect of false beliefs by making individuals who hold false beliefs more comparable to those who do not (entropy balancing) and to show that the results are similar when making different analytic choices (specification curve analysis) are limited by the variables included. We nevertheless believe that individuals using their false beliefs to justify their negative perceptions of transparency constitutes evidence that false beliefs do shape perceptions of transparency.

## **Methods**

This study used Canadian opinion data drawn from the Citizens’ Attitudes Under the COVID-19 Pandemic project. Surveys were administered in April 2020, June 2020, and January 2021 to a sample of adult Canadians drawn from Léger’s Internet panel of participants, the largest proprietary panel in Canada. A quota-based sample (age, gender, education, region, language) of around 1,000 respondents answered each wave. The second and third waves include respondents who answered the previous wave(s) and additional respondents to meet the target sample size. 600 respondents answered both Wave 2 and 3, on which most of the results are based. All our analyses were run on data weighted to age, gender, education, and province of residence as provided by the Canadian census.

We estimated the relationship between false beliefs and perceptions of transparency using ordinary least squares (OLS) regression (closed-ended responses) and multinomial logistic regression (open-ended

responses). Building on the literature on political support and information processing (see Appendix E), we controlled for socio-demographic variables (age, sex, education, region), identification with the governing party at the federal and provincial levels, ideology, trust in scientists, and frequency of exposure to information about COVID-19 on traditional and social media. Descriptive statistics and details about the construction of the dependent and independent variables are respectively presented in Appendices A and D. All independent variables have been rescaled from 0 to 1 in all analyses.

False beliefs were only measured in the third wave (January 2021) using respondents' evaluations of the truthfulness of six false statements about the COVID-19 pandemic, on a scale from 0 (*not likely at all to be true*) to 10 (*extremely likely to be true*). Three statements shared characteristics of conspiracy theories: (1) the government is exaggerating the risks of the coronavirus to be able to restrict people's rights and freedoms; (2) the virus was created by China to increase its power in the world; and (3) the virus was created by large corporations because some of them can directly profit from it. The three other statements constituted health-related misinformation: (1) the prolonged use of masks can lead to CO<sub>2</sub> intoxication or oxygen deficiency; (2) hydroxychloroquine is an effective treatment against COVID-19; and (3) coronavirus figures are inflated because a significant number of people who tested positive were not infected with the virus. While health-related misinformation does not necessarily constitute conspiracy theories, some of these statements (e.g., inflated numbers) have been included as part of various conspiracy theories during the pandemic. The percentage of people endorsing each statement varies from 15.5% (hydroxychloroquine) to 26.6% (false positives). The false beliefs items are highly correlated (Pearson's  $r$  ranging from  $r(1003) = .54, p < .001$  to  $r(1003) = .78, p < .001$ , as detailed in Appendix A), and the Cronbach's alpha is 0.91, also indicating that these items are closely related. We thus created a false beliefs index by averaging the perceived truthfulness of the false statements.

We measured perceptions of transparency using (1) the level of agreement with the statement that the provincial government lacks transparency on what drives its decisions (4-point agree-disagree scale); (2) the perceived probability that governments are hiding information about the pandemic (0-10 scale); (3) changes in perceptions that governments are hiding information about the pandemic (-10 to 10); and (4) responses to an open-ended question about what governments are hiding about the pandemic. The open-ended question was only asked to those who rated the probability that governments are hiding information at least a 4 out of 10, given that one needs to believe that governments are hiding information to explain this belief. Open-ended questions are particularly useful for understanding how people rationalize their attitudes and behaviors, as this type of question elicits a broad range of answers and "[...] do not cue respondents to think of particular causes or treatments" (Iyengar, 1996, p. 64). Respondents were exposed to the false statements after answering the open-ended question, so any priming effect is very unlikely. The responses were manually coded by two coders (Cohen's kappa = 0.88, suggesting that there was a high level of agreement between the two raters) to distinguish between those who think governments are manipulating the public (misinformation-based answers), those who express a general mistrust of government, those who question the handling of the pandemic, and those who have positive perceptions of government transparency. Responses were coded into a single category. When answers overlapped with multiple response options, respondents referring to a conspiracy theory were automatically coded into the manipulation category. The mistrust category was used as a residual category when no other explanation was provided (e.g., answers expressing mistrust *and* discussing the handling of the pandemic were coded into the handling category). When there was disagreement between the coders (less than 12% of answers), we randomly kept the code of one of the two coders. Using another method for dealing with disagreement does not change the results, as reported in Appendix C.



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### **Competing interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### **Ethics**

The research protocol employed was approved by an institutional review board at Université de Montréal.

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### **Data availability**

All materials needed to replicate this study are available via the Harvard Dataverse: <https://doi.org/10.7910/DVN/3CE9GA>

## Appendix A: Descriptive statistics

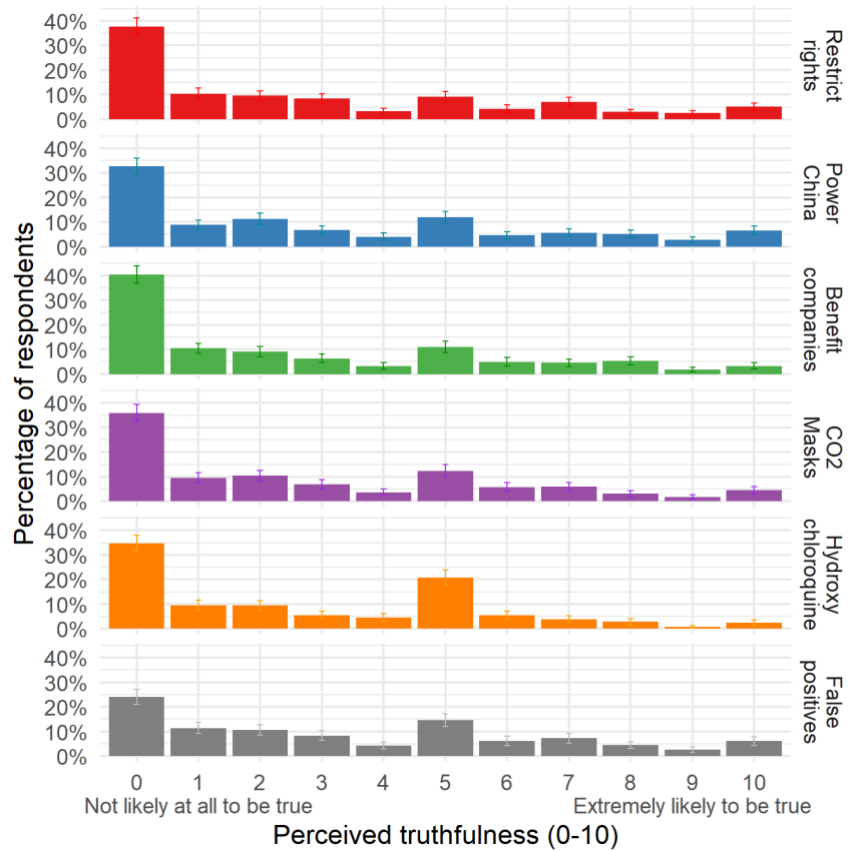
This Appendix presents the descriptive statistics of the variables included in our main models, as well as figures showing the distribution of our main dependent (perceptions of transparency) and independent (false beliefs) variables.

**Table A1.** Descriptive statistics.

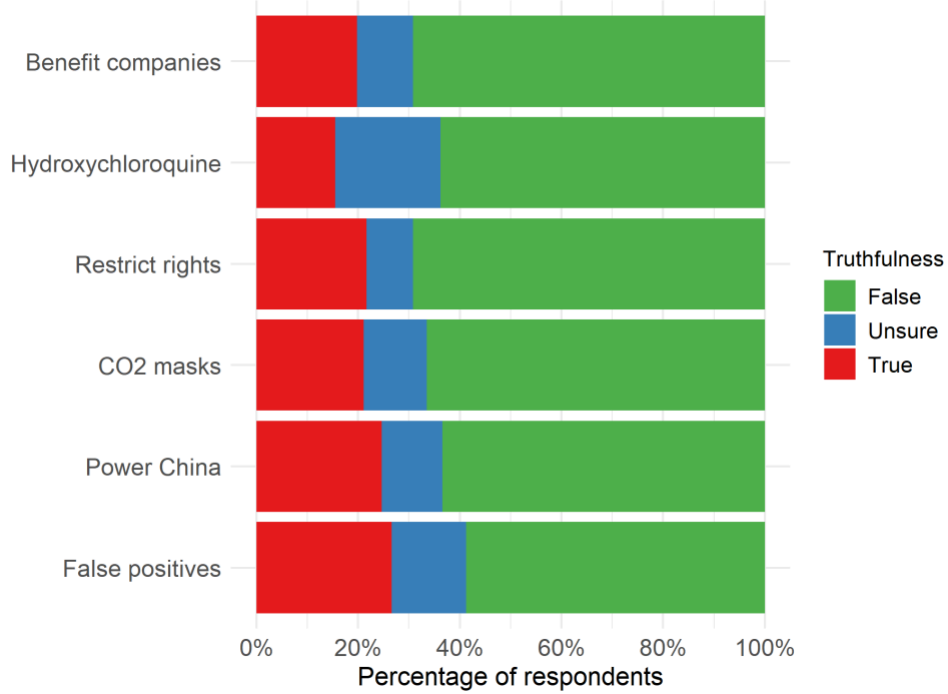
	n	mean	sd	min	max
Lacks transparency	935	0.576	0.324	0.00	1.00
Hides information	976	0.503	0.303	0.00	1.00
Hides information (t-1)	592	0.504	0.293	0.00	1.00
Δ Hides information	574	-0.207	2.373	-8.00	10.00
False beliefs	1005	0.283	0.254	0.00	1.00
Vote federal	1005	0.277	0.448	0.00	1.00
Vote federal (t-1)	600	0.305	0.461	0.00	1.00
Δ Vote federal	600	-0.007	0.295	-1.00	1.00
Vote provincial	999	0.340	0.474	0.00	1.00
Vote provincial (t-1)	594	0.362	0.481	0.00	1.00
Δ Vote provincial	594	-0.013	0.394	-1.00	1.00
Trust federal	992	0.521	0.279	0.00	1.00
Trust federal (t-1)	597	0.531	0.288	0.00	1.00
Δ Trust federal	594	-0.010	0.215	-1.00	0.67
Trust provincial	986	0.539	0.280	0.00	1.00
Trust provincial (t-1)	598	0.543	0.252	0.00	1.00
Δ Trust provincial	591	-0.013	0.234	-1.00	1.00
Satisfaction democracy	978	0.614	0.267	0.00	1.00
Satisfaction democracy (t-1)	579	0.571	0.264	0.00	1.00
Δ Satisfaction democracy	575	0.044	0.246	-1.00	1.00
Handling federal	983	0.518	0.298	0.00	1.00
Handling federal (t-1)	592	0.594	0.305	0.00	1.00
Δ Handling federal	587	-0.079	0.206	-0.67	0.67
Handling provincial	992	0.505	0.308	0.00	1.00
Handling provincial (t-1)	587	0.644	0.242	0.00	1.00
Δ Handling provincial	583	-0.138	0.266	-1.00	1.00
Trust scientists	994	0.722	0.232	0.00	1.00
Trust scientists (t-1)	598	0.706	0.210	0.00	1.00
Federal PID	1005	0.233	0.423	0.00	1.00
Provincial PID	1005	0.280	0.449	0.00	1.00
Left-right ideology	915	0.498	0.209	0.00	1.00
Social media news consumption	1005	0.548	0.317	0.20	1.00
Television news consumption	1005	0.677	0.323	0.20	1.00
Print news consumption	1005	0.359	0.259	0.20	1.00
Age	1005	0.522	0.278	0.00	1.00
Female	1005	0.483	0.500	0.00	1.00
Education	999	0.619	0.394	0.00	1.00

Notes: Statistics at t-1 (June 2020) are calculated on those who also answered the survey at t (January 2021).

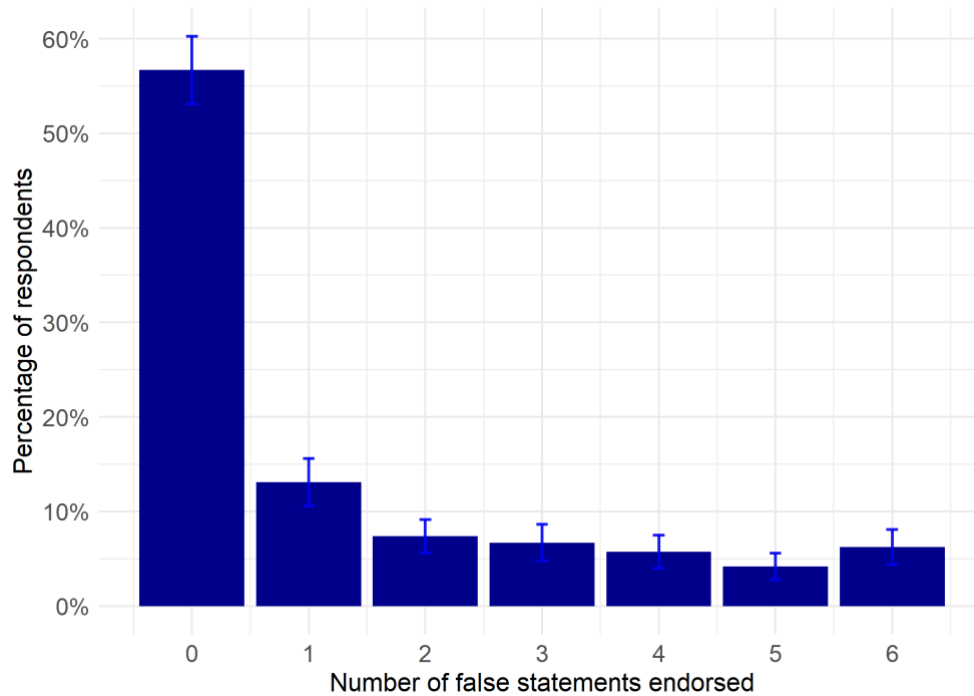
Figures A1 and A2 show the perceived truthfulness of the six false statements in our false beliefs index. The statements were the following: (1) the government is exaggerating the risks of the coronavirus to be able to restrict people’s rights and freedoms; (2) the virus was created by China to increase its power in the world; (3) the virus was created by large corporations because some of them can directly profit from it; (4) the prolonged use of masks can lead to CO<sub>2</sub> intoxication or oxygen deficiency; (5) hydroxychloroquine is an effective treatment against COVID-19; and (6) coronavirus figures are inflated because a significant number of people who tested positive were not infected with the virus.



**Figure A1. Distribution of the perceived truthfulness of each false statement.** Weighted percentages of responses falling into each category are shown with 95% confidence intervals.



**Figure A2. Weighted percentage of respondents endorsing each false statement.** False statements are coded as true when the perceived truthfulness is greater than 5/10, false when it is lower than 5/10, and unsure when it is exactly 5/10.

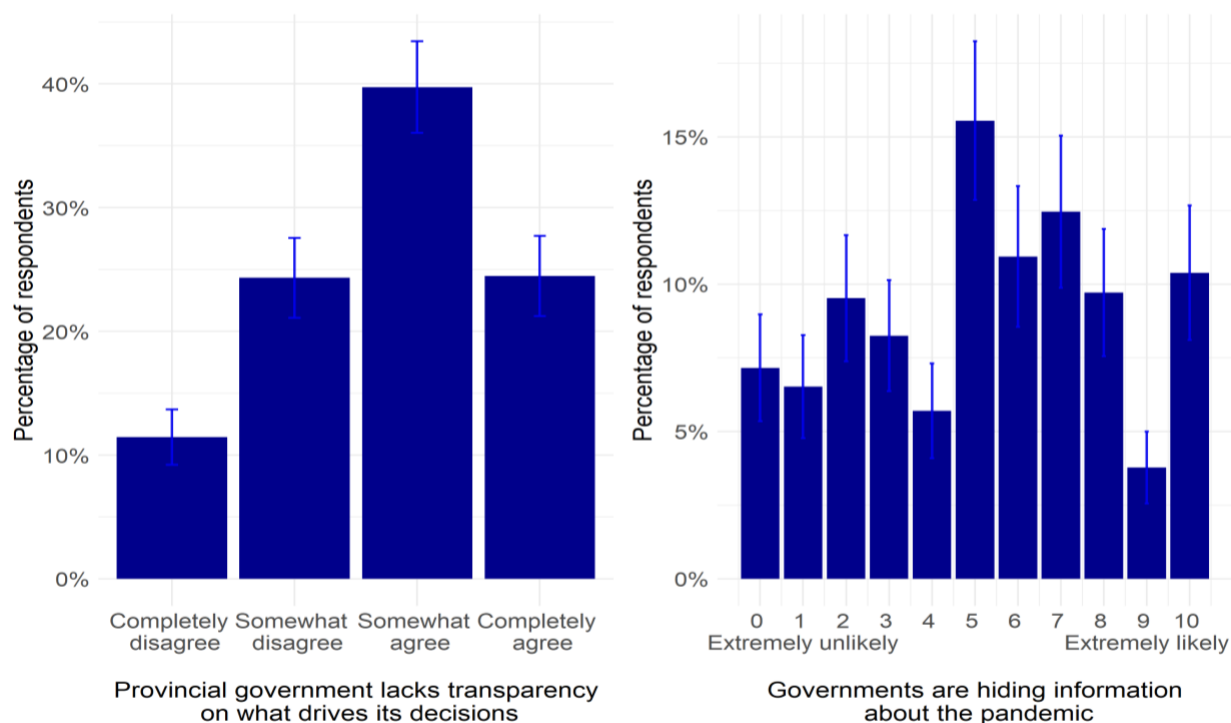


**Figure A3. Number of false statements endorsed.** Weighted percentages of respondents by number of false statements endorsed are reported with 95% confidence intervals. The number of false statements endorsed represents the number of false statements to which a respondent assigned a perceived level of truthfulness of 6 or more on a 0 (not likely at all to be true) to 10 (extremely likely to be true) scale.

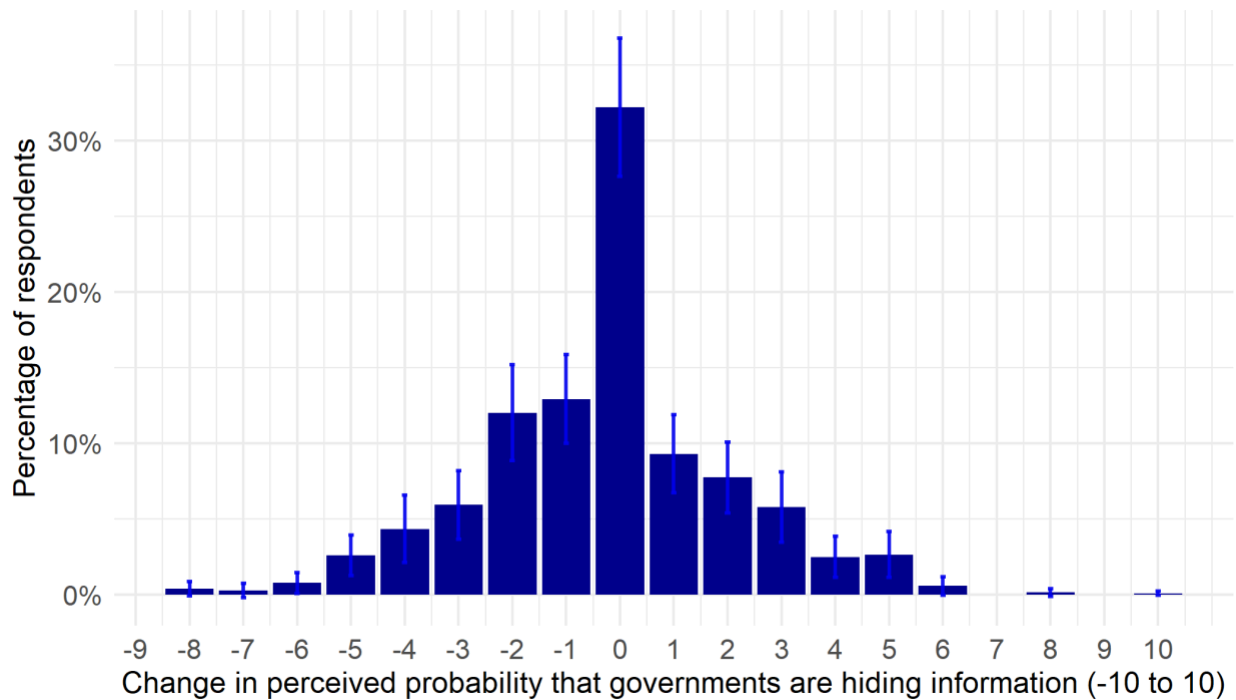


**Table A2.** Correlation between false beliefs.

	Restrict rights	Power China	Benefit companies	CO <sub>2</sub> intoxication	Hydroxychloroquine	False positives
Restrict rights	1					
Power China	0.61	1				
Benefit companies	0.68	0.72	1			
CO <sub>2</sub> intoxication	0.70	0.62	0.67	1		
Hydroxychloroquine	0.60	0.54	0.59	0.57	1	
False positives	0.78	0.58	0.64	0.69	0.58	1



**Figure A4.** Distribution of the variables measuring perceptions of government transparency in the third wave (January 2021). Weighted percentages of respondents falling into each response category are reported with 95% confidence intervals.



**Figure A5. Distribution of the variable measuring the difference in the perceived likelihood (0-10) that governments are hiding information about the pandemic between the second wave (June 2020) and the third wave (January 2021).** For example, a respondent reporting that the perceived likelihood that governments are hiding information is 8/10 in June 2020 and 5/10 in January 2021 would be coded as -3. Weighted percentages are reported with 95% confidence intervals.

## Appendix B: Main results tables

This Appendix presents the regression tables of the main results presented in the manuscript. Table B1 shows the results of the OLS regression models that were used to examine the association between the false beliefs index and two measures of perceptions of transparency: perceptions that the government lacks transparency about what drives its decision and perceptions that governments are hiding information about the pandemic. These results were used to build Figure 1 in the manuscript. Table B2 presents the results of OLS regression models examining how false beliefs and perceptions of transparency are associated with changes in voting intentions at the federal and provincial levels. These results were used in the main text to illustrate that false beliefs have implications for democratic accountability. Table B3 reports the results of OLS regression models showing that perceptions of transparency can also predict changes in trust in governments and satisfaction with democracy. Table B4 shows the results of OLS regression models examining the association between the false beliefs index and changes in perceptions of transparency between the second and third survey wave. These results constitute the cornerstone of what is presented in the *Finding 2* section in the main text. Finally, Table 5 shows the results of a multinomial logistic regression examining the association between the false beliefs index and responses provided to an open-ended question asking respondents to explain what they believe the government is hiding about the pandemic. Only those answering that the likelihood that governments are hiding information is 4/10 or more were asked this question. The responses were manually coded by two coders to distinguish between those who think governments are manipulating the public (misinformation-based answers), those who express a general mistrust of government, those who question the handling of the pandemic, and those who have positive perceptions of government transparency. These results were used to build Figure 3 in the manuscript.

**Table B1.** Results of OLS regressions examining the relationship between false beliefs and perceptions of transparency. Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Hides information (1)	Lacks transparency (2)
False beliefs	0.65*** (0.04)	0.34*** (0.05)
Trust scientists	-0.06 (0.05)	0.05 (0.07)
Federal PID	-0.05* (0.02)	-0.02 (0.03)
Provincial PID	0.01 (0.02)	-0.11*** (0.03)
Left-right ideology	-0.02 (0.05)	-0.01 (0.06)
Social media news consumption	-0.01 (0.03)	-0.03 (0.04)
TV news consumption	-0.04 (0.03)	-0.07+ (0.04)
Print news consumption	-0.03 (0.04)	0.005 (0.05)
Age	-0.07 (0.04)	-0.03 (0.04)
Female	0.01 (0.02)	-0.04 (0.02)
Education	-0.02 (0.03)	-0.03 (0.03)
Regional fixed effects	Yes	Yes
Observations	880	848
R <sup>2</sup>	0.38	0.18
Adjusted R <sup>2</sup>	0.37	0.16
Residual Std. Error	0.23	0.29

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

**Table B2.** Results of OLS regressions examining the relationship between false beliefs, perceptions of transparency, and changes in voting intentions for the governing party between Wave 2 (June 2020) and Wave 3 (January 2021). Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	$\Delta$ Vote federal (1)	$\Delta$ Vote federal (2)	$\Delta$ Vote provincial (3)	$\Delta$ Vote provincial (4)
False beliefs	-0.02 (0.05)		-0.17* (0.07)	
Hides information (t-1)		0.01 (0.05)		-0.13* (0.06)
Trust scientists (t-1)	0.001 (0.06)	0.01 (0.06)	0.08 (0.10)	0.10 (0.10)
Federal PID (t-1)	0.13* (0.06)	0.13* (0.06)		
Provincial PID (t-1)			0.29*** (0.07)	0.28*** (0.07)
Left-right ideology (t-1)	0.01 (0.06)	0.004 (0.06)	0.21* (0.09)	0.19* (0.08)
Social media news consumption	-0.0005 (0.05)	-0.01 (0.05)	0.002 (0.05)	-0.02 (0.05)
TV news consumption	0.03 (0.05)	0.03 (0.05)	-0.01 (0.06)	-0.01 (0.06)
Print news consumption	0.08 (0.06)	0.07 (0.06)	0.01 (0.07)	0.004 (0.07)
Age	-0.05 (0.05)	-0.05 (0.06)	-0.14* (0.08)	-0.16* (0.08)
Female	0.02 (0.03)	0.02 (0.03)	-0.04 (0.03)	-0.04 (0.03)
Education	0.002 (0.04)	0.004 (0.04)	0.001 (0.05)	-0.01 (0.05)
Vote federal (t-1)	-0.29*** (0.05)	-0.29*** (0.05)		

Vote provincial (t-1)			-0.54*** (0.06)	-0.53*** (0.06)
Regional fixed effects	Yes	Yes	Yes	Yes
Observations	556	551	555	550
R <sup>2</sup>	0.16	0.16	0.28	0.28
Adjusted R <sup>2</sup>	0.14	0.13	0.26	0.26
Residual Std. Error	0.28	0.28	0.34	0.34

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

**Table B3.** Results of OLS regressions examining the relationship between perceptions that governments are hiding information and changes in trust in governments and satisfaction with democracy between Wave 2 (June 2020) and Wave 3 (January 2021). Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Trust federal government (1)	Trust provincial government (2)	Satisfaction democracy (3)
Hides information (t-1)	-0.17*** (0.04)	-0.13** (0.04)	-0.18*** (0.05)
Trust scientists (t-1)	0.005 (0.05)	0.07 (0.06)	0.01 (0.07)
Federal PID (t-1)	0.07* (0.03)		0.05 (0.03)
Provincial PID (t-1)		0.06* (0.03)	-0.07* (0.03)
Left-right ideology (t-1)	-0.02 (0.05)	0.05 (0.06)	-0.01 (0.06)
Social media news consumption	-0.01 (0.04)	0.07+ (0.04)	0.09* (0.04)
TV news consumption	0.06+ (0.03)	0.01 (0.04)	0.03 (0.04)
Print news consumption	-0.03 (0.04)	0.01 (0.05)	0.02 (0.04)
Age	-0.03 (0.04)	0.05 (0.05)	0.03 (0.05)
Female	0.04+ (0.02)	0.01 (0.02)	-0.04+ (0.02)

Education	-0.002 (0.02)	0.005 (0.03)	0.01 (0.03)
Satisfaction with democracy (t-1)			-0.59*** (0.06)
Trust federal (t-1)	-0.45*** (0.04)		0.12* (0.06)
Trust provincial (t-1)		-0.48*** (0.05)	0.04 (0.06)
Regional fixed effects	Yes	Yes	Yes
Observations	549	546	535
R <sup>2</sup>	0.27	0.22	0.30
Adjusted R <sup>2</sup>	0.25	0.20	0.28
Residual Std. Error	0.19	0.21	0.21

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

**Table B4.** Results of OLS regressions examining the relationship between false beliefs and changes in perceptions of transparency between Wave 2 (June 2020) and Wave 3 (January 2021). Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Δ Hides information (1)	Δ Hides information (2)	Δ Hides information (3)
False beliefs	4.13*** (0.52)	4.21*** (0.53)	4.38*** (0.53)
Δ Trust federal			-0.08 (0.51)
Δ Trust provincial			0.10 (0.49)
Δ Handling federal		-0.18 (0.54)	-0.27 (0.53)
Δ Handling provincial		-0.14 (0.39)	-0.25 (0.42)
Trust scientists (t-1)	-1.16* (0.57)	-1.24* (0.58)	-1.21* (0.59)
Federal PID (t-1)	-0.16 (0.28)	-0.16 (0.28)	-0.16 (0.28)
Provincial PID (t-1)	-0.04 (0.27)	-0.04 (0.27)	-0.03 (0.27)

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Left-right ideology (t-1)	0.24 (0.48)	0.20 (0.49)	0.18 (0.49)
Social media news consumption	-0.10 (0.32)	-0.15 (0.33)	-0.17 (0.33)
TV news consumption	-0.19 (0.35)	-0.22 (0.36)	-0.32 (0.36)
Print news consumption	0.27 (0.38)	0.40 (0.38)	0.40 (0.38)
Age	-0.19 (0.47)	-0.24 (0.50)	-0.20 (0.51)
Female	-0.01 (0.20)	0.003 (0.21)	0.01 (0.21)
Education	0.07 (0.28)	-0.04 (0.29)	-0.12 (0.29)
Hides information (t-1)	-0.53 <sup>***</sup> (0.05)	-0.52 <sup>***</sup> (0.05)	-0.53 <sup>***</sup> (0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	535	522	517
R <sup>2</sup>	0.28	0.28	0.29
Adjusted R <sup>2</sup>	0.26	0.26	0.26
Residual Std. Error	1.97	1.97	1.96

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+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001



**Table B5.** Results of a multinomial logistic regression examining the relationship between false beliefs and categories of answers to an open-ended question asking respondents to explain what governments are hiding about the pandemic, with four categories (positive perceptions, handling of the pandemic, general mistrust, and manipulation of the public). Logistic coefficients are shown with standard errors in parentheses.

	Handling of the pandemic (1)	General mistrust (2)	Manipulation of the public (3)
False beliefs	2.07*** (0.50)	4.71*** (0.56)	6.10*** (0.58)
Trust scientists	-0.67 (0.46)	-1.06* (0.52)	-0.49 (0.53)
Left-right ideology	-0.63 (0.49)	-0.06 (0.62)	0.48 (0.63)
Social media news consumption	0.05 (0.30)	-0.35 (0.38)	-0.07 (0.38)
TV news consumption	-0.75* (0.31)	-0.53 (0.38)	-0.41 (0.39)
Print news consumption	-0.24 (0.39)	-0.22 (0.49)	-0.98+ (0.53)
Age	-0.39 (0.37)	-0.65 (0.45)	-0.60 (0.45)
Female	0.05 (0.18)	0.29 (0.23)	0.45* (0.23)
Education	0.21 (0.24)	-0.21 (0.30)	-0.93** (0.31)
Regional fixed effects	Yes	Yes	Yes
Observations	880	880	880
Akaike Inf. Crit.	2,052.03	2,052.03	2,052.03

Notes: Positive perceptions of transparency constitutes the reference category.

+  $p < .1$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

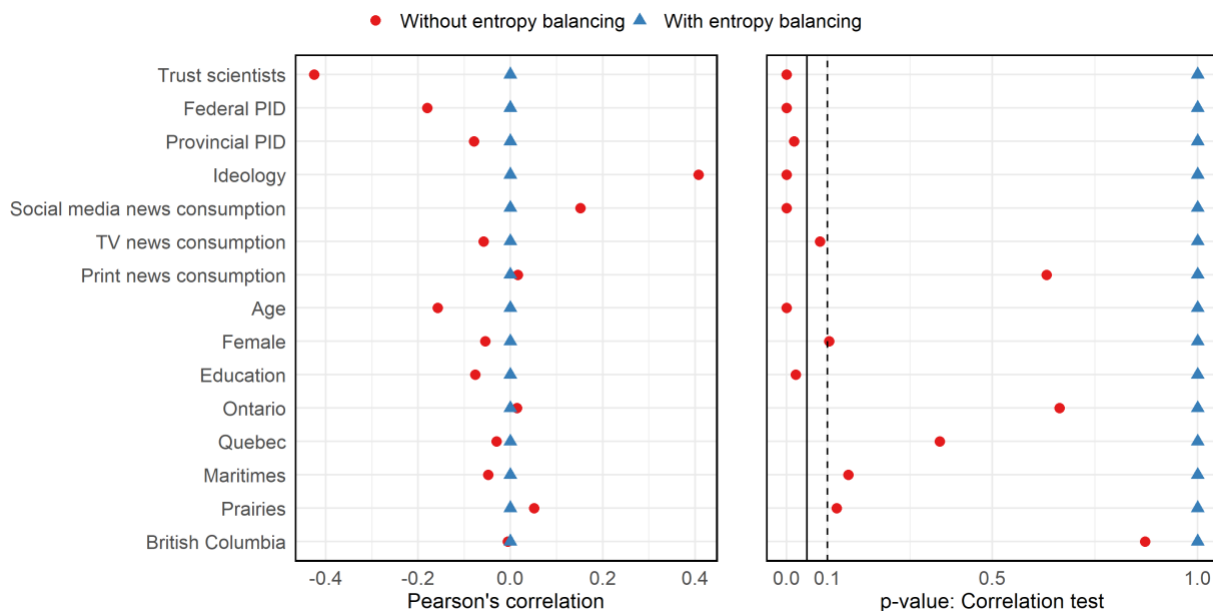
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## Appendix C: Robustness checks

This Appendix presents the results of the robustness checks that were made to evaluate the robustness of the results. First, we show that the results are similar when using entropy balancing to make individuals who assigned high and low levels of truthfulness to COVID-19 false statements more comparable on relevant observable covariates (i.e., variables that are associated both with the perceived truthfulness of false statements and with perceptions of transparency). The results are presented in Figure C1 and Table C1. Second, we examine how each false belief item contributes to perceptions of transparency and show that false beliefs that are conspiratorial in nature and false beliefs that are not necessarily related to conspiracy theories both predict perceptions of transparency, as reported in Tables C2 and C3. Relatedly, we used exploratory factor analysis to examine the structure of false beliefs and assess if there could exist different types of false beliefs. We identify two types of false beliefs among the false statements we used—those related to the severity of COVID-19 and those related to the origin of the virus—and show their respective association with perceptions of transparency. The results of these analyses are presented in Tables C4 to C7. We also examined whether the results remain unchanged when including both true and false statements in the false beliefs index, as reported in Table C8. Figure C2 shows the results of a specification curve analysis that we conducted to examine how much the size of the coefficient for “false beliefs” depends on the specification of our OLS model. A simulation was conducted where the model could include any combination of variables among a list of 22 control variables. Finally, Figure C3 shows that the results of our multinomial logistic regression examining the relationship between false beliefs and categories of answers to an open-ended question asking respondents to explain what governments are hiding about the pandemic are not influenced by the method used to deal with disagreements between coders.

### *Entropy balancing*

Entropy balancing, a preprocessing method that reweights observations to achieve covariate balance (i.e., to remove observable differences between treated and control units), was used to better isolate the effect of false beliefs from that of other correlated variables, by making sure that we compare individuals that are similar on other relevant covariates (Hainmueller, 2012). Given the continuous nature of the false-beliefs variable, we used entropy balancing for continuous treatment, which reweights units to achieve zero correlations between the treatment variable and covariates (Tübbicke, 2020). Using standard entropy balancing (which requires dichotomizing the treatment based on whether respondents have endorsed at least one of the false statements or not) or also including trust in the federal and provincial governments in the entropy balancing yield similar results. Entropy balancing succeeded in removing any correlation between false beliefs and the covariates, as reported in Figure C1. Entropy balancing also successfully removed the correlation between false beliefs and the square of each variable. Using entropy balancing does not change our conclusions about the association between false beliefs and perceptions of transparency, as coefficients are of a similar magnitude, as shown in Table C1.



**Figure C1. Pearson's correlation between false beliefs and covariates before and after entropy balancing.** Left panel shows Pearson's correlation coefficients between false beliefs and covariates. A correlation coefficient of zero indicates there is no linear relationship between false beliefs and covariates, correlations greater than zero indicates that false beliefs are associated with higher values on the covariates, and correlations lower than zero indicates that false beliefs are associated with lower values on the covariates. The right panel shows the p-value for a covariate-by-covariate correlation test. A p-value lower than 0.05 indicates that the correlation coefficient is significant.

Note that we balanced partisan identification, ideology, and trust in scientists at t-1 in the model predicting changes in perceptions that governments are hiding information. The correlations are also reduced to 0. Measuring these variables at t instead yield similar results.

**Table C1. Results of OLS regressions examining the relationship between false beliefs and perceptions of transparency after entropy balancing.** Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Hides information Lacks transparency Δ Hides information		
	(1)	(2)	(3)
False beliefs	0.66*** (0.05)	0.30*** (0.05)	3.48*** (0.58)
Trust scientists	-0.21** (0.07)	-0.11+ (0.06)	
Federal PID	-0.01 (0.03)	-0.004 (0.03)	
Provincial PID	0.03 (0.03)	-0.08** (0.03)	
Left-right ideology	-0.01 (0.07)	-0.11 (0.07)	
Trust scientists (t-1)			-1.65*

			(0.82)
Federal PID (t-1)			-0.08 (0.29)
Provincial PID (t-1)			-0.16 (0.29)
Left-right ideology (t-1)			0.22 (0.53)
Social media news consumption	-0.03 (0.04)	-0.03 (0.04)	-0.05 (0.37)
TV news consumption	0.02 (0.04)	-0.03 (0.05)	-0.21 (0.41)
Print news consumption	-0.002 (0.05)	0.03 (0.06)	0.62 (0.44)
Age	-0.10 <sup>+</sup> (0.06)	-0.07 (0.06)	-0.93 <sup>+</sup> (0.52)
Female	0.004 (0.02)	-0.04 <sup>+</sup> (0.03)	-0.33 (0.24)
Education	0.02 (0.03)	-0.03 (0.03)	-0.32 (0.35)
Hides information (t-1)			-0.46 <sup>***</sup> (0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	880	848	535
R <sup>2</sup>	0.35	0.16	0.24
Adjusted R <sup>2</sup>	0.34	0.14	0.22
Residual Std. Error	0.25	0.29	2.11

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

*Disaggregating the false beliefs index into its constitutive elements*

We did different tests to examine how specific items contribute to the relationship between false beliefs and perceptions of government transparency. First, it is interesting, from a theoretical perspective, to distinguish between items that are expressly conspiratorial (e.g., they identify powerful groups that can benefit from some secret plans) and those that are not expressly conspiratorial (e.g., health-related misinformation, which might still have been used as part of some conspiracy theories). The three conspiratorial items are as follows: (1) the government is exaggerating the risks of the coronavirus to be able to restrict people's rights and freedoms; (2) the virus was created by China to increase its power in the world; and (3) the virus has been created by large corporations because some of them can directly profit from it. The three health-related statements are as follows: (1) the prolonged use of masks can lead to CO<sub>2</sub> intoxication or oxygen deficiency; (2) hydroxychloroquine is an effective treatment against COVID-19; and (3) coronavirus figures are inflated because a significant number of people tested positive are not infected with the virus.

The first two columns of Table C2 and C3 respectively present the disaggregated results of the conspiratorial and health-related (not-expressly-conspiratorial) items, while the third column presents the results when including all items. The results suggest that the belief that the government is exaggerating the pandemic to be able to restrict people's rights, that figures are inflated because of false positives, and that China has created the coronavirus to increase its power in the world have the strongest independent effects on perceptions of transparency.

**Table C2.** Results of OLS regressions examining the relationship between the perceived truthfulness of each false statement and perceptions that governments are hiding information about the pandemic. Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Hides information (1)	Hides information (2)	Hides information (3)
Restrict rights	0.39*** (0.05)		0.28*** (0.06)
Power China	0.18*** (0.05)		0.16** (0.05)
Benefit companies	0.02 (0.06)		0.01 (0.06)
CO <sub>2</sub> masks		0.11* (0.04)	-0.0001 (0.05)
Hydroxychloroquine		0.03 (0.04)	-0.04 (0.04)
False positives		0.39*** (0.05)	0.20*** (0.06)
Trust scientists	-0.04* (0.02)	-0.05* (0.02)	-0.04+ (0.02)
Federal PID	0.003 (0.02)	0.005 (0.02)	0.004 (0.02)

Provincial PID	-0.02 (0.05)	0.02 (0.06)	-0.03 (0.05)
Left-right ideology	0.01 (0.03)	-0.01 (0.03)	-0.003 (0.03)
Social media news consumption	-0.03 (0.03)	-0.02 (0.03)	-0.02 (0.03)
TV news consumption	-0.02 (0.04)	-0.03 (0.04)	-0.02 (0.04)
Print news consumption	-0.08* (0.04)	-0.09* (0.04)	-0.09* (0.04)
Age	0.02 (0.02)	0.01 (0.02)	0.02 (0.02)
Female	-0.03 (0.02)	-0.01 (0.03)	-0.02 (0.03)
Education	-0.06 (0.05)	-0.10* (0.05)	-0.05 (0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	880	880	880
R <sup>2</sup>	0.40	0.36	0.41
Adjusted R <sup>2</sup>	0.39	0.35	0.40
Residual Std. Error	0.23	0.24	0.23

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

**Table C3.** Results of OLS regressions examining the relationship between the perceived truthfulness of each false statement and changes in perceptions that governments are hiding information about the pandemic between Wave 2 (June 2020) and Wave 3 (January 2021). Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Δ Hides information (1)	Δ Hides information (2)	Δ Hides information (3)
Restrict rights	2.77*** (0.56)		2.34*** (0.66)
Power China	0.33 (0.52)		0.34 (0.53)
Benefit companies	0.76 (0.52)		0.71 (0.57)
CO <sub>2</sub> masks		0.82 (0.52)	-0.03 (0.55)
Hydroxychloroquine		0.09 (0.46)	-0.44 (0.47)
False positives		2.35*** (0.57)	0.94 (0.66)
Trust scientists (t-1)	-1.28* (0.56)	-1.23* (0.57)	-1.23* (0.57)
Federal PID (t-1)	-0.12 (0.28)	-0.17 (0.28)	-0.11 (0.29)
Provincial PID (t-1)	-0.02 (0.27)	-0.09 (0.27)	-0.05 (0.27)
Left-right ideology (t-1)	0.19 (0.48)	0.44 (0.49)	0.22 (0.49)
Social media news consumption	-0.06 (0.33)	-0.10 (0.33)	-0.07 (0.33)
TV news consumption	-0.12 (0.36)	-0.12 (0.35)	-0.11 (0.36)
Print news consumption	0.29 (0.37)	0.35 (0.38)	0.32 (0.38)
Age	-0.29 (0.46)	-0.38 (0.47)	-0.37 (0.46)
Female	0.01 (0.20)	-0.01 (0.21)	0.02 (0.21)

Education	-0.03 (0.27)	0.06 (0.29)	-0.03 (0.28)
Hides information (t-1)	-0.54*** (0.05)	-0.49*** (0.05)	-0.55*** (0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	535	535	535
R <sup>2</sup>	0.30	0.27	0.31
Adjusted R <sup>2</sup>	0.28	0.24	0.28
Residual Std. Error	1.95	2.00	1.95

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

### *Exploratory factor analysis*

We also ran an exploratory factor analysis<sup>2</sup> to see if different COVID-19 false statements can potentially load on different factors and have a different impact on perceptions of government transparency. We still believe that it is justified to use a single factor given the high correlations between items, the high Cronbach's alpha, and the fact that principal component analysis indicates that there is a single factor with an Eigenvalue greater than 1 (4.2). Nevertheless, the results of the exploratory factor analysis presented in Table C4 suggest that some items might contribute more to some subdimensions than others. The results suggest that two factors are sufficient, since we fail to reject the null hypothesis that two factors are sufficient,  $X^2(4, N = 1005) = 1.09, p = .90$ .

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<sup>2</sup> Exploratory factor analysis is a statistical method that is used to identify the latent constructs (i.e., factors) that underly a set of variables (Watkins, 2018). We use exploratory factor analysis to reduce our false beliefs items to a smaller number of hypothetical constructs that are assumed to explain the order and structure among false beliefs.



**Table C4.** Factor loadings and communality for varimax rotated two-factor solution for six false beliefs items.

	Factor loading		Communality
	1 Severity	2 Origin	
The government is exaggerating the risks of the coronavirus to be able to restrict people's rights and freedoms.	0.76	0.45	0.78
Coronavirus figures are inflated because a significant number of people tested positive are not infected with the virus.	0.79	0.39	0.78
The virus was created by China to increase its power in the world.	0.37	0.73	0.67
The virus has been created by large corporations because some of them can directly profit from it.	0.44	0.76	0.77
The prolonged use of masks can lead to CO <sub>2</sub> intoxication or oxygen deficiency.	0.61	0.53	0.65
Hydroxychloroquine is an effective treatment against COVID-19.	0.50	0.48	0.49

**Table C5.** Eigenvalues, percentages of variance, and cumulative percentages for factors for six false beliefs items.

Factor	Eigenvalue	% of variance	Cumulative %
1	4.20	36.57	36.57
2	0.51	32.49	69.05

Based on the results of the factor analysis, we created two factors using the factor loadings, that is weighting each item based on their contribution to each factor. We have named the first factor the "Severity factor," given that the two items that contribute the most to this factor are the idea that (1) the government is exaggerating the risks of the coronavirus to be able to restrict people's rights and freedoms; and (2) coronavirus figures are inflated because a significant number of people tested positive are not infected with the virus. We named the second factor the "Origin factor," given the comparatively high contribution of the following two items: (1) the virus was created by China to increase its power in the world; (2) the virus has been created by large corporations because some of them can directly profit from it. Tables C6 and C7 show the results of the regression analysis when using these two factors in place of the false-beliefs index. The results suggest that different types of false beliefs (about the severity and origin of the pandemic) can have different, independent effects on perceptions of transparency.

**Table C6.** Results of OLS regressions examining the relationship between different false beliefs indices and perceptions that governments are hiding information about the pandemic. Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Hides information (1)	Hides information (2)	Hides information (3)
Severity factor	0.16*** (0.02)		0.15*** (0.01)
Origin factor		0.12*** (0.01)	0.10*** (0.01)
Trust scientists	-0.14** (0.05)	-0.17** (0.05)	-0.06 (0.05)
Federal PID	-0.05* (0.02)	-0.06* (0.02)	-0.05* (0.02)
Provincial PID	0.004 (0.02)	-0.01 (0.02)	0.01 (0.02)
Left-right ideology	0.06 (0.06)	0.13* (0.06)	-0.02 (0.05)
Social media news consumption	0.01 (0.03)	0.03 (0.03)	-0.01 (0.03)
TV news consumption	-0.002 (0.04)	-0.07* (0.04)	-0.02 (0.03)
Print news consumption	-0.02 (0.04)	-0.02 (0.04)	-0.03 (0.04)
Age	-0.10* (0.04)	-0.09* (0.04)	-0.07+ (0.04)
Female	0.01 (0.02)	0.004 (0.02)	0.02 (0.02)
Education	-0.03 (0.03)	-0.01 (0.03)	-0.02 (0.03)
Regional fixed effects	Yes	Yes	Yes
Observations	879	879	879
R <sup>2</sup>	0.34	0.26	0.40
Adjusted R <sup>2</sup>	0.33	0.24	0.38
Residual Std. Error	0.24	0.26	0.23

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

**Table C7.** Results of OLS regressions examining the relationship between two false beliefs indices and changes in perceptions that governments are hiding information about the pandemic between Wave 2 (June 2020) and Wave 3 (January 2021). Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	ΔHides information		
	(1)	(2)	(3)
Severity factor	1.00*** (0.19)		0.99*** (0.17)
Origin factor		0.60*** (0.14)	0.59*** (0.16)
Trust scientists (t-1)	-1.41* (0.55)	-1.78** (0.56)	-1.12* (0.57)
Federal PID (t-1)	-0.16 (0.28)	-0.20 (0.30)	-0.15 (0.28)
Provincial PID (t-1)	-0.08 (0.27)	-0.10 (0.29)	-0.04 (0.27)
Left-right ideology (t-1)	0.43 (0.50)	0.81 (0.52)	0.21 (0.48)
Social media news consumption	-0.07 (0.35)	0.25 (0.34)	-0.15 (0.33)
TV news consumption	-0.03 (0.37)	-0.35 (0.37)	-0.11 (0.36)
Print news consumption	0.39 (0.38)	0.18 (0.39)	0.32 (0.38)
Age	-0.41 (0.47)	-0.14 (0.50)	-0.30 (0.47)
Female	-0.003 (0.21)	-0.08 (0.21)	0.005 (0.20)
Education	-0.02 (0.29)	0.22 (0.28)	0.01 (0.28)
Hides information (t-1)	-0.47*** (0.06)	-0.43*** (0.04)	-0.53*** (0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	535	535	535
R <sup>2</sup>	0.26	0.20	0.29
Adjusted R <sup>2</sup>	0.24	0.18	0.27
Residual Std. Error	2.00	2.07	1.96

+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

### Accounting for the acceptance or rejection of true statements

In the survey, we also measured the perceived truthfulness of three statements that are assumed to be true, based on the best expert evidence available at the time. These statements were included to avoid bias caused by asking respondents to only evaluate the truthfulness of false statements. The three statements are as follows:

- The virus is the result of an accidental animal-human transmission that occurred in China (Maxmen & Mallapaty, 2021).
- The only permanent solution to this pandemic is developing a vaccine (van Riel & de Wit, 2020).
- The number of accidental poisonings involving hand sanitizer and children has increased significantly since the pandemic began (Feireisen, 2020).

To incorporate the effect of accepting or rejecting true information into our assessment of the relationship between false beliefs and perceptions of transparency, we computed a new variable consisting of the difference between the perceived truthfulness of the false and true statements. The variable is measured on a -1 to 1 scale, where -1 indicates a complete belief in true statements and disbelief in false statements and 1 indicates the reverse. Including the acceptance of true statements in our measure of false beliefs does not change our conclusions. The results presented in Table C8 show that the greater the distance between the perceived truthfulness of false and true statements, the greater the likelihood of believing that governments are hiding information or lacking transparency about what motivates their decisions. To put it simply, those who believe the COVID-19 misinformation statements but not the factual statements are more likely to have negative perceptions of government transparency.

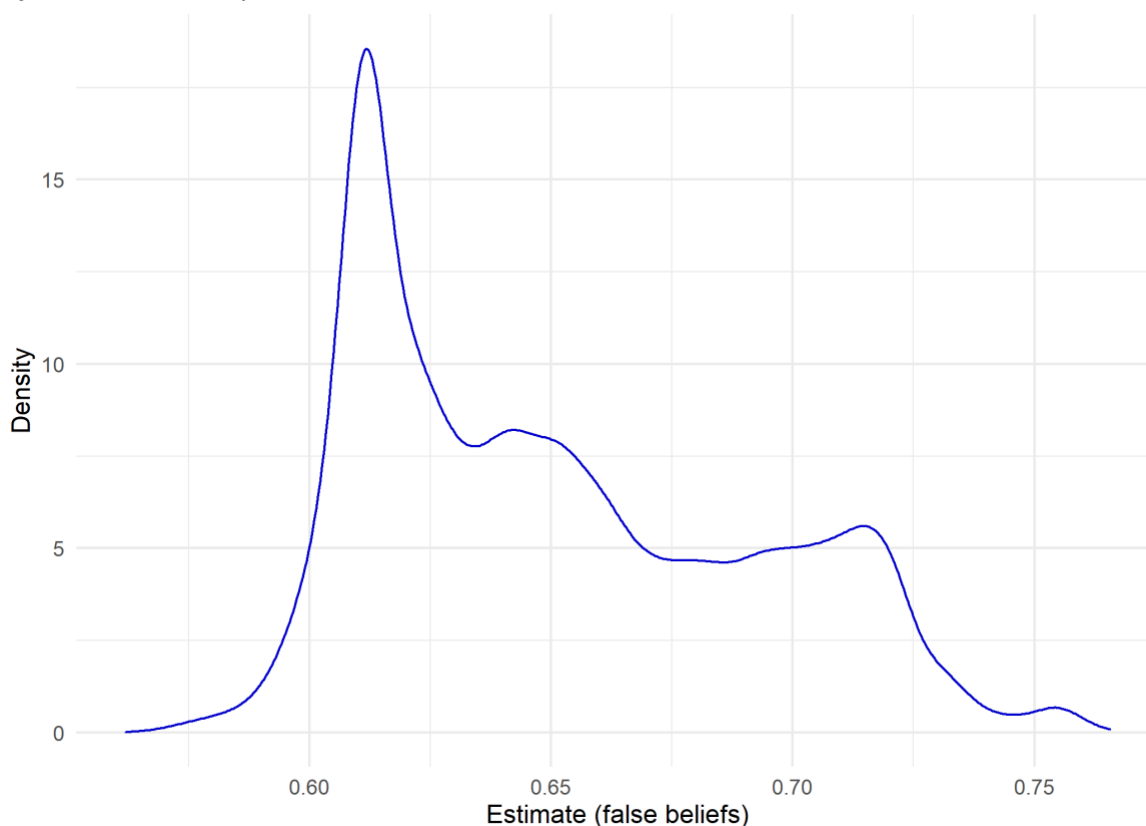
**Table C8.** Results of OLS regressions examining the relationship between the difference in the perceived truthfulness of the false and true statements (-1 to 1) and perceptions of transparency. Unstandardized regression coefficients are shown with robust (HC2) standard errors in parentheses.

	Hides information (1)	Lacks transparency (2)	ΔHides information (3)
False - true beliefs	0.42*** (0.04)	0.24*** (0.04)	3.00*** (0.40)
Trust scientists	-0.12* (0.05)	0.02 (0.07)	
Trust scientists (t-1)			-1.35** (0.56)
Federal PID	-0.04 (0.02)	-0.01 (0.03)	-0.11 (0.29)
Provincial PID	-0.01 (0.02)	-0.11*** (0.03)	-0.10 (0.29)
Left-right ideology	0.08 (0.06)	0.04 (0.06)	0.52 (0.50)
Social media news consumption	0.03 (0.03)	-0.01 (0.04)	0.04 (0.32)
TV news consumption	-0.02	-0.06	-0.07

	(0.04)	(0.04)	(0.35)
Print news consumption	0.01	0.02	0.44
	(0.04)	(0.05)	(0.37)
Age	-0.08 <sup>+</sup>	-0.04	-0.37
	(0.05)	(0.05)	(0.49)
Female	0.01	-0.04	-0.17
	(0.02)	(0.02)	(0.20)
Education	-0.02	-0.03	-0.03
	(0.03)	(0.03)	(0.29)
Hides information (t-1)			-0.49 <sup>***</sup>
			(0.05)
Regional fixed effects	Yes	Yes	Yes
Observations	880	848	535
R <sup>2</sup>	0.30	0.16	0.26
Adjusted R <sup>2</sup>	0.29	0.15	0.24
Residual Std. Error	0.25	0.29	2.00

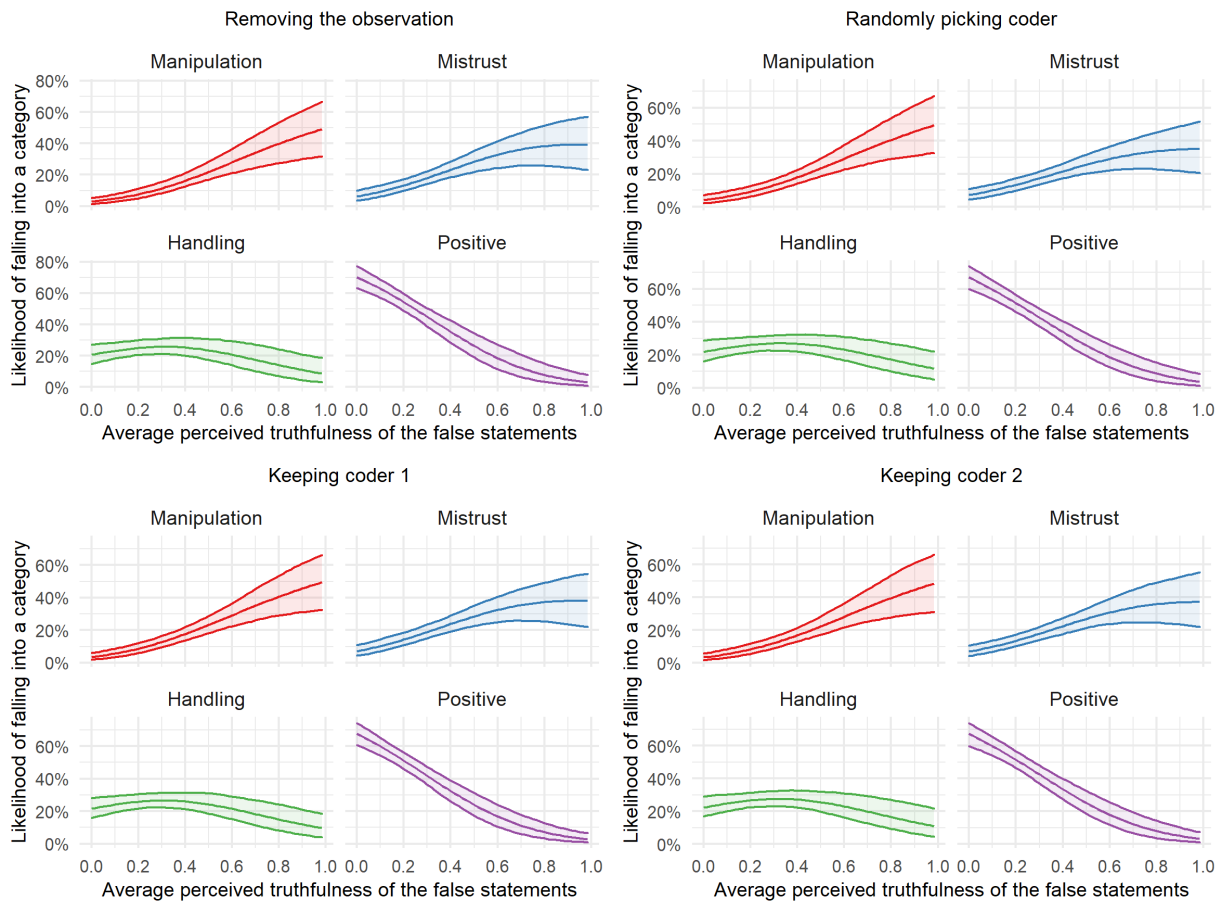
+ p < .1; \* p < .05; \*\* p < .01; \*\*\* p < .001

## Specification curve analysis



**Figure C2. Density of the “False beliefs” unstandardized regression coefficient across 50,000 randomly sampled model specifications.** Results based on OLS regression models where perceptions that governments are hiding information about the pandemic is the dependent variable. Across specifications, control variables could randomly include any combination of the following variables: age, sex, education, identification with the governing federal and provincial parties, ideology, trust in scientists, frequency of exposure to COVID-19 information on television, radio, newspapers, and social media, trust in the federal and provincial governments, identification with opposition parties, generalized social trust, perceived threat of becoming unemployed, life satisfaction, and emotions caused by COVID-19 (fear, anger).

## Using different methods to deal with disagreement between coders



**Figure C3: Results of the multinomial logistic models based on the method used to deal with disagreement between coders.** Predicted probability of falling into each response category to an open-ended question asking respondents to explain what governments are hiding about the pandemic, based on the perceived truthfulness of COVID-19 false statements. Predicted probabilities are generated from a multinomial logistic regression, with 95% confidence intervals, using an observed value approach (MNL\_pred package in R). The model controls for trust in scientists, identification with the federal and provincial governing party, ideology, news consumption, and socio-demographic variables (age, gender, education, region). Four methods of dealing with disagreement are compared: removing the observation (top-left panel); randomly selecting one of the two codes (top-right panel); keeping the code of the first coder (bottom-left panel); and keeping the code of the second coder (bottom-right panel).

## Appendix D: Variable coding

**Table D1.** Classification of the open-ended responses to the following question: Can you briefly explain what you think the government is hiding about the coronavirus epidemic?

Category	Sub-categories	Description of what should be included
(1) Manipulation of the public (15% of answers)	Conspiracy/hidden agenda	<p>Answers that refer to:</p> <ul style="list-style-type: none"> <li>• population reduction,</li> <li>• controlling the population,</li> <li>• the Great Reset,</li> <li>• 5G,</li> <li>• Bill Gates,</li> <li>• Plandemic,</li> <li>• a hoax,</li> <li>• COVID-19 being a bioweapon,</li> <li>• a secret agenda,</li> <li>• corporations and big pharma,</li> <li>• making money with COVID-19,</li> <li>• hiding a cure,</li> <li>• the origin of the virus,</li> <li>• the virus is man-made or was created in a lab,</li> <li>• the reasons behind this pandemic,</li> <li>• Canada was aware of it/covers up for China, etc.</li> </ul>
	Severity overestimated	<p>Answers that indicate that the pandemic is less severe than what governments let us think.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• “inflating the numbers,”</li> <li>• “false positives,”</li> <li>• “accuracy of the tests,”</li> <li>• “real cases,”</li> <li>• “they are counting flu cases/deaths,”</li> <li>• “people die of other causes,”</li> <li>• “dying of the virus versus with the virus,” etc.</li> </ul> <p>We also include people questioning the numbers without further details (e.g., answers saying that governments are hiding the “real” numbers/statistics).</p>
(2) General mistrust (16% of answers)	Explicit mistrust	<p>Answers indicating that the government is:</p> <ul style="list-style-type: none"> <li>• not to be trusted,</li> <li>• never fully honest,</li> <li>• not transparent,</li> <li>• not (always) telling the truth,</li> <li>• usually hiding information,</li> <li>• not telling everything, etc.</li> </ul>



	<p>Unable to explain negative perceptions of transparency</p>	<p>R who answered that the likelihood that governments are hiding information is 5/10 or more and were not able to explain their negative perceptions of transparency. Examples:</p> <ul style="list-style-type: none"> <li>• “I don’t know,”</li> <li>• “It’s an intuition,”</li> <li>• “no comment,” and unintelligible answers.</li> </ul>
<p>(3) Handling of the pandemic (23% of answers)</p>	<p>Decision-making and implementation</p>	<p>Answers that refer to:</p> <ul style="list-style-type: none"> <li>• government motivations (economic, political, health),</li> <li>• the reasoning behind decisions (or questioning the decisions or why/how some decisions were made),</li> <li>• the role of scientific evidence, proactivity, delays in reaction,</li> <li>• (problems with) implementation of sanitary restrictions,</li> <li>• vaccines implementation (vaccine acquisition, timeline, details), etc.</li> </ul>
	<p>Communications</p>	<p>Answers that refer to:</p> <ul style="list-style-type: none"> <li>• the lack of clarity in government communication,</li> <li>• inconsistent/contradictory/changing messages,</li> <li>• governments not answering questions, etc.</li> </ul>
	<p>Request for more details/data</p>	<p>Answers that refer to:</p> <ul style="list-style-type: none"> <li>• the desire to have more information or more specific data about outbreaks, cases, or deaths (by location, ethnicity, age, etc.),</li> <li>• modeling and forecasting,</li> <li>• data about the effectiveness of sanitary restrictions,</li> <li>• the effects of the virus on your body, etc.</li> </ul>
	<p>Costs of the pandemic</p>	<p>Answers that relate to:</p> <ul style="list-style-type: none"> <li>• the economic and health costs of the pandemic, including the costs for small businesses,</li> <li>• the public debt,</li> <li>• the effects of lockdown on mental health,</li> <li>• lack/exhaustion of frontline/healthcare workers, etc.</li> </ul>
	<p>Severity underestimated</p>	<p>Answers that refer to the idea:</p> <ul style="list-style-type: none"> <li>• that numbers (cases, deaths) are higher than reported,</li> <li>• that only a fraction of infected people are being tested,</li> </ul>

		<ul style="list-style-type: none"> <li>that the pandemic is worse than what they are saying,</li> <li>that we will have to live with the virus for a long time, etc.</li> </ul>
(4) Positive perceptions of transparency (46% of answers)	Nothing	<ul style="list-style-type: none"> <li>R who answered that the likelihood that the government are hiding information is 3/10 or less (they did not have to answer the open-ended question),</li> <li>R who answered that the likelihood that governments are hiding information is 4/10 and didn't know what governments are hiding,</li> <li>Answers including expressions like "nothing," "not much," "I don't think that the government is hiding information," "I am not sure they are hiding information," etc.</li> </ul>
	Justifying governments' lack of transparency	<p>Answers including explanations like:</p> <ul style="list-style-type: none"> <li>"to avoid panic,"</li> <li>"providing too much information might reduce clarity/compliance (e.g., uncertainty in scientific findings),"</li> <li>"the government does not have all the information,"</li> <li>"the public does not need to know everything,"</li> <li>"national security,"</li> <li>"privacy,"</li> <li>and other negative consequences of giving all the information.</li> </ul>

**Table D2.** Example of responses falling into each coding category to the following open-ended question: *Can you briefly explain what you think the government is hiding about the coronavirus epidemic?*

Category	Example of responses
Manipulation of the public	<ul style="list-style-type: none"> <li>Because they've been hiding that this virus was made on purpose</li> <li>The covid virus is false, the virus is SARS that has been perfected after its first test run many years ago. Today's SARS has been effecting certain blood types of race for population reasons. World population increasing rapidly, plus an increase of average human life expectancy. Our global food supply is in great jeopardy within 30 years</li> <li>The intentional propagation of fear and intentions to abide by the Great Reset agenda</li> </ul>
General mistrust	<ul style="list-style-type: none"> <li>Don't want to tell us the truth</li> <li>Our federal government is not transparent and has never been honest.</li> </ul>

Handling of the pandemic	<ul style="list-style-type: none"> <li>• Can't be trusted</li> <li>• Hiding the political and economic motivations for the actions or lack thereof regarding implementation of sanitary measures.</li> <li>• They hid that we needed to wear masks at the start of the outbreak because there were not enough masks to go around for healthcare workers, then later when supply stabilized, said we all need to wear masks.</li> <li>• The case numbers may be higher since they don't test as many people.</li> </ul>
Positive perceptions of transparency	<ul style="list-style-type: none"> <li>• I think there is portion that can be expected to be kept from the public in the interest of stemming panic. However, I believe the directions given are in place with our best interests intended.</li> <li>• They must balance information and protect privacy.</li> <li>• I don't think they are hiding much</li> </ul>

**Table D3.** Question wording and variable construction.

Variable	Question(s)	Coding
False beliefs	<p>In your opinion, how likely is it that the following statements are true? Use the following 0 to 10 scale where 0 means "not likely at all" and 10 means "extremely likely."</p> <ol style="list-style-type: none"> <li>1. The government is exaggerating the risks of the coronavirus to be able to restrict people's rights and freedoms.</li> <li>2. The virus was created by China to increase its power in the world.</li> <li>3. The virus has been created by large corporations because some of them can directly profit from it.</li> <li>4. The prolonged use of masks can lead to CO<sub>2</sub> intoxication or oxygen deficiency.</li> <li>5. Hydroxychloroquine is an effective treatment against COVID-19.</li> <li>6. Coronavirus figures are inflated because a significant number of people tested positive are not infected with the virus.</li> </ol>	Additive index calculated as the average perceived truthfulness of the false statements. Rescaled on a 0-1 scale.
Hides information	In your opinion, what is the likelihood that governments are hiding information from the public about the coronavirus epidemic? To express your opinion, please use the following scale, where 0 means "not at all likely" and 10 means "extremely likely."	0-10 scale. Recoded on a 0-1 scale for most analyses.
Open-ended	Can you briefly explain what you think the government is hiding about the coronavirus epidemic?	See table A1.
Lacks transparency	Thinking about the measures put in place to slow the spread of the virus IN YOUR PROVINCE, do you strongly	1. Completely disagree 2. Somewhat disagree

	agree, somewhat agree, somewhat disagree, or strongly disagree with the following statements? The government lacks transparency on what drives its decisions	3. Somewhat agree 4. Completely agree Recorded on a 0-1 scale.
Vote federal	If federal elections were held next Sunday and voting would be safe, which party would you be most likely to vote for in your electoral district?	Coded as 1 if the respondent intends to vote for the governing party (Liberal Party of Canada) and 0 otherwise.
Vote provincial	If provincial elections were held next Sunday and voting would be safe, which party would you be most likely to vote for in your electoral district?	Coded as 1 if the respondent intends to vote for the governing party and 0 otherwise.
Trust federal	What is your level of trust in the following institutions? The government of Canada	1. No trust at all 2. Not much trust 3. Some trust 4. Complete trust Recorded on a 0-1 scale.
Trust provincial	What is your level of trust in the following institutions? Your provincial government	Same as above.
Handling federal	Generally speaking, are you satisfied with how the federal government in Ottawa is handling coronavirus?	1. Completely dissatisfied 2. Somewhat dissatisfied 3. Somewhat satisfied 4. Completely satisfied Recorded on a 0-1 scale.
Handling provincial	Generally speaking, are you satisfied with how your provincial government is handling coronavirus?	Same as above.
Satisfaction with democracy	Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied or very dissatisfied with the way democracy works in Canada?	1. Very dissatisfied 2. Somewhat dissatisfied 3. Somewhat satisfied 4. Very satisfied Recorded on a 0-1 scale.
Trust scientists	What is your level of trust in the following institutions? Scientists	Same as trust federal.
Federal PID	Generally speaking, is there a political party that you feel close to in <u>federal</u> politics? Which party do you feel closest to?	Coded 1 if identifying with the Liberal Party of Canada and 0 otherwise.
Provincial PID	Generally speaking, is there a political party that you feel close to in <u>provincial</u> politics? Which party do you feel closest to?	Coded 1 if identifying with the provincial governing party and 0 otherwise.
Left-right ideology	In politics, we often talk about the concepts of left and right. On a scale of 0 to 10, where 0 is left and 10 is right, where would you place yourself politically?	Recorded on a 0-1 scale.
Social media	In a typical week, how often do you get information	1. Never

news consumption	about the coronavirus from the following sources? Social media	2. One or two days a week 3. Three or four days a week 4. Five or six days a week 5. Everyday Recorded on a 0-1 scale.
TV news consumption	In a typical week, how often do you get information about the coronavirus from the following sources? Television	Same as above.
Print news consumption	In a typical week, how often do you get information about the coronavirus from the following sources? Prints	Same as above.
Age	How old are you?	1. Between 18 and 24 2. Between 25 and 34 3. Between 35 and 44 4. Between 45 and 54 5. Between 55 and 64 6. Between 65 and 74 7. 75 or older Recorded on a 0-1 scale.
Gender	Please indicate your sex: Note: As indicated by Statistics Canada, transgender, transsexual, and intersex Canadians should indicate the sex (male or female) with which they most associate themselves.	0 = Male, 1 = Female
Education	What is the highest level of education that you have completed (diploma obtained)?	1. Elementary 2. High school: general or vocational training 3. College: general pre-university programs or technical programs 4. University Recorded on a 0-1 scale.
Region	In which province or territory do you live?	Quebec (Quebec) Ontario (Ontario) Prairies (Alberta, Saskatchewan, Manitoba) British Columbia (British Columbia) Atlantic (New Brunswick, Nova Scotia, Prince-Edward-Island, Newfoundland and Labrador)

## Appendix E: Justification for the covariates included in our models

Determinants of perceptions of transparency have not been studied extensively, but the literature about political support (including trust in governments) and how people process and evaluate new information allows us to identify variables that are likely to be related both to COVID-19 false beliefs and perceptions of government transparency. The paragraphs below explain the rationale behind the inclusion of trust in scientists, partisan identification, ideology, media consumption, and socio-demographic variables in our regression models.

### *Trust in scientists*

Anti-intellectualism is not a new concept (Hofstadter, 1963), but many researchers suggest that it is on the rise in the United States and other developed democracies (e.g., Motta, 2018). This general distrust of scientists and other experts is strongly connected to citizens' response to the COVID-19 pandemic, including false beliefs, the adoption of preventive health behaviors, and information acquisition (Merkley & Loewen, 2021). Given that experts are highly featured in information about COVID-19, including communication by the government, those with higher distrust of scientists are more likely to avoid this information altogether or perceive it as less credible (Merkley & Loewen, 2021), which might increase perceptions that governments are keeping information or lying to the public.

### *Political orientations*

Generally speaking, evaluations of the government tend to be influenced by citizens' prior attitudes about the governing party or leader. Because citizens are prone to confirmation bias (Kunda, 1990; Taber & Lodge, 2006), they are more likely to accept information on government transparency that aligns with their predispositions (van der Cruijssen & Eijffinger, 2010). Many studies have documented the importance of source credibility (the perceived expertise or trustworthiness of a source of information) on the acceptance of the message (Benegal & Scruggs, 2018; Greer, 2003; Pornpitakpan, 2004). As a result, partisan identification is likely to be an important factor influencing perceptions of transparency, as citizens with greater faith in the governing party are more likely to believe the information they are sharing (Mabillard & Pasquier, 2015; Walle & Bouckaert, 2003). Public polling shows, for example, that perceptions that the current administration is too secretive can change quickly among partisans when a new government takes office, with people forming negative opinions of an administration they dislike (Fenster, 2017).

Studies documenting the influence of ideology and partisan identification find that liberals/Democrats are more likely to perceive COVID-19 as a serious threat and are less likely to fall for COVID-19 misinformation than conservatives/Republicans, with consequences for compliance with public health measures (Calvillo et al., 2020; Kerr et al., 2021). Still, people on both sides of the political spectrum are likely to believe in and share ideologically-consistent misinformation, especially at the extremes (Enders & Uscinski, 2021; Osmundsen et al., 2021; van Prooijen et al., 2015). Although ideology was also correlated with perceptions of pandemic severity in Canada, we expect ideology and partisan identification to play a smaller role in the Canadian context than in the United States, given lower levels of political polarization (Pennycook et al., 2021) and elite consensus on the need for broad and science-informed collective action on the coronavirus pandemic (Merkley et al., 2020).

### *Information consumption*

Holding governments accountable is one of the defining roles of the media in a democracy (Asp, 2007). Hence, the media tend to scrutinize the decision-making process and provide cues that influence citizens' perceptions of government transparency (de Fine Licht, 2014). An extensive literature suggests that people's opinions can be influenced by the nature of the information they receive and believe in (Levendusky, 2013; Motta et al., 2020; Swami et al., 2013).

Because of information needs, the COVID-19 pandemic led to a significant increase in news consumption, especially among those who had previously been inattentive to conventional media (Casero-Ripollés, 2020). Media coverage of COVID-19 varied significantly between countries. Coverage was politicized in the United States, where media like Fox News sometimes propagated misinformation (Jamieson & Albarracin, 2020), with consequences for COVID-19 attitudes and behaviors (Stecula & Pickup, 2021). Conversely, it was less politicized and more likely to focus on policy in countries like Canada (Sommer & Rappel-Kroyzer, 2020). Exposure to traditional media was thus potentially more likely to inform citizens about what governments were doing and less likely to polarize evaluations of government transparency in Canada than in the United States.

While social media platforms are important channels through which governments and media outlets can share information during a pandemic, they can also facilitate the propagation of misinformation and hinder response efforts (Bridgman et al., 2020; Hagar, 2013). For example, following the arrival of the Zika virus in the United States, researchers found that posts spreading false or misleading information were more popular than posts spreading accurate public health information (Sharma et al., 2017). Comparing the effects of trust in different sources of information on COVID-19, Vardavas et al. (2021) found that evaluations of government communication were the lowest among those having social media or other non-official/non-traditional sources as their most trusted information source. There are different reasons why social media could lead to more negative perceptions of transparency, including the fact that social media consumption is driven by algorithms where content that generates a negative emotive response (fear, disgust) is more likely to become viral (Vosoughi et al., 2018).

The effects of social media might depend on how they are used (unfortunately, the data we have do not have that level of specificity, hence we cannot examine this aspect here). For instance, exposure to information from governments on social media (following a government agency or official, for example) is associated with improved perceptions of transparency (Song & Lee, 2016).

### *Socio-demographics*

Lastly, we control for socio-demographic variables (age, gender, education, region) because they have been found to affect evaluations of government communications (Vardavas et al., 2021) and trust in government (Newton & Norris, 2000). The relationship between socio-demographic variables and either evaluations of government communication or trust is not consistent across studies, potentially because the effect of socio-demographic variables depends on what governments are actually doing. For example, perceptions of government transparency might be more strongly influenced by the actions of governments among highly educated citizens, who are more knowledgeable about what governments are doing. That being said, men and younger citizens generally have lower trust in governments and more negative evaluations of government communication and transparency (Jia et al., 2019; Newton & Norris, 2000; Vardavas et al., 2021). Finally, controlling for the region of residence is important because the pandemic and health restrictions have been felt differently in different regions, different provinces have had different responses to COVID-19, but also because of the existence of regional political cultures that might influence perceptions of the government (Wiseman, 2007).