

Who Shares Conspiracy Theories and Other Misinformation about Covid-19 Online: Survey Evidence from Five Countries

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Social media have long been considered a venue in which conspiracy theories and other misinformation incubate and spread. It has been no different during the COVID-19 pandemic. However, understanding who spreads misinformation by sharing it on social media, and why, has been underexplored, especially in a cross-national context. The global nature of the novel coronavirus pandemic presents an opportunity to understand the exposure and sharing of the same COVID-19 misinformation across multiple countries. We rely on nationally representative surveys conducted in July of 2020 and January of 2021 in the United States, United Kingdom, Canada, Australia, and New Zealand, to begin to understand what characterizes those who are most likely to share misinformation online. We find that Americans are no more likely to encounter prominent COVID-19 misinformation online but are considerably more likely to share it. Americans are less likely to say they share misinformation to make others aware of it or to criticize it, and considerably more likely to say their motivation is to promote it or to demonstrate their support for it. Americans are also more likely to say their motivation is to connect with others. In all countries but Canada, those who trust information from social media are more likely to share misinformation than those who do not trust social media. In all countries, those who have populist attitudes and distrust health officials are more likely to share misinformation than those who do not. In the U.S. in particular, sharing misinformation is associated with trust in

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Date submitted: 2022-04-08

government and identifying as conservative. Our results make clear that the United States is an outlier. We theorize why this might be the case.

Keywords: *misinformation, conspiracy theory, social media, COVID-19*

Who Shares Misinformation

Since the emergence of the novel coronavirus pandemic, social scientists have been working on identifying causes and correlates of COVID-19 related attitudes and behaviors. A lot of that focus has been centered on COVID-19 misinformation, and specifically endorsement of different coronavirus related conspiracy theories. Misinformation matters, because belief in it has been found to correspond with public health behaviors, such as compliance with mask wearing or social distancing, or willingness to accept a COVID-19 vaccine.² Much of this research has focused on social media, as the environment in which misinformation originates and proliferates (Enders et al., 2020; Shahsavari et al., 2020). Existing research, however, does not really shed light onto who is sharing and proliferating misinformation online, nor does it explore these behaviors across different national contexts. In fact, the bulk of the existing work has focused on the United States. In this article, we examine individual level correlates of sharing, and therefore spreading, COVID-19 conspiracies and other misinformation online, based on the results of ten large, nationally representative surveys fielded during the pandemic (in July of 2020 and January of 2021) in the United States, Canada, United Kingdom, Australia, and New Zealand. In doing so, we begin to answer the question: *what characterizes those most likely to share conspiracy theories and other misinformation about COVID-19 online?*

Answering this question provides some understanding of how COVID-19 misinformation spreads. First, we find that sharing misinformation online unsurprisingly

² Belief in conspiracy theories and other misinformation is correlated with behaviors such as refusal to vaccinate, but that does not necessarily imply a causal relationship between the two variables. Previous work (for example Enders et al., 2022) suggests that certain psychological, social, and political considerations drive both conspiracy endorsement and health related behaviors.

correlates with seeing misinformation online. This is true across all five countries in our study, but the United States stands out in terms of how often Americans share COVID-19 misinformation, even though they are not more likely to see it than residents of the other countries we study. Second, Americans are less likely to say they share misinformation to make others aware of it or to criticize it, and considerably more likely to say their motivation is to promote it or to demonstrate their support for it. Americans are also more likely to say their motivation is to connect with others. Third, in all five countries except Canada, those that trust that social media provides factual and objective information on COVID-19 are more likely to share misinformation than those that do not trust social media networks. This is most true amongst Americans. Fourth, in all five countries, those that exhibit populist attitudes are more likely to share conspiracies than those that do not exhibit populist attitudes. Fifth, we find evidence that distrust of health officials negatively correlates with sharing conspiracies. Those that trust that health officials provide factual and objective information are less likely to share conspiracies online, compared to those that do not trust health officials. This is strongest in Canada and Australia. Sixth, we find that the U.S. is distinct in the degree to which sharing of conspiracies online correlate with political factors, such as ideology and trust in government. Overall, our results make clear that America is an outlier. In the discussion at the end of this paper, we theorize a potential reason for the American exceptionalism we observe in our data.

Global Pandemic, Global Conspiracies

The emergence of the global pandemic in 2020 presented a ripe opportunity for the spread of a variety of conspiracy theories and other misinformation pertaining to the origins of the pandemic, the severity of COVID-19, and the ways of dealing with it in a global context. Regardless of where one lives, everything changed because of COVID-19, and the misinformation that emerged was largely universal across the world. This presents us with a unique opportunity to study the characteristics of those that share misinformation beyond just a single country context and make nation level comparisons. At the beginning of the pandemic, a handful of theories about the virus escaping from a Wuhan lab, or that it is a

bioweapon circulated heavily in the information environment (Motta et al., 2020). Over time, however, an increasing amount of misinformation surrounding COVID-19 began to emerge.

Beyond just being inaccurate, this misinformation has real world consequences. Scholars have demonstrated that those believing in COVID-19 conspiracies were less likely to engage in social distancing, handwashing, mask wearing, and other public health recommended behaviors (Allington et al., 2020; Bertin et al., 2020; Roozenbeek et al., 2020; Stecula & Pickup, 2021). Additionally, people holding these beliefs were found to be more likely to reject the COVID-19 vaccine, which is consistent with general work on conspiracy theories, misinformation and vaccine intention (Enders et al., 2020; Bertin et al., 2020; Romer & Jamieson, 2020; Lindholt et al., 2021; Jolley & Douglas, 2014). Finally, misinformation might have consequences beyond the realm of public health, as it might have also fueled racially charged attacks against those of Asian ancestry (Shahsavari et al., 2020; Lu & Sheng, 2020).

Social and online media have been identified as one of the key venues in which misinformation originates and spreads (Shahsavari et al., 2020; Papakyriakopoulos et al., 2020). Those who rely on social media for information have been found to be more misinformed about basic facts surrounding the novel coronavirus and endorse misinformation related to it (Allington et al., 2020; Bridgman et al., 2020; Jamieson & Albarracin, 2020). Researchers have also found that this misinformation frequently enters the mainstream, amplified by traditional media outlets (Shahsavari et al., 2020). For example, in the early days of the pandemic, misinformation about the coronavirus being a bioweapon or escaping from a lab in Wuhan was amplified by conservative news media in the United States (Motta et al., 2020).

Misinformation is incorrect or misleading information, and conspiracy theories are a common form of misinformation. Conspiracy theories can be defined as suspected secret arrangements, usually between a small group of people, to seize political or economic

power, violate established rights, hide important secrets, or illicitly cause widespread harm (Douglas et al., 2019). In this paper, we focus on the viewing and sharing of the following seven COVID-19 conspiracy theories and misinformation:

- The Chinese government engineered the coronavirus in a lab.
- The pharmaceutical industry is involved in the spread of the coronavirus.
- There is a link between 5G technology and the coronavirus.
- The United States military developed the coronavirus as a bioweapon.
- Bill Gates is using the coronavirus to push a vaccine with a microchip capable of tracking people.
- The coronavirus escaped from a lab in Wuhan.
- The worldwide death toll from COVID-19 is highly exaggerated.

Some of these theories are explicitly conspiracy theories (e.g., Gates and microchips) and others are simply misinformation (e.g., the Chinese government engineering the coronavirus), although much of the misinformation also implicitly includes a conspiracy theory (e.g., the Chinese government covering up the that the coronavirus escaped from the Wuhan lab). These are, by no means, all of the COVID-19 conspiracy theories or all of the misinformation. Given the global nature of the crisis and the impact COVID-19 has had on the lives of nearly everyone on the planet, the number of different theories, or the different versions of the above theories has been staggering. But these theories have been some of the most popular forms of misinformation surrounding COVID-19 (Gregory & McDonald, 2020). Furthermore, these claims originated on obscure websites or on nebulous social media profiles and were proliferated by other social media accounts (Klepper et al., 2021). For example, the claim that “Bill Gates is using the coronavirus to push a vaccine with a microchip capable of tracking people” has its origins on an obscure website BioHackInfo.com, and it was then amplified by a YouTube video from the Jacksonville, Florida-based Law of Liberty Baptist Church (Gregory & McDonald, 2020; Klepper et al., 2021).

Thanks to the research highlighted above, we know that misinformation matters, and that it tends to spread online. We know much less about the characteristics of those that spread misinformation by sharing it online. This is the motivating question of our descriptive survey work. We also explore the self-reported reasons for sharing COVID-19 misinformation online.

Based on existing research, we derive several expectations for who will share COVID-19 misinformation. First, we expect that sharing misinformation online correlates with the degree to which individuals are exposed to it online. As the work of Van Bavel and co-authors (2021) show, one does not have to believe in conspiracy theories to share them online, but being exposed to these theories is of crucial importance.

We also expect that trust in different sources of COVID-19 information are important correlates of sharing. For starters, conspiracy theories generally spread expeditiously under the conditions of low trust in official information sources (Shahsavari et al., 2020). Previous work also highlights that trust in health officials correlates negatively with the acceptance of common vaccine-related misinformation (Roozenbeek et al., 2020; Stecula et al., 2020). As a result, we expect the sharing of conspiracy theories and other misinformation to correlate negatively with trust that the information from public health officials is factual and objective. On the flip side, we expect those who trust information coming from social media are more likely to share misinformation than those that do not trust this information (Laato et al., 2020).

We also expect an important relationship between politics and the spreading of misinformation online. First, ideology might be an important correlate of sharing COVID-related misinformation. In general, there is not a clear relationship between left-right ideology and belief in misinformation generally. A lot depends on the misinformation itself (Douglas et al., 2019; Enders et al., 2022). At the same time, in the context of the COVID-19 pandemic specifically, researchers have discovered that conservatives have been more likely to endorse COVID-19 misinformation, including outside of the United States

(Pennycook et al., 2022; Roozenbeek et al., 2020; Uscinski et al., 2020). Furthermore, political considerations, such as ideology, have been found to be associated with a variety of COVID-related attitudes and behaviors, in both the U.S. and elsewhere (Clinton et al., 2021; Pickup et al., 2020; Gadarian et al., 2021). Additionally, behavioral evidence of sharing misinformation during the 2016 Presidential election in the United States suggests that conservatives were much more likely to share misinformation than liberals. Part of that pattern is likely because most misinformation in that election cycle was targeted at conservatives (Guess et al., 2019). As a result, we expect conservatives (those identifying as political right) to be more likely to share COVID-related misinformation online than liberals (those identifying as political left).

For the same reason that we expect ideology to correlate with sharing COVID-19 misinformation, trust in government may also be important. Trust in government is likely related to partisanship. Identifying with the party in government is correlated with trust in government and the information coming from that government. To the extent that a government engages with COVID-related misinformation, this partisan motivated trust could be related to the action of sharing misinformation online.

On the theme of politics, previous work has shown that, especially during a pandemic, conspiracy theory endorsement is high amongst those with populist attitudes (Stecula & Pickup, 2021). Some of the key components of populist attitudes include anti-elitism and anti-intellectualism, which are themselves often based in conspiracy theories. In Canada, for example, Merkley and Loewen (2021) found a strong relationship between COVID misinformation endorsement and anti-intellectualism, but no relationship with ideology. In a cross-national study, Humprecht et al. (2021) found a correlation between populist party support and sharing disinformation online. Because populism can thrive across the traditional left-right political spectrum, it has an important relationship with misinformation endorsement, above and beyond partisanship or ideology (Stecula & Pickup, 2021). As a result, we expect those high in populism to be more likely to share misinformation online than those low in populism.

Data and Methods

Survey data source: Respondents to our survey were recruited by Vox Pop Labs for their COVID-19 Monitor initiative in five countries at two points in time (July 2020 and January 2021). Sample sizes and survey dates for the July 2020 wave are: U.S. (1,275 respondents; July 11 - August 13, 2020), Britain (1,107 respondents; July 11-19, 2020), Canada (1,376 respondents; July 11-15, 2020), Australia (1,976 respondents; July 10-14, 2020) and New Zealand (1,222 respondents; July 10-17, 2020). Sample sizes and survey dates for the January 2021 wave are: U.S. (963 respondents; January 15-20, 2021), Britain (928 respondents; January 16-23, 2021), Canada (1,589 respondents; January 15 - February 7, 2021), Australia (907 respondents; January 15 - February 8, 2021) and New Zealand (1,477 respondents; January 15 - February 5, 2021).

The Vox Pop Labs online respondent panel contains more than 1.2 million richly-profiled panelists from Canada, Australia, New Zealand, the United Kingdom, the United States, France, and Germany. Panel respondents are screened in a variety of ways when recruited through the Vote Compass application, including by cookie-ing them, capturing and comparing IP addresses, and setting minimum response time thresholds. Panelist e-mails are screened to ensure that they are valid. Any illegitimate e-mail addresses or bounce-backs are removed from the panel.

To increase representativeness, we pre-stratified on the basis of age, sex and geography. Post-stratification weights are based on age, education, sex and past vote. In Australia/U.K. we also used state/region, and in New Zealand we also used Maori identification in the construction of weights. Informed consent was obtained from all subjects participating in the survey. The survey instrument has been approved by the McMaster University institutional ethics review board (REB# 4877 “COVID-19 Monitor”) as well as the Simon Fraser University Office of Research Ethics. All methods were performed in accordance with relevant guidelines and regulations.

It is important to caveat the potential limits of measuring behavior, such as social media activity, with a survey instead of using actual social media analytics or other types of web-tracking data. All methods of data collection and analysis have strengths and limitations. Survey data does not have the same precision as social media analytics when it comes to the sharing of information. Previous work, however, has shown that there is a correspondence between survey responses and online behavior. For example, in recent research linking survey data with online activity, Guess et al. (2019) show that respondents who declared that they tweet more on a survey actually tweeted more often in real life (a relationship with sizable correlation of $r=0.47$). Further, social media analytics are often restricted to the few platforms that make this type of data accessible, and social media analytics do not provide the detailed information about individuals that survey data can provide. Survey data can provide information on a representative sample, which social media analytics cannot, avoiding problems of selection bias. To date, there is little high-quality, cross-country survey data on COVID-19 misinformation sharing, of the type provided by this study.

Survey measures: We asked respondents about the seven prominent COVID-19 related theories mentioned above. There has been some discussion about whether one of the theories (The coronavirus escaped from a lab in Wuhan) might actually be accurate (Tufkeci, 2021; though see Zimmer & Mueller, 2022 for an overview of why that might not be the case). It remains unclear whether that happened, but the potential Chinese government coverup would still make this a conspiracy.

We asked respondents how much truth there was to each theory:

- ‘How much truth do you think there is to each of the following claims about the novel coronavirus?’

The response options were: (0) No truth at all; (1) Very little truth; (2) Some truth; (3) A great deal of truth. We also included a clear “don’t know” option. Our response scale, along with the inclusion of a clear “don’t know” is in line with best practices in measuring misinformation in surveys and avoiding unnecessary inflation of these beliefs (Sutton &

Douglas, 2020; Clifford et al., 2019). At the same time, recent work suggests that common ways to measure misperceptions and misinformation could be interpreted as uneducated guesses due to low levels of certainty in these beliefs (Graham, 2022). Unfortunately, we cannot fully address these concerns in our work due to lack of appropriate survey items.

To measure misinformation theory *seeing* and *sharing* online, respondents were asked:

- ‘How often do you encounter stories and posts about any of these claims online, for example on social media platforms like Facebook, Twitter, or YouTube?’
- ‘Whether or not you agree with them, how often do you yourself share stories and posts about any of these claims online, for example on social media platforms like Facebook, Twitter or YouTube?’

The response options ranged from never (0) to all the time (10).

To measure where respondents are seeing misinformation online, we asked:

- ‘Where have you seen the claim(s)?’

Of those that indicated they shared the theories online, we asked:

- ‘Where have you shared the claim(s)?’
- ‘People share content on their social media accounts for different reasons. Why did you share stories about the claim(s) on your social media accounts?’

For the questions asking where respondents saw or shared the theories, the response options were: Gab; Parler; Twitter; Facebook; YouTube; Reddit; MeWe; Wimkin; Stormfront; Searched the web; Navigated to specific websites; Apps like WhatsApp; Signal or Telegram; and Other. For the question asking the motivation for sharing, the response options were: To make others aware of them; To promote them; To demonstrate my support for them; To add information about them; To criticize them; To connect with others; For fun; and Other. For all questions, those that indicated ‘Other’ were asked to specify.

We measured *trust in social media* using responses to a question asking respondents ‘how much trust do you have in social media to provide factual and objective information

about COVID-19?’ Response options were: No trust at all (1); Little trust (2); Moderate trust (3); A great deal of trust (4).

Trust in government was measured by using a question that asks respondents ‘how much trust do you have in the federal government to provide factual and objective information about COVID-19?’ Response options were: No trust at all (1); Little trust (2); Moderate trust (3); A great deal of trust (4). Where appropriate, respondents were also asked about their trust in the information from their provincial/state government.

Trust in public health officials was measured using the average response to questions asking respondents ‘how much trust do you have in: [public health officials, local health care providers, and the World Health Organization (WHO)] to provide factual and objective information about COVID-19?’ The response categories are the same as the other trust questions, and the measure is the average response across the three sources.

Populism for each respondent is measured by calculating the average disagreement/agreement across three items, which has been deployed in previous peer reviewed work (Stecula & Pickup, 2021):

- [Country] is divided between ordinary people and the corrupt elites who exploit them.
- The will of the people should be the highest principle in this country’s politics.
- It doesn’t really matter whom you vote for because the rich control all political parties.

The response options for each item is the same: Strongly disagree (1); Somewhat disagree (2); Somewhat agree (3); Strongly agree (4); Don’t know. This battery is designed to capture the foundational aspect of populism: conflict between average citizens and elites.

Ideology was measured using the respondent's self-placement on a liberal (0) to conservative (10) scale in the US, and a left (0) to right (10) scale elsewhere.

Results

We start by looking at the average level of truth attributed to each theory in each country. To calculate truthfulness of each theory (Figures 1a and 1b), we calculated the average response for each theory, in each country, and divided by three, to provide a truth score between 0 and 1 and the corresponding 95% confidence intervals.

Looking first to the results from July 2020 (Figure 1a), there is a fair bit of variation in the average truth attributed to each theory but much less variation between countries. There are some exceptions, such as the high degree of truth attributed to the theory that the worldwide death toll is highly exaggerated in New Zealand, but the patterns in truth attributed to each theory are generally similar across countries.³ Although not to a great degree, the U.S. does stand out slightly. Belief in four of the theories is greatest in the U.S. and belief in the other three theories is second greatest in the U.S.. The 95% CI for the difference in the average belief in the U.S. (across all theories) compared to the next highest average (UK) is (0.079, 0.14).

Looking next to the results from January 2021 (Figure 1b), New Zealand no longer stands out in terms of the belief that the death toll from COVID-19 is exaggerated. Belief in the conspiracies has increased in the U.S., and to a lesser extent the U.K., so that the U.S. now clearly stands out. For all theories there is a notable increase in the U.S.. The average increase is 0.1 on the (0 to 1) scale. The 95% CI for the difference in the average belief in the U.S. in January 2021 compared to July 2020 is (0.058, 0.12). The smallest increase is 0.05 (the theory regarding Bill Gates) and the largest is 0.17 (the theory regarding the Chinese government engineered the coronavirus in a lab). By January 2021, belief was highest in the U.S. for six out of the seven theories, and second highest for the seventh theory. The 95% CI for the difference in the average belief in the U.S. (across all theories) compared to the next highest average (U.K.) is (0.14, 0.19).

³ The 95% CI for the difference between belief in New Zealand and the next highest country (U.S.) is (0.17, 0.30)

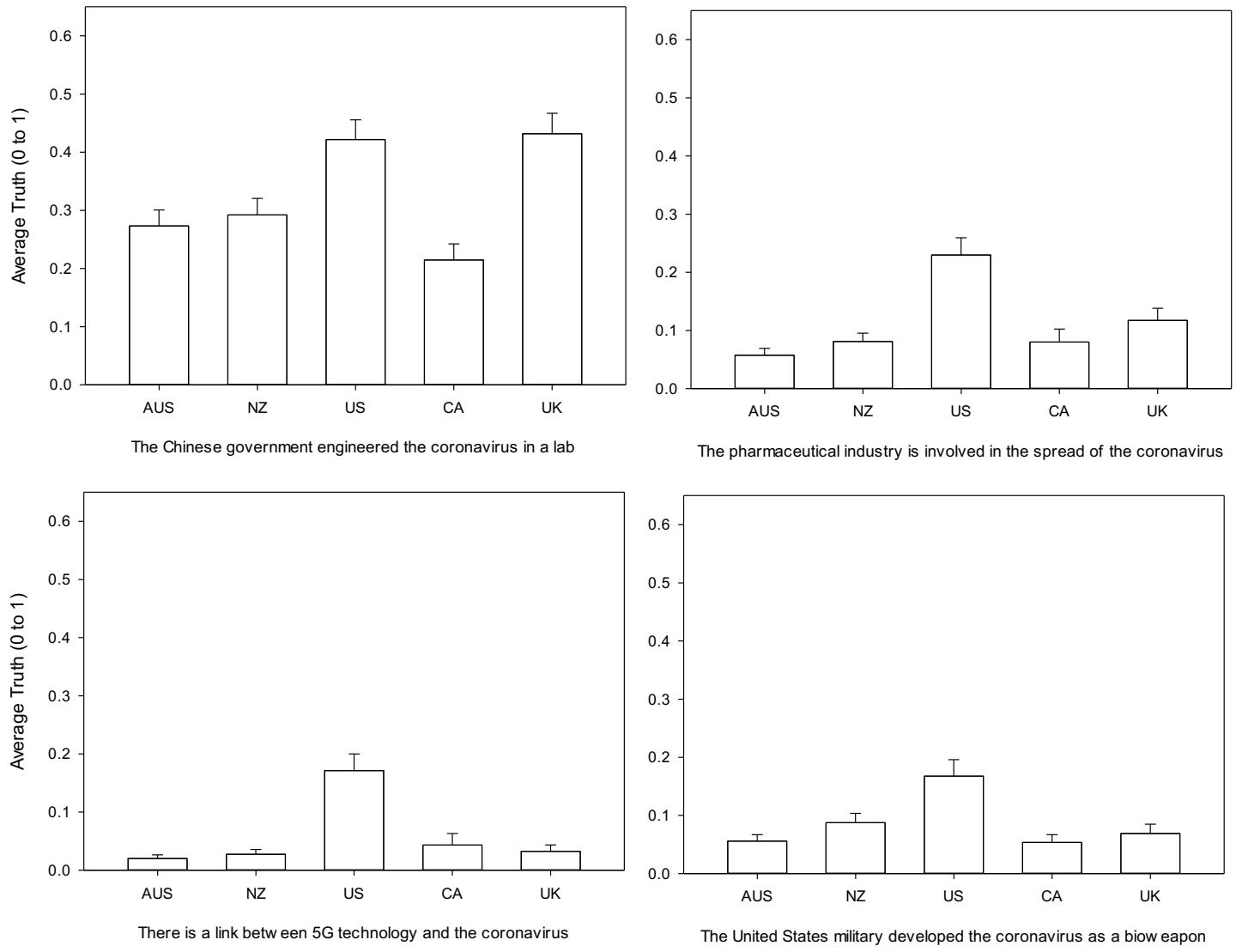


Figure 1a. Average Truth Attributed to each Conspiracy Theory (July 2020)

Note: the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each conspiracy theory, in each country (with 95% confidence interval). $N = 1,218$ (U.S.); 1,336 (Canada); 1,074 (U.K.); 1,916 (Australia); 1,167 (New Zealand).

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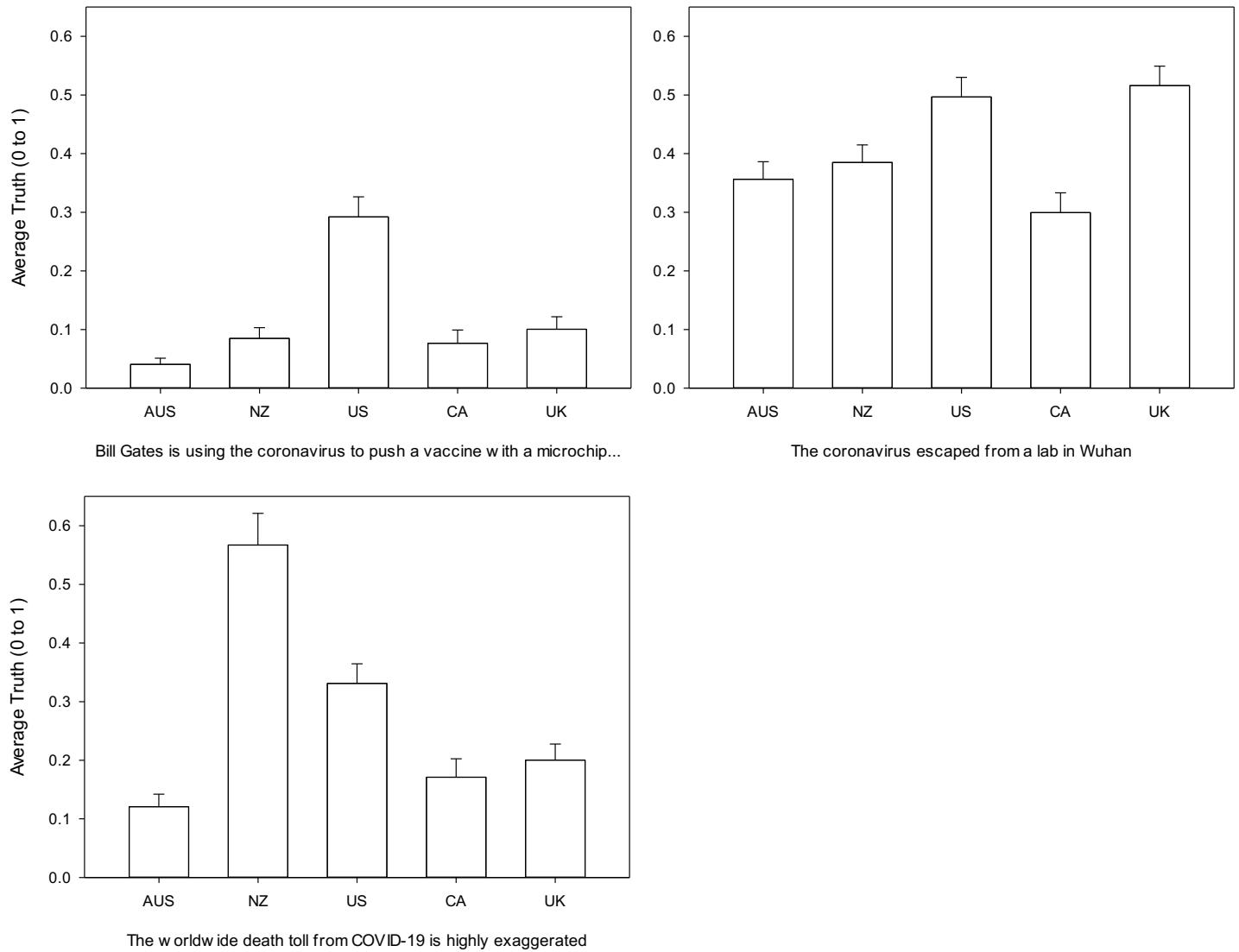


Figure 1a. Average Truth Attributed to each Conspiracy Theory (July 2020) continued

Note: the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each conspiracy theory, in each country (with 95% confidence interval). $N = 1,218$ (U.S.); 1,336 (Canada); 1,074 (U.K.); 1,916 (Australia); 1,167 (New Zealand).

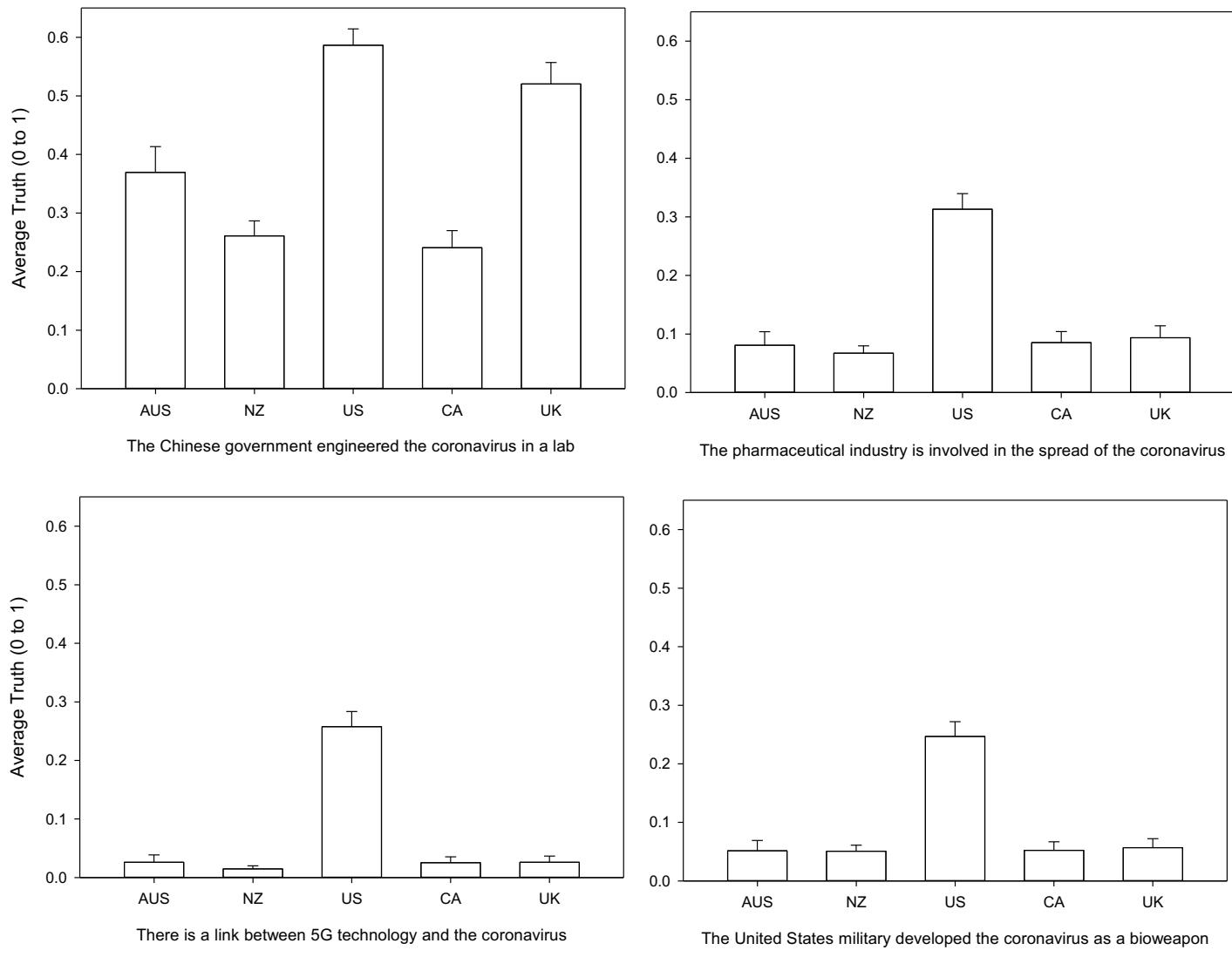


Figure 1b. Average Truth Attributed to each Theory (January 2021)

Note: the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each theory, in each country (with 95% confidence interval). $N = 866$ (U.S.); 1,409 (Canada); 893 (U.K.); 804 (Australia); 1,416 (New Zealand).

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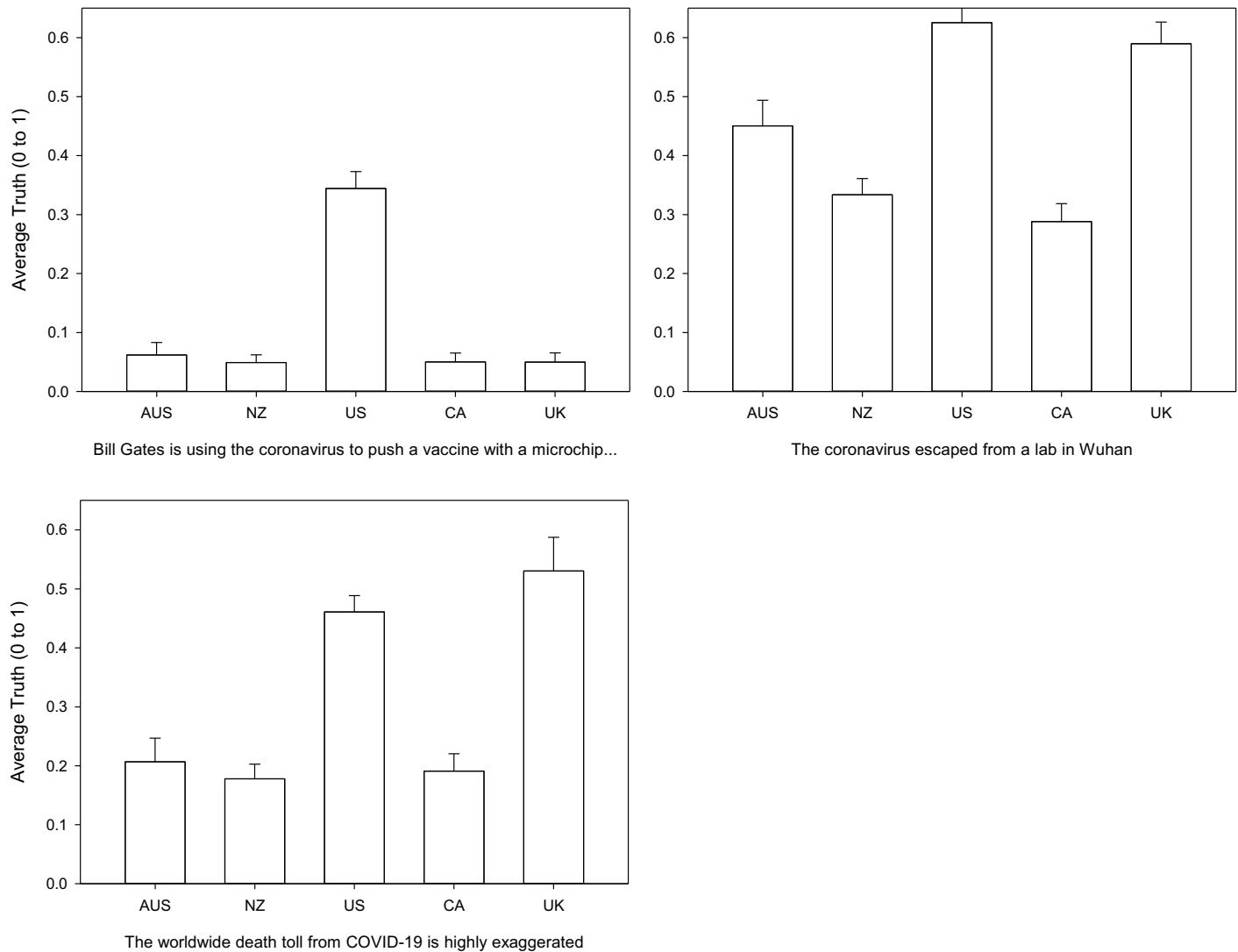


Figure 1b. Average Truth Attributed to each Theory (January 2021) continued
 Note: the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each theory, in each country (with 95% confidence interval). $N = 866$ (U.S.); 1,409 (Canada); 893 (U.K.); 804 (Australia); 1,416 (New Zealand).

To begin answering the question 'what characterizes those that are most likely to share conspiracy theories and other misinformation about COVID-19?', we first examine the average frequency with which the theories are seen and shared in each country. The frequency with which a respondent views the theories is measured with the question: 'How often do you encounter stories and posts about any of these claims online, for example on social media platforms like Facebook, Twitter, or YouTube?'. The frequency with which a respondent shares the theories is measured with the question: 'Whether or not you agree with them, how often do you yourself share stories and posts about any of these claims online, for example on social media platforms like Facebook, Twitter or YouTube?' The response scales for both questions is the same: 0-Never to 10-All the time. The results in Figures 2a and 2b were produced by calculating the average response to the frequency of *seeing* and *sharing* variables and the corresponding 95% confidence interval in each country.

We also report the transmission rates of COVID-19 misinformation on the Internet. Just because an individual sees misinformation online does not mean they will share it. Therefore, knowing the degree to which the viewing of misinformation corresponds with sharing it and how that differs across countries is important. It is also true that just because an individual believes there is truth to the misinformation does not mean that they will share it. Therefore, it is also useful to know the degree to which belief in misinformation corresponds with sharing it. The reported transmission rates are calculated by regressing frequency of *seeing* the theories on frequency of *sharing* them in each country (*seen/share*), and by regressing degree of *belief* on frequency of *sharing* in each country (*belief/share*). The regression coefficients were estimated by OLS and the resulting slope coefficients are the transmission rates.

From the July 2020 results (Figure 2a), we see that respondents in Australia report seeing these theories least often, on average, (3.87 on the 0 to 10 scale) and respondents in the U.K. report seeing these theories most often (4.91). We also can see that there is a correspondence between the average frequency with which the COVID-19 theories are

seen and the average frequency with which they are shared, and the frequency with which the theories are shared is a small fraction of the frequency with which they are seen. One country defies this pattern. While the U.S. falls in the middle on the frequency with which the theories are seen (4.27), it far surpasses all other countries on the frequency with which the theories are shared. In the U.S., the average frequency with which the theories are shared is 2.27 (on the 0 to 10 scale). This is over half the frequency with which they are seen. The next closest nation is the U.K. with a share frequency of 0.77. This is less than a fifth of the frequency with which they are seen. The 95% CI for the difference in the average frequency with which the theories are shared in the US compared to the next highest average (U.K.) is (1.20, 1.78).

The transmission rates are reported in parentheses. We see that the seen/share transmission rate in the U.S. (0.47) is more than three times that of any other country in the study. The next closest is the U.K. (0.13) and the lowest transmission rate is in Australia (0.09). The P-value for the difference in the seen/share transmission rates between the U.S. and the U.K., using an F-test, is less than 0.001. Figure SI.1 in the Supplementary Information (<https://doi.org/10.7910/DVN/HTBXMM>) provides a more detailed look at the relationship between the seeing and sharing of the misinformation. It shows that as the frequency of seeing misinformation increases, so does the frequency of sharing it. This relationship is much stronger in the U.S. compared to other countries. Those that frequently view misinformation in the U.S. also share it much more often than individuals that frequently view misinformation in other countries. At the other end of the scale, those that infrequently view misinformation in the U.S. share it about as often as those that infrequently view misinformation in other countries.

As for the belief/share transmission, the pattern is similar to seen/share transmission. The country in which the transmission from seeing to sharing the theories is the highest (the U.S.) has both the highest average level of belief in the conspiracy theories, and the highest transmission from believing the theories to sharing them. The transmission is 0.59 in the US but only 0.34 in the next highest country (Canada). The P-value for the

difference in the belief transmission rates between the U.S. and Canada is less than 0.001. Unlike seeing conspiracies, belief is relatively higher in the US compared to the other countries but given the greater belief, rates of sharing are still higher.

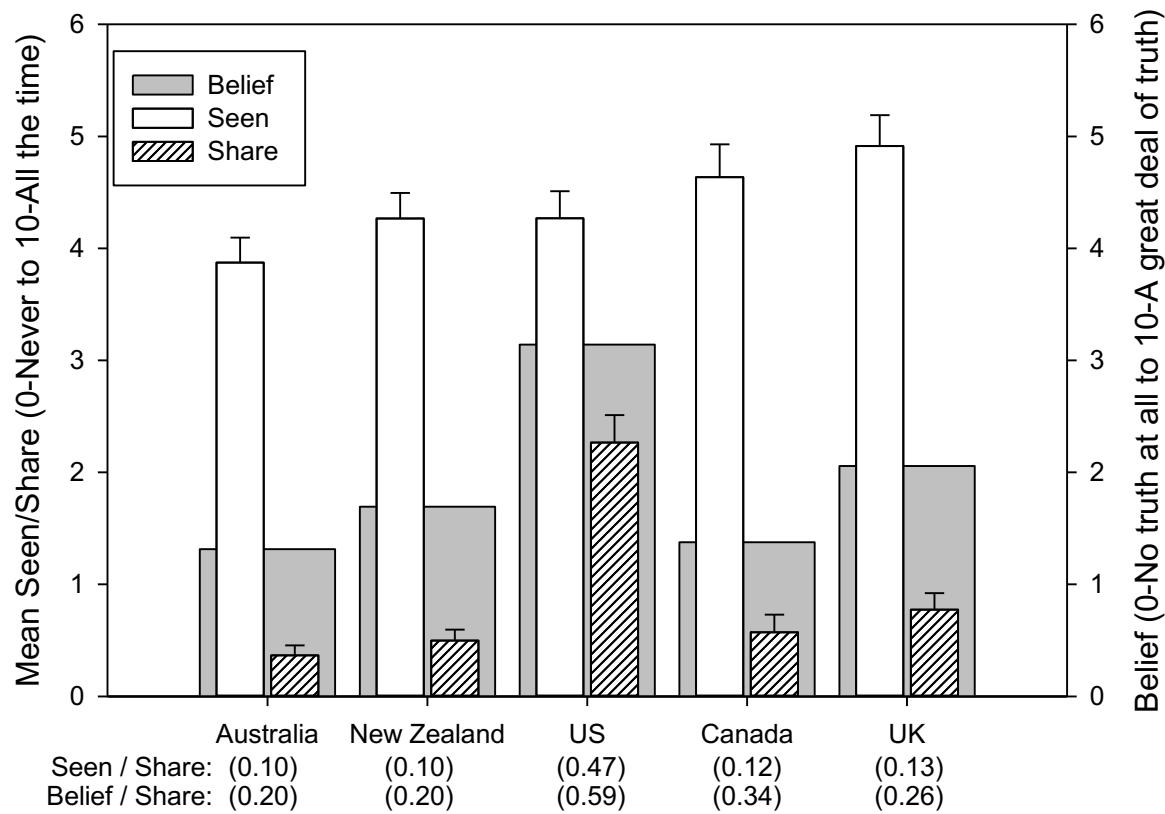


Figure 2a. Distribution of Seeing, Believing and Sharing COVID-19 Misinformation (July 2020)

Note: the average frequency (from 0 equals never to 10 equals always) a respondent sees and shares COVID-19 related misinformation online, in each country (with 95% confidence interval). And the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each theory, in each country. Transmission rates in parentheses are the frequency of sharing misinformation relative to the frequency of seeing it, and the frequency of sharing misinformation relative to the belief them. $N = 1,275$ (U.S.); 1,376 (Canada); 1,107 (U.K.); 1,976 (Australia); 1,222 (New Zealand).

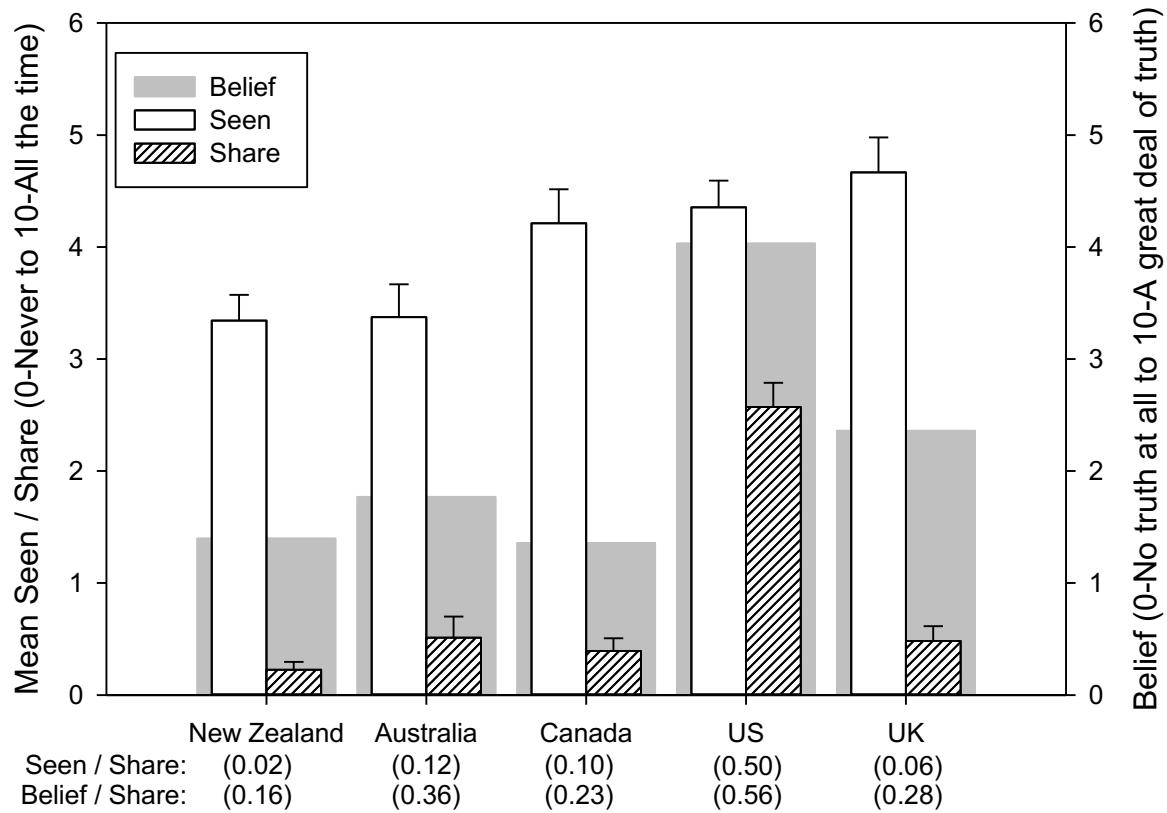


Figure 2b. Distribution of Seeing, Believing and Sharing COVID-19 Misinformation (Jan 2021)

Note: the average frequency (from 0 equals never to 10 equals always) a respondent sees and shares COVID-19 related misinformation online, in each country (with 95% confidence interval). And the average truth (from 0 equals ‘no truth at all’ to 1 equals ‘a great deal of truth’) attributed to each theory, in each country. Transmission rates in parentheses are the frequency of sharing misinformation relative to the frequency of seeing it, and the frequency of sharing misinformation relative to the belief them. $N = 963$ (U.S.); 1,589 (Canada); 928 (U.K.); 907 (Australia); 1,477 (New Zealand).

We next turn to the results from January 2021 (Figure 2b). The reported rates of seeing the theories have declined a little in each country. The lowest is now New Zealand (3.34 on the 0 to 10 scale) and the highest continues to be in the U.K. (4.67 on the 0 to 10

scale). The changes are small, however, and it doesn't necessarily mean that misinformation is less prevalent online. It may just be that these specific theories are beginning to be replaced by newer ones, as the initial focus on the origins of the virus are replaced by ways of dealing with it, such as vaccinations. The transmission rates from seeing to sharing the theories have not changed significantly. The U.S. continues to stand out with the highest seen/share transmission rate: 0.50. This is four times higher than the next greatest transmission rate (Australia at 0.12). The P-value for the difference in the seen/share transmission rates between the U.S. and Australia is less than 0.001. The US also continues to have the highest transmission from believing to sharing the theories. The belief/share transmission rate in the US is 0.56. The next highest is now Australia at 0.36. The P-value for the difference in the belief transmission rates between the U.S. and Australia is 0.009.

We asked respondents to the January 2021 survey where online they had seen the theories we asked them about (Table 1). Facebook was most commonly mentioned, ranging from 70 to 79 percent of respondents in each country, consistent with work showing the high levels of usage of Facebook in these countries (Newman et al., 2021). Twitter and YouTube are the next most commonly mentioned platforms, with Twitter mentioned a little less often in Australia and New Zealand. After that, 13 to 15 percent of respondents indicated they saw the theories when searching the web. Messaging apps like WhatsApp, Signal or Telegram were also common sources in all countries except the U.S.. Finally, Reddit was mentioned fairly often in Canada (16 percent), considerably more often than in other countries. It is worth noting that the platforms on which respondents view the theories online likely reflect the relative use of these platforms generally in these countries.

Table 1. Where have you seen the claim(s)?

	CA(%)	UK(%)	US(%)	AUS(%)	NZ(%)
Gab	0.79	0.4	4.16	0.33	0.19
Parler	1.4	2.14	5.27	0.98	0.68
Twitter	37.16	48.46	32.87	25.98	21.12
Facebook	70.64	77.7	70.32	72.71	78.88
YouTube	35.58	30.17	38.28	27.94	31.05
Reddit	15.69	6.81	9.29	8.99	8.58
MeWe	0.26	0.67	2.64	0.16	0.29
Wimkin	0.09	0	1.66	0	0.1
Stormfront	0.18	0	1.66	0	0
Searched the web	14.02	12.95	12.34	15.03	12.73
Navigated to specific websites	7.71	4.14	4.02	8.01	5.98
Apps like WhatsApp, Signal or Telegram	12.36	17.62	6.38	11.27	11.19
Other (Please specify):	19.46	9.08	5.83	17.48	15.72
N	1141	749	721	612	1037

Note: in identifying where respondents had seen the theories, they were instructed to select all that applied, and were given the opportunity to specify other online platforms not provided in the response options. Table SI.1 provides a breakdown of the ‘Other’ responses.

We asked those that indicated that they shared the theories online where they share them (Table 2). Not surprisingly, in all countries, the most common response was Facebook. This includes more than half of those that share the misinformation in each country. Twitter is also a common venue for sharing these theories in Canada, the U.K. and the United States. This is less common in Australia and rare in New Zealand.⁴ Despite being a common source of the misinformation, YouTube is not a common way of sharing it, except in the U.S. (10 percent). Sharing misinformation with friends on apps like WhatsApp, Signal or Telegram is common in New Zealand and the U.K.. This includes about one quarter of those that share the misinformation in these two countries. It is less common in Canada and Australia, and uncommon in the U.S..⁵ It is worth noting that about

⁴ For example, the 95% CI for the difference in the percent seeing the claims on Twitter between the US and Australia is (2.01, 11.77).

⁵ For example, the 95% CI for the difference in the percent sharing the claims on these platforms between the UK and Canada is (0.40, 18.65).

10 percent of Americans share the misinformation on new, alt-right social media platforms like Gab and Parler, platforms with considerably less users in the other countries.

Table 2. Where have you shared the claim(s)?

	CA(%)	UK(%)	US(%)	AUS(%)	NZ(%)
Gab	0.6	0.79	8.56	0	0
Parler	2.98	3.97	11.06	0	0
Twitter	19.05	26.98	29.23	14.14	1.69
Facebook	57.14	54.76	60.96	60.61	61.02
YouTube	6.55	10.32	33.4	11.11	5.08
Reddit	1.79	3.17	8.77	1.01	0
MeWe	0.6	1.59	1.67	0	0.85
Wimkin	0.6	0.79	1.88	0	0.85
Stormfront	0.6	0	1.46	0	0
Searched the web	3.57	4.76	9.39	5.05	4.24
Navigated to specific websites	2.98	2.38	2.92	6.06	3.39
Apps like WhatsApp, Signal or Telegram	14.29	23.81	7.52	16.16	27.97
Other (Please specify):	27.38	15.87	6.05	25.25	19.49
<i>N</i>	168	126	479	99	118

Note: in identifying where respondents share the theories, they were instructed to select all that applied, and were given the opportunity to specify online platforms not provided in the response options. Table SI.2 provides a breakdown of the ‘Other’ responses.

We also asked those that indicated that they shared the theories online their reason for doing so (Table 3). In every country, making others aware of the theories is the number one reason given for sharing them. The biggest cross-national difference is that Americans are less likely to say they share the theories to make others aware of them and considerably more likely to say their motivation is to promote them or to demonstrate their support for them. The 95% CI for the difference between percent of Americans saying they share the theories to make others aware of them and the next lowest country (New Zealand) is (-

22.20, -2.42). The 95% CI for the difference between the percent of Americans saying they share the theories to promote them and the next highest country (Australia) is (13.43, 25.44). Americans are also somewhat more likely to say their motivation is to connect with others. The 95% CI for the difference between percent of Americans saying they share the theories to connect with others and the next highest country (New Zealand) is (-0.56, 13.70). In Canada, the U.K. and New Zealand, the second most common reason given is to criticize the theories. It is the third most common in Australia, but only the sixth most common reason in the U.S.. Adding information about the theories is also a common motivation across all countries.

So far, the answer to our question 'what are the characteristics of those most likely to share conspiracy theories and other misinformation about COVID-19 online': those that often see the theories, especially Americans, who do so primarily to make others aware of them, promote them, add information about them and/or to demonstrate their support for them. To explore the question further, we examine the correlations between the sharing of misinformation and our theoretically derived individual level correlates. We limit the analysis to those that have seen at least one theory online (answered more than '0-Never' to the question about seeing the theories online), so we are estimating the correlations among those that have seen misinformation. We include individuals that have seen the theories online, but not necessarily on social media because individuals can share misinformation online without using social media (e.g., by email). We use a 0.05 significance level to determine if a correlation is statistically significant. The results are based on the aggregation of both July 2020 and January 2021 waves of data, with a control for the survey wave. As we are not exploring causal relations, each correlation is calculated without controlling for other potential correlates.

Table 3. People share content on their social media accounts for different reasons.**Why did you share stories about the claim(s) on your social media accounts?**

	CA(%)	UK(%)	US(%)	AUS(%)	NZ(%)
To make others aware of them	53.14	54.33	39.33	55.88	51.64
To promote them	3.43	6.3	25.31	5.88	1.64
To demonstrate my support for them	10.29	13.39	22.18	8.82	7.38
To add information about them	17.71	19.69	24.69	29.41	17.21
To criticize them	36	37.01	18.83	27.45	36.07
To connect with others	13.71	10.24	20.5	9.8	13.93
For fun	11.43	14.17	14.02	13.73	11.48
Other (Please specify):	14.29	10.24	4.6	16.67	11.48
<i>N</i>	175	127	478	102	122

Note: in identifying reasons for sharing the theories, respondents were instructed to select all that applied, and were given the opportunity to specify other reasons not provided in the response options. Extremely few respondents chose to specify their other reasons.

In our analysis we include political variables: populism (4-point scale), ideology (11-point scale), trust that the information about COVID-19 from *government* is factual and objective (4-point scale), trust that the information about COVID-19 from *public health officials* is factual and objective (4-point scale), and trust in COVID-19 information from *social media* (4-point scale). We also include *age*, *gender*, *education*, *use of digital news media*, and *trust in the pharmaceutical industry*. This last is included because one of the theories explicitly mentions the pharmaceutical industry, and distrust of “Big Pharma” plays a prominent role in vaccine misinformation (Stecula et al., 2020). *Trust in pharmaceutical industry* was measured using responses to a question asking respondents how much trust they have in the pharmaceutical industry in general. The response categories are the same as the other trust questions. *Use of digital news* was measured by asking respondents what percentage of their news and information on the COVID-19 pandemic they get from online and social media sources? Finally, *age* was measured in

years, and *university degree* and *male* are binary (0,1) demographic variables based on self-reports.

Table 4 shows the correlations for each country. Table SI.3 in the Supplementary Information demonstrates that the results do not vary substantively between the two waves. Very evident from the results is that trust in social media and populist attitudes are positively correlated with sharing COVID-19 misinformation. Those that trust social media to provide factual and objective information about COVID-19 and those that have populist attitudes are more likely to share misinformation than those that do not trust social media information or do not have populist attitudes. This is true in all five countries, except Canada where trust social media is not correlated with sharing. The correlation for trust in social media is strongest in the US: 0.42. The next largest is Australia at 0.21. The P-value for the difference, using an F-test, is less than 0.001. The correlation for populist attitudes all fall within the range of 0.16 (UK) to 0.22 (Australia).

The United States is distinct in the way that other political variables correlate with the sharing of conspiracies. The correlation between the liberal/conservative scale (0 to 10) and the frequency of sharing misinformation is 0.50. Although not necessarily causal, those who are on the right of the spectrum are more likely to share conspiracies than those on the left. The next strongest correlation is 0.20 for Australia. The P-value for the difference is less than 0.001. Canada and the UK have similar correlations and there is no statistically significant correlation for New Zealand. The U.S. is also the only country for which trust in information from the government correlates positively with misinformation sharing, with a correlation of 0.28 for the federal government. In all other countries, trust in the federal and/or state government correlates negatively with sharing misinformation, or there is no correlation (UK).

Table 4. Correlates of Sharing COVID-19 Conspiracies Online

	CA	UK	US	AUS	NZ					
	Corr.	P-value								
Trust in health officials	-0.32	<0.001	-0.23	<0.001	-0.14	<0.001	-0.30	<0.001	-0.20	<0.001
Trust in federal gov't	-0.27	<0.001	-0.023	0.57	0.28	<0.001	-0.077	0.15	-0.15	<0.001
Trust in state/prov. gov't	-0.15	0.038			-0.039	0.27	-0.21	0.0013		
Trust in social media	0.051	0.30	0.12	0.013	0.42	<0.001	0.21	<0.001	0.089	0.014
Populism	0.21	<0.001	0.16	<0.001	0.18	<0.001	0.22	0.0020	0.18	<0.001
Ideology (L-R)	0.15	<0.001	0.17	<0.001	0.50	<0.001	0.20	<0.001	0.060	0.073
Trust in pharm. industry	-0.023	0.46	0.096	0.028	-0.086	0.046	-0.076	0.13	-0.072	0.011
Digital Information	-0.034	0.29	0.0086	0.84	-0.14	<0.001	-0.066	0.28	-0.039	0.13
Age	0.14	0.0014	0.14	<0.001	-0.21	<0.001	0.20	<0.001	0.15	<0.001
Male	0.070	0.11	0.043	0.26	-0.030	0.38	0.035	0.50	0.069	0.013
University degree	-0.12	0.0033	-0.16	<0.001	-0.065	0.017	-0.12	<0.001	-0.060	0.022
<i>N</i>	2,015		1,730		1,275		1,997		1,532	

Note: estimated partial correlations of hypothesized correlates of frequency of sharing COVID-19 conspiracies online. Estimates include a control for wave. Shading indicates significant at 0.05 level.

Trust in health officials is clearly negatively correlated with misinformation sharing. Those that trust the information from public health officials are less likely to share conspiracies than those that do not trust this information. This correlation is weakest for the US (-0.14). The next weakest correlation is -0.20 for New Zealand (P-value: 0.025). The strongest correlation is in Canada (-0.32).

The US is the only country where use of digital sources of news information correlates (negatively) with sharing. Interestingly, respondents that indicate they get more of their news and information on the COVID-19 pandemic online and from social media are less likely to share conspiracies than those that get less of their pandemic news online and from social media. Finally, the U.S. is distinct in that age negatively correlates with sharing, suggesting that younger Americans are more likely to share COVID-19 misinformation than older Americans. In other countries, the correlation is positive.

Discussion

When the entire world stopped in early 2020 due to the global COVID-19 pandemic, we were presented with a rare opportunity to study the sharing of the same conspiracy theories and other misinformation, across multiple countries. Here, we focused on five peer countries, all Western, English-speaking democracies: United States, Canada, United Kingdom, Australia, and New Zealand.

There are common themes between all five countries. Populist attitudes are an important correlate of sharing misinformation across all five countries in our study. Trusting the information on social media about COVID-19 as factual and objective is an important correlate in four. We also find big and important differences between the countries of interest, mostly in the form of U.S. as an outlier. In the United States, respondents are no more likely to report seeing any of the theories online than respondents in the other four countries. But they are more than three times more likely to share these theories with their followers than respondents in the other countries.

Our findings are consistent with recent work about the outsized role that Americans play in sharing misinformation on social media. A study by Bridgman et al. (2021), analyzing a large dataset of Twitter users in Canada, found that the majority of misinformation found on Twitter that is shared by Canadians is retweeted from U.S.-based accounts. Furthermore, those exposed to American accounts on Twitter were more likely to post misinformation on their accounts (Bridgman et al., 2021). Our findings expand this notion, showcasing the exceptional nature of American misinformation sharing online.

Americans also stand out in their self-reported reasons for sharing COVID-19 misinformation. Compared to respondents in other countries, they are less likely to say they share the theories to make others aware of them or to criticize them, and considerably more likely to say their motivation is to promote them or to demonstrate their support for them. Americans are also more likely to say their motivation is to connect with others. In the early days of social media, many scholars highlighted the democratizing nature of this new medium (Shirky, 2011). Our findings demonstrate the flip side of this phenomenon: the ability of people to connect with others over harmful misinformation.

A hint as to why Americans are more distinct in their sharing of COVID-19 misinformation online may be found in the degree to which political factors correlate with sharing in the US. In particular, those that identify as conservative and those that trust information from the federal government are more likely to share misinformation online. It is also important to note that ideology is more diverse (more polarized) in the U.S. compared to other nations. Ideology (0 to 10) standard deviations: U.S., 3.1; Canada, 2.5; U.K., 2.4; Australia, 2.4; New Zealand, 2.2. This serves to exacerbate the ideological divide between those that do and do not share misinformation in the U.S.

A theoretically possible reason for the relationship between politics and sharing in the U.S. is the political context of COVID-19 misinformation in the U.S. compared to other countries. As scholars have noted, the pandemic has been exceptionally politicized in some

parts of the world (Abbasi, 2020). During the early days of the pandemic, President Donald Trump, and his allies in the conservative media downplayed the danger of the novel coronavirus and accused other news sources and Democratic politicians of creating mass hysteria and panic. The tone of coverage temporarily changed after President Trump declared a national emergency on March 13, 2020, but the broader point is that from the very beginning, politicians across the political spectrum in the U.S. were sending very different signals about the nature of COVID-19 (Motta et al., 2020; Green et al., 2020). Peer reviewed content analysis from the first half of 2020 finds that U.S. scientists had to share news space with politicians, and this politicization of coverage contributed to polarization of attitudes around COVID-19 (Hart et al., 2020).

That is consistent with other work on how the politicization of science polarizes public attitudes (Merkley & Stecula, 2021). The downstream effects of this have been reflected in polls and behavioral data showing the linkage between political orientation in the U.S. and pandemic response in the form of social distancing, mask wearing, physical hygiene, or policy support (Capraro & Barcelo, 2020; Gollwitzer et al, 2020; Van Bavel et al., 2022). That degree of politicization simply did not happen in U.S.'s peer countries. In Canada, for example, there was (mostly) a consensus among political elites about the coronavirus during the early stages of COVID-19 pandemic (Merkley et al., 2020).⁶ The “Trump effect” may also explain the positive correlation between trust in the US federal government and sharing misinformation. This is unique to the US.

Of course, as is the case with all social science scholarship, our approach is not without caveats. One caveat to our theorized reason for American exceptionalism is that we don't know whether the United States simply has a different culture of social media use. Future work should examine the extent to which it may be that American users just share a lot more of *everything*, misinformation or not. Previous work has found, for example, that heavy social media users in general are more likely to share misinformation

⁶ Figure SI.2 in the Supplementary Information provides a further illustration of the polarization of COVID-19 in the news media across the five countries.

(Valenzuela et al., 2019). Clearly, a deeper understanding of cross-national social media usage is needed to better understand these patterns. Another caveat is that the higher level of sharing of the theories reported in the US could partly be a function of lower social desirability against this behavior. However, to the extent that there are lower restrictions to admitting to this behavior, there are likely also lower restrictions to the behavior itself. Therefore, it is highly plausible that sharing is actually higher in the U.S.. Partisan signaling in survey responses may also partially explain partisan differences in the U.S.. However, if this type of signaling is happening in an online survey, it is likely also happening in the real world (online and in person). Therefore, it has real world consequences and is not just a measurement artifact.

As a further caveat, we rely here on self-reported survey measures, which has some downsides. Future work in this space should focus on replicating these findings with actual behavior data on social media platforms. It is also worth noting that we focus here on a finite set of misinformation claims and conspiracy theories centered on COVID-19 during a global pandemic. Recent work of Enders et al. (2022), finds that context plays an important role in conspiracy theory endorsement, both in the U.S. and abroad. Patterns of sharing may also differ by conspiracy. Future work should explore these relationships with a broader set of theories, especially ones unrelated to the pandemic. Finally, not all misinformation becomes mainstream online. Much of it remains on the fringes and never gains prominence. Future work should explore the conditions under which certain misinformation gets shared.

As governments around the world are trying to vaccinate their populations, containing misinformation and conspiracy theories, particularly those regarding the COVID-19 vaccinations, is of utmost importance. Known anti-vaccine accounts continue to spread on Twitter, Facebook, YouTube, and other platforms, despite official attempts to ban them (Ortutay & Seitz, 2021). We take an important step here in trying to understand what characterizes those who share misinformation online, but more research is needed, especially into what exactly sets the U.S. apart.

Acknowledgements

We thank the editors and reviewers of the Journal for their insightful and constructive comments and suggestions.

Funding information

Social Sciences and Humanities Research Council Insight Grant 435-2021-1169; Mitacs Accelerate IT28016; McMaster University Future of Canada Project

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