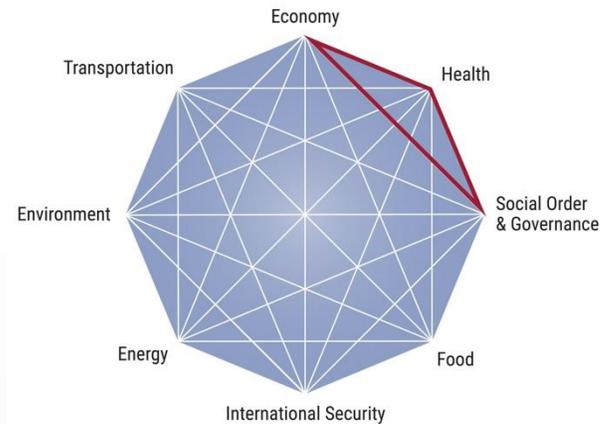


Behind the mask

Anti-mask and pro-mask attitudes in North America

Scott Janzwood & Michelle Lee



Summary

This Brief reviews the emerging scientific evidence on the effectiveness of masks for preventing the spread of COVID-19. It then examines pro-mask and anti-mask belief systems and offers strategies for addressing persistent anti-scientific beliefs around COVID-19 and other issues.

Emerging trends

- Only a small percentage of Canadians and Americans are strongly opposed to rules mandating masks in indoor or crowded public spaces.
- In Canada, anti-mask attitudes are held across the political spectrum.
- Both pro-maskers and anti-maskers defend their position using (what they consider to be) compelling scientific evidence.
- Anti-maskers strongly believe in returning to “normal,” while pro-maskers believe this to be impossible in the short-term (if at all).
- Pro-maskers and anti-maskers both invoke the precautionary principle—but only pro-maskers use it correctly.
- Like anti-vaxxers, anti-maskers distrust public health experts, emphasize personal choice, and are influenced by anecdotal, emotionally provocative evidence.

Implications for action

- Efforts to target misinformation and conspiracy theories online should focus on the role of social media companies and the disproportionate influence of highly connected people like celebrities and public figures.
- Anti-scientific beliefs can be changed the same way they are often formed: using emotionally provocative, anecdotal evidence that illustrates the direct, personal harms associated with COVID-19.
- By emphasizing the development of critical thinking skills and scientific literacy in schools, we can cultivate greater “intellectual resilience.”

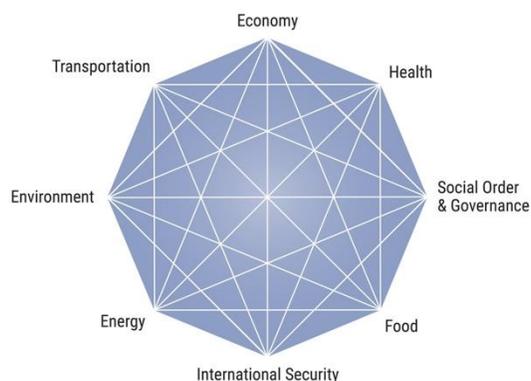
About the Cascade Institute

The Cascade Institute is a Canadian research center addressing the full range of humanity's converging environmental, economic, political, and technological crises. Using advanced methods for mapping and modeling complex global systems, Institute researchers identify *high-leverage intervention points* in cognitive, institutional, and technological systems that, if effectively exploited, could rapidly shift humanity's course towards fair and sustainable prosperity.

The Institute is located at Royal Roads University in British Columbia, a leader in training professionals to apply creative solutions to entrenched problems.

About the Inter-Systemic Cascades (ISC) Project

The Cascade Institute's *Inter-Systemic Cascades Project* maps causal routes through which the COVID-19 pandemic could sequentially destabilize associated national and global systems, causing cascades of change. This series of Briefs focuses on the pandemic's implications for the eight key systems highlighted around the adjacent octagon, and each Brief maps a possible causal route of destabilization among these systems. Cascades may be either "pernicious" (socially harmful) or "virtuous" (socially beneficial).



The analysis in this series starts from the assumption that societies are organized around cohesive sets of worldviews, institutions, and technologies (WITs), where:

- **Worldviews** are mental networks of concepts, beliefs, and values—often emotionally charged—that allow people to interpret things around them and plan their actions.
- **Institutions** are a community's rules governing social behavior, including formal rules (constitutions, laws, and contracts), informal rules (customs and norms), and mechanisms of enforcement.
- **Technologies** are problem-solving tools that people create by harnessing phenomena of their physical and social environments.

WITs in this Brief

Worldviews: anti-mask beliefs, pro-mask beliefs, anti-vax beliefs

Institutions: public health authorities, scientific research on masks

Technologies: cloth masks, surgical masks, N95 ventilators, vaccines

What's *not* in this Brief

The following topics are not addressed in this Brief, but they may be considered in future contributions to this series:

- Beliefs around pandemic recovery priorities
- A comparative analysis of public health responses around the world

Behind the mask: Anti-mask and pro-mask attitudes in North America

Background

The state of scientific research on masks and coronavirus transmission

Over the last few months, both proponents and opponents of masks have pointed to the shifting recommendations of public health experts to defend their views on mask-wearing as a strategy to prevent the spread of COVID-19. Proponents of masks point to recommendations from public health authorities encouraging—and increasingly mandating—masks in indoor public spaces and when physical distancing is difficult to maintain outdoors. While initially hesitant to make firm recommendations around mask-wearing, the Centers for Disease Control and Prevention (CDC), the Public Health Agency of Canada, and the World Health Organization (WHO) now support the use of cloth face masks, citing “new evidence” (Schulman 2020). Meanwhile, opponents of mandatory mask-wearing policies point to this “about face” as evidence that expert recommendations on masks are politically motivated and based on unsettled science.

As of September 15, 2020, guidelines and policies encouraging or mandating the use of masks are based on a combination of compelling scientific evidence supported by a near-consensus of experts *and* preliminary findings from unsettled research. In the first category, several important findings relevant to mask effectiveness are now well-established, including:

- Asymptomatic and presymptomatic individuals can transmit the coronavirus (Rothe et al. 2020; Zou et al. 2020; Pan et al. 2020; Bai et al. 2020; Kimball et al. 2020; Wei et al. 2020; R. Li et al. 2020; Furukawa, Brooks, and Sobel 2020; Oran and Topol 2020);
- The coronavirus can be transmitted not only through large droplets but also through much smaller aerosolized particles that can travel beyond two meters (Allen and Marr 2020; NASEM 2020; Anfinrud et al. 2020);¹
- N95 respirators (or the FFP2 in Europe) protect both the wearer and others from large droplets and aerosolized particles.² While early research indicated that single-use surgical masks primarily serve to protect others but not the wearer (Johnson et al. 2009; Wang et al. 2020; Leung et al. 2020; Offeddu et al. 2017),³ recent research indicates that surgical masks also protect the wearer by interfering with the

¹ Aerosolized particles are generally defined to be less than 5 microns in diameter.

² Only N95 masks without an exhalation valve provide effective source control (protecting others from the wearer).

³ However, Isaacs et al. (2020) caution that single-use surgical masks can paradoxically increase the risk of transmission if not changed regularly.

mobility of aerosol particles, thus reducing the distance these particles can travel and the viral load that people inhale; (Gandhi et al. 2020; Homer-Dixon 2020a); and

- Multi-layered cloth masks effectively block large droplets (Aydin et al. 2020; Kähler and Hain 2020).

Other claims—particularly those concerning the ability of cloth masks to block aerosolized particles—are still the subject of some debate in the emerging scientific literature. For instance, one well-cited study on cloth masks used in a clinical setting found that cloth masks led to significantly worse infection outcomes than surgical masks (MacIntyre et al. 2015).⁴ Another study cited by the CDC on the effectiveness of cloth masks at blocking influenza transmission argues that cloth masks should only be considered a last resort (Davies et al. 2013). The superior performance of surgical masks over cloth masks is well-known in countries like South Korea and Taiwan that have encouraged the use of surgical masks by the general public (and have significantly ramped up their production as a result) (Howard et al. 2020). However, the focus on cloth masks by public health authorities in North America is likely the result of persistent fears around PPE shortages for essential workers—concerns that no longer seem valid. Elsewhere, scientists have called for randomized control trials to bolster the evidence on the effectiveness of cloth masks (Chu et al. 2020).

The string of endorsements for the use of cloth masks coming from the majority of public health authorities in both Canada and the United States, however, reflects growing agreement within the scientific community regarding the effectiveness of these masks. While they are not as effective as surgical masks and respirators, they still reduce transmission rates. Currently, the balance of evidence suggests that:

*It is **more likely than not** that the widespread use of cloth masks in indoor or crowded places leads to a lower COVID-19 transmission rate than physical distancing alone, especially when physical distancing is not possible.*

The emerging scientific claims supporting this view include:

- Cloth masks provide a degree of “source control” (they protect others but not the wearer) from both large droplets and aerosolized particles (Chu et al. 2020; Howard et al. 2020; Kähler and Hain 2020; Konda et al. 2020; Aydin et al. 2020; Hendrix et al. 2020);
- Cloth masks are more effective if they use multiple layers of fabric, a higher thread count, and fit snugly around the nose and mouth (Konda et al. 2020); and
- Cloth masks primarily reduce the risk of transmission by ensuring that exhaled air remains close to the mask wearer, decreasing the likelihood that droplets are aerosolized and travel beyond two meters and reducing the viral load that people inhale (Kähler and Hain 2020; Howard et al. 2020; Gandhi et al. 2020).

⁴ A key limitation of this study is that it lacks a no-mask control group and thus does not show the relative effectiveness of cloth masks compared with not wearing a mask.

More importantly, a scientific consensus on the effectiveness of cloth masks or surgical masks is *not a necessary condition* for justifying the implementation of rules that encourage or mandate their use. Scientists and public health experts have increasingly invoked the *precautionary principle* to argue that we do not require scientific certainty to promote mask use because “there is little to lose and potentially much to be gained” (Brooks et al. 2020). As we explore further in this Brief, opponents of mask-wearing contend that masks pose significant health risks to the wearer, such as hypoxia, distress, headaches, or exhaustion—claims that have been debunked many times over (Greenhalgh 2020).⁵ For most, masks are only a minor and temporary inconvenience. However, the benefits of widespread mask use could be significant. Therefore, in the absence of compelling evidence contrary to this recommendation, masks should be an important part of strategies to safely reopen businesses and schools as we wait for a vaccine or effective treatment.

Mask-wearing reveals new social divisions in Canada and the US

A recent Gallup poll shows that 98 percent of Democrats report wearing a mask compared to just 66 percent of Republicans (Brenan 2020).⁶ But the far more interesting fault line is the growing divide *within* the Republican party around mask-wearing and the White House’s response to COVID-19 in general. Although President Donald J. Trump finally endorsed masks in mid-July, masks are now considered “the ultimate symbol of this new cultural and political divide” (Lizza and Lippman 2020).

While significantly fewer Canadians wore masks than Americans in June and early-July, mask-wearing rates in Canada and the US were roughly identical by late-July. According to polling data from July 21, 74 percent of Canadians and Americans report regularly wearing a mask when in public places (YouGov 2020). However, in Canada, resistance to masks is far more dispersed across the political spectrum than in the US. According to polling data from early-July (when the mask-wearing rate was only 60 percent in Canada), the number of individuals who voted for the Conservative party in the last federal election who “always” or “almost always” wore a mask in public was only four percentage points below the national average (Anderson and Coletto 2020). Meanwhile, supporters of politically central and left-leaning parties were only slightly less likely to never wear a mask in a public place as Conservatives (30 percent of Conservatives, 21 percent of Liberals, and 19 percent of New Democrats).

The main factor influencing whether Canadians wear masks is not the party that someone votes for but rather where they live and their perception of the risk in their community (*ibid.*). In early-July, only 14 percent of Canadians opposed mandatory mask-wearing policies compared with 62 percent that supported them and 24 percent that would “go along with” them. These data suggest that most Canadians who never or rarely wear masks in public are not necessarily “anti-mask,” but rather that they believe the risk of COVID-19 transmission in their community to be so low that they see masks as an unnecessary precaution.

⁵ Mask-wearing guidelines universally exclude young children and individuals that have trouble breathing.

⁶ The survey asked respondents if they had worn a mask “in the last week” (June 22-28, 2020). 85 percent of independents also reported wearing a mask in the last week.

These data show that in Canada a small minority of Canadians have attitudes strongly opposing mandatory mask policies and these attitudes are distributed (somewhat unevenly⁷) across the political spectrum. In order to better understand this fault line, this Brief examines the beliefs of the small group that is *most resistant* to mandatory mask policies and compares them to the beliefs of the pro-mask majority in North America.

Analysis

Mapping pro-mask and anti-mask belief systems

A belief system is a dynamic configuration of emotionally charged ideas about a particular topic—like masks or COVID-19—that can be held by an individual or shared with a larger group (Homer-Dixon et al. 2014). The interplay between ideas and emotions influences how we interpret the world and the actions we take—such as whether we choose to put on a mask before entering an indoor public space.

To unpack the key differences between the belief systems of “pro-maskers” and “anti-maskers,” we use a method called Cognitive-Affective Mapping (Box 1). Each cognitive-affective map (CAM) provides a visualization of the prominent ideas embedded within the belief system, their emotional valence, and how they interconnect (Cascade Institute 2020). The analysis focuses on pro-mask and anti-mask groups in Canada, where both groups are less explicitly partisan than in the US, and thus provide a clearer view of the anti-mask beliefs that exist across the entire political spectrum. But since there are significant similarities between pro- and anti-mask beliefs in Canada and the US, these CAMs are designed to be broadly applicable to both countries.

To map the belief system of pro-maskers, we reviewed public communication materials, speeches, and interviews from the chief medical officers of the four largest Canadian provinces (British Columbia, Alberta, Ontario, and Quebec) in June and July. We augmented these data with opinion pieces written by pro-mask commentators from several major Canadian news outlets. We then surmised key concepts and links from the dataset and constructed a “composite” belief system that is broadly representative of the group. The anti-mask CAM was built from content analysis of the websites, Facebook pages, pamphlets, and other online materials of four Canadian anti-mask groups—all of which have organized anti-mask and anti-physical distancing events in the last month.⁸

⁷ (24 percent of Conservatives, 9 percent of Liberals and 5 percent of New Democrats).

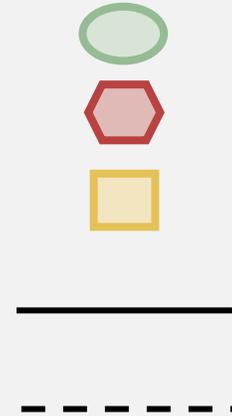
⁸ The analysis focused on the following organizations: Hugs Over Masks, Mothers Against Distancing, March to Unmask, and Fearless Ontario.

Box 1: Cognitive-Affective Mapping

Cognitive-affective maps (CAMs) model belief systems as networks of interconnected concepts related to a particular topic or issue—in this case, mask-wearing and mandatory mask policies. Unlike conventional cognitive maps, CAMs also assign each concept an emotional (affective) valence, differentiating concepts that invoke “positive,” “negative,” and “neutral” emotions.

How to read a CAM:

- **Green** concept nodes signify a positive emotional valence.
- **Red** concept nodes signify a negative emotional valence.
- **Yellow** concept nodes signify a neutral emotional valence.
- **Solid links** (the lines connecting concepts) represent concordant or mutually supportive relationships between concept nodes.
- **Dashed links** represent discordant or unsupportive relationships between concept nodes.



Both the pro-masker and anti-masker CAMs (Figure 1 and Figure 2) are organized around the same four high-level “pillars”:

- beliefs about economic prosperity,
- beliefs about health and safety,
- beliefs about the legitimacy of institutional expertise, and
- beliefs about the ideal relationship between the individual and the community.

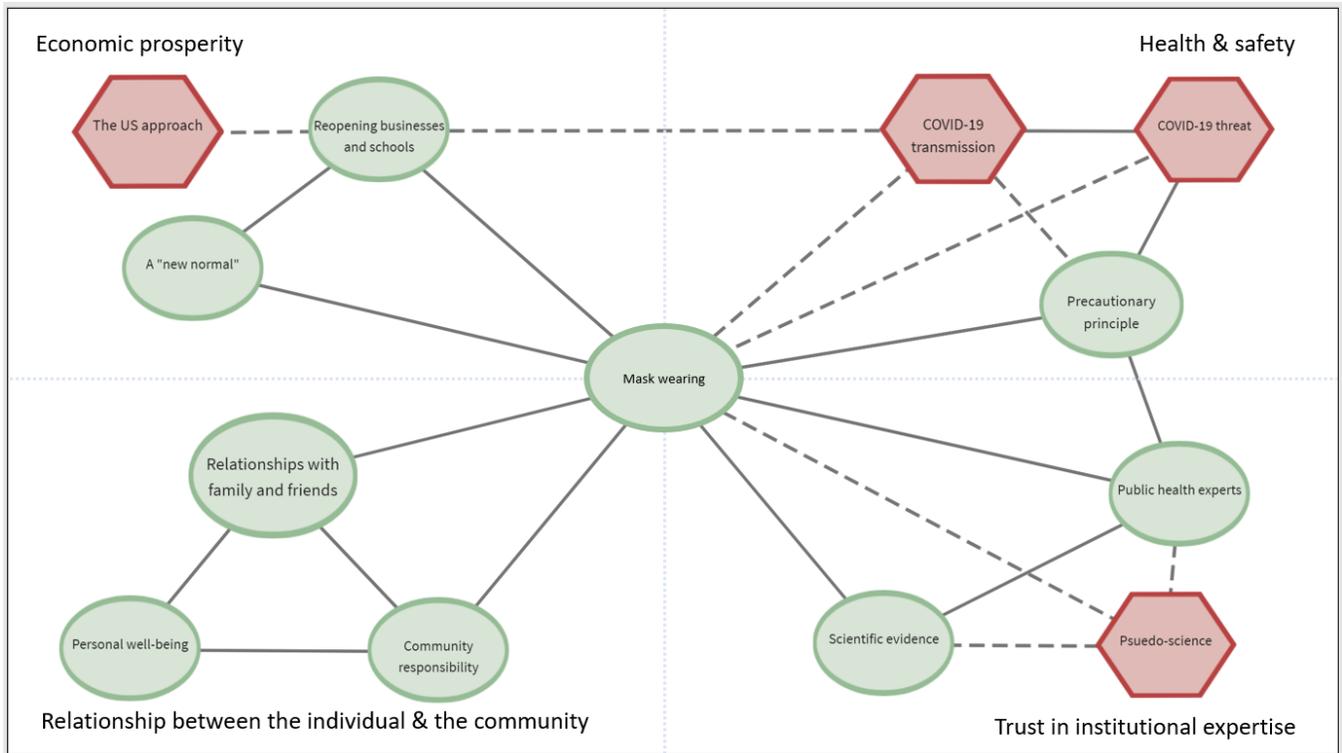


Figure 1: CAM of the pro-mask belief system

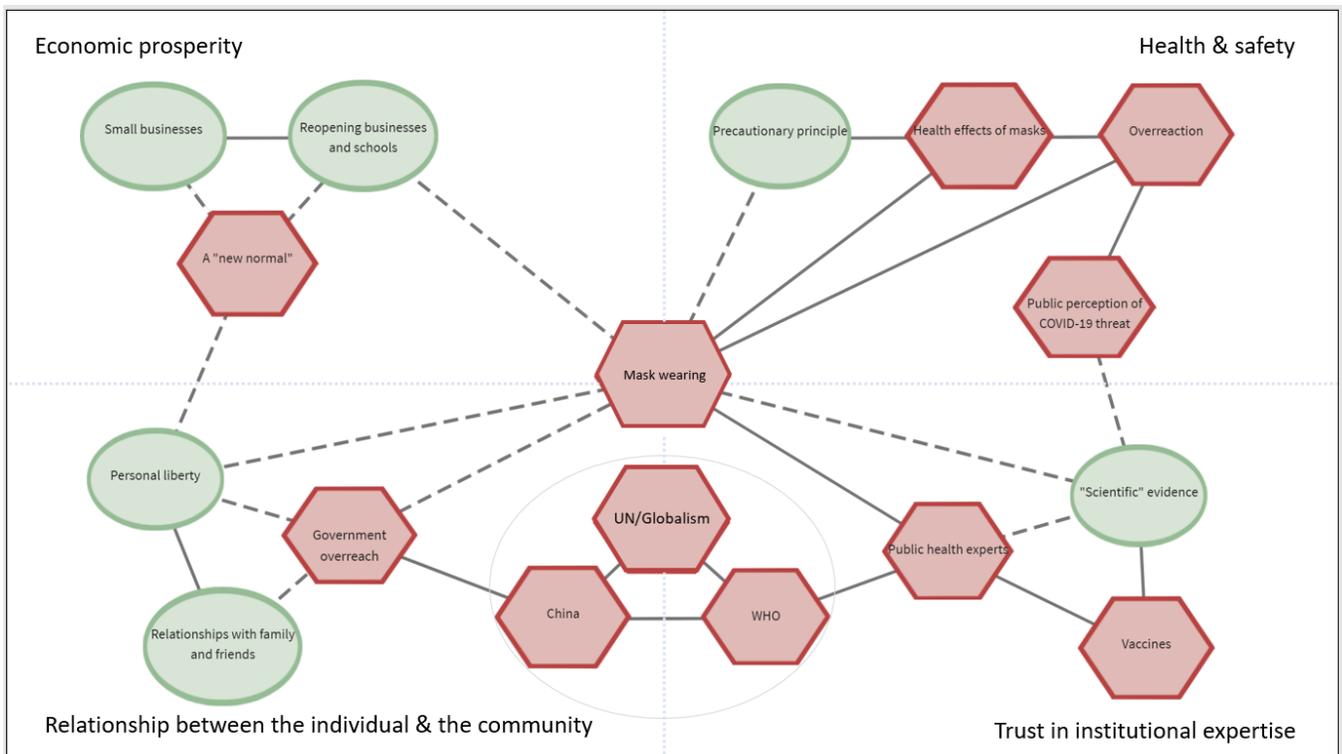


Figure 2: CAM of the anti-mask belief system

Beliefs about economic prosperity

- **Both pro-maskers and anti-maskers believe that reopening businesses and schools is vital.** However, pro-maskers tend to connect the goal of reopening businesses and schools with fears about doing so in a rushed or unsafe way, pointing to recent failures in the US (e.g. Grenier 2020). Pro-maskers see mask-wearing as a prerequisite for allowing businesses and schools to reopen safely and to stay open. In contrast, anti-maskers see mask-wearing, along with physical distancing rules, as obstacles impeding economic activity that harm small businesses in particular.
- **Anti-maskers believe in the possibility of a “return to normal,” while pro-maskers believe in the inevitability of a “new normal.”** Anti-maskers strongly desire a return to the same economic and social conditions that were in place before the pandemic, even if it comes at a cost (although they believe the human cost associated with a rapid reopening of the economy to be much smaller than pro-maskers do). For example, some protest signs at anti-mask rallies have specifically attacked the idea of a “new normal” (Figure 3). And importantly, anti-maskers believe that this return to normal is possible. Meanwhile, pro-maskers either believe that significant economic and social changes in the coming months and years are unavoidable (e.g., Baker 2020) or see the pandemic as an opportunity to build a more equitable and environmentally sustainable future (e.g., Lawrence 2020; Task Force for a Resilient Recovery 2020).

Beliefs about health and safety

- **Pro-maskers and anti-maskers differ considerably in their beliefs about the seriousness of the COVID-19 threat and the proportionality of the government response.** Anti-maskers tend to believe that COVID-19 poses minimal risk to both themselves and society at large and perceive the government response to be an overreaction. Some anti-maskers question why mandatory mask policies are going into place now (as opposed to five months ago), since case counts in some parts of the country are lower than in March. Recent spikes in Manitoba, Saskatchewan, Alberta, and British Columbia (and across the US) give credence to the pro-masker belief that the outbreak can get out of control quickly if safeguards are not in place.
- **Pro-maskers and anti-maskers differ considerably in their beliefs about the relative benefits and harms of masks.** On the pro-masker side, many chief medical officers and public health authorities acknowledge the combination of settled and unsettled science underpinning their recommendations around masks. But many pro-mask voices in the media exaggerate the level of certainty in the scientific literature about the effectiveness of cloth masks. For example, some commentators cite evidence about the effectiveness of surgical masks to defend recommendations around cloth masks (e.g., Li 2020). Anti-maskers exploit these exaggerated claims to portray the mainstream support of masks as anti-scientific.

Meanwhile, anti-maskers believe that masks are not only ineffective but extremely harmful. Specifically, they link mask-wearing to hypoxia, toxin or carbon dioxide poisoning, and the weakening of the immune system. While masks can pose problems for children and people with respiratory conditions (who are exempt from mandatory mask-wearing rules), all of these claims have been thoroughly debunked (Dunham 2020; Goodman and Carmichael 2020).

- **Pro-maskers and anti-maskers both invoke the precautionary principle—but only pro-maskers use it correctly.** Anti-maskers adopt a conventional interpretation of the precautionary principle—the idea that we should emphasize caution when a significant harm is *not yet happening*, but there is good reason to believe that a new intervention could produce that harm. In this case, anti-maskers believe that a new intervention (masks) could produce significant harm to the wearer. One anti-mask group states on their website: “No longitudinal studies exist on the physical and mental effects of frequent face mask wearing in a population. The precautionary principle advises against face mask use” (Fearless Ontario 2020). However, contrary to these claims, solid research shows that masks are harmless for the vast majority of the population. Pro-maskers adopt an “inverted”—but equally valid (Greenhalgh 2020)—interpretation of the precautionary principle, according to which we should emphasize caution when a significant harm is *currently happening* (the pandemic), and we have good reason to believe that a technology or intervention (masks) may reduce that harm.

Beliefs about the legitimacy of institutional expertise

- **Both pro-maskers and anti-maskers base their position on what they consider to be compelling scientific evidence.** Pro-maskers often cite the guidance of national-level public health authorities (like the Public Health Agency of Canada and the CDC in the United States) and specific scientific studies or literature reviews published in credible scientific journals. However, anti-maskers reference evidence (scientific or otherwise) at nearly the same rate. Like pro-maskers, anti-maskers tend to highlight credible scientific research that supports their view,⁹ but they ignore emerging evidence that challenges their view.¹⁰ They also inflate the significance of fringe expert opinion and present the anecdotal experiences of individuals as evidence.¹¹
- **Anti-maskers have a complicated relationship with the term “scientific consensus.”** Pro-maskers point to a consensus (or near-consensus) opinion within the scientific community to indicate the strength or “truth value” of their empirical claims. Meanwhile, anti-maskers simultaneously emphasize the *lack* of scientific consensus on the effectiveness of masks (implying that they would find a scientific consensus persuasive), while also associating scientific consensus with an elite expert community that they see as corrupt and politically motivated. Anti-mask messaging also valorizes the “rogue scientist” who bravely puts their career and reputation on the line by speaking out against the establishment. Such a figure on the mask issue is Dr. Rashid Buttar, a prominent anti-vaxxer and propagator of COVID-19 conspiracy theories (Cook 2020).
- **Anti-maskers link masks to vaccines.** Anti-maskers tend to link discussions of mandatory mask-wearing policies with the issue of vaccines. These discussions are focused on fears around a potential mandatory vaccine for COVID-19.

⁹ For example, one anti-mask group references the CDC-cited study by MacIntyre et al. (2020) comparing the effectiveness of surgical and cloth masks in a clinical setting.

¹⁰ The CDC cites evidence that both supports and questions the effectiveness of masks (CDC 2020).

¹¹ For example, one anti-mask organization references an unsubstantiated claim made in a perspective piece (“We know that wearing a mask outside health care facilities offers little, if any, protection from infection (Klompas et al. 2020)”) and presents it as scientific evidence.

Beliefs about the ideal relationship between the individual and the community

- **Pro-maskers link personal well-being to their duty to the broader community, while anti-maskers emphasize personal liberty.** While both pro-maskers and anti-maskers emphasize the importance of personal happiness and their relationships with family and friends, the pro-masker belief system focuses on the interconnections between personal well-being and the collective well-being of the community and is anchored in an empathetic or altruistic duty to community members. Anti-maskers narrowly define personal well-being as being free of constraints imposed by the broader community (i.e., personal liberty). Community well-being is maximized when personal liberty is maximized. And one’s duty is to protect perceived violations to one’s freedom—particularly from the state.
- **Anti-maskers emphasize the potential cascading harms from government overreach.** Anti-maskers make connections between mandatory mask-wearing policies and what they see as a gradual encroachment of government on personal freedoms and civil liberties. For example, protesters have prominently displayed warnings about government overreach on signs at anti-mask protests (Figure 3).



Figure 3 (from left): A protester attending a rally outside the Missouri Capitol on April 21, 2020 (AP Photo/Jeff Roberson); and a protester at a rally in Calgary on July 21, 2020 (CTV News).

Box 2: Pro-mask beliefs in South Korea

While mask-wearing in public is a relatively new phenomenon in North America, it has grown increasingly popular in South Korea over the last several years. Compared to Canada and the US, there is far less vocal opposition to masks in South Korea. Masks were encouraged early on in the pandemic and eventually mandated by national and regional authorities for public transit and indoor public spaces (Ministry of Health and Welfare 2020). While South Korea is not without incidents of public disagreement over adherence to mask-wearing policies (Lee 2020), a poll from March found that that 94 percent of South Koreans regularly wear a mask in public—the highest rate of all the countries surveyed. (Gallup International 2020).

The popularity of masks in South Korea prior to the pandemic—and the near-consensus of support for mandatory mask-wearing policies among South Koreans today—stems from four widely-held beliefs. First, the costs associated with wearing masks—both in terms of negative health effects and the “nuisance factor”—are believed by most South Koreans to be very low. Mask-wearing for health reasons increased substantially during the 2015 MERS-CoV epidemic (Oh et al. 2018). More significantly, over the past few years, health experts have strongly encouraged the use of masks as a protective measure against government-issued warnings of fine dust and air pollution (Kyung and Jeong 2020). Unrelated to health, masks have also been normalized through Korean beauty culture (Kim 2020). Celebrities and influential figures frequently wear masks as fashion statements and to disguise their identity in public, popularizing the use of masks as fashion accessories. Therefore, South Korea, like many of its neighbors, has had the benefit of slowly normalizing mask-wearing over several years.

Second, like pro-maskers in North America, South Koreans tend to believe that the potential benefits associated with wearing masks are very high. Korean public health authorities have cited research comparing mass masking to the herd immunity benefits of vaccines (Cheng, Lam, and Leung 2020). Third, South Koreans have relatively high levels of trust in government, public health experts, and scientific expertise in general—despite previous failings of the public health response during the MERS epidemic (Lee et al. 2020). Polls found that following the height of the pandemic in March, 74 percent of South Koreans thought the government was handling the response well (Gallup International 2020).

Fourth, decisive government action early on in the pandemic seems to have encouraged collective participation in physical distancing and mask-wearing (Kim 2020). Similar to arguments of the pro-mask contingent in North America, adherence to mask-wearing and other measures is often framed as a civic responsibility. However, a key difference between North American and South Korean pro-maskers is that, for some South Koreans, this collectivist identity is strengthened by anti-China sentiment. Like the North American anti-maskers, many South Koreans blame China for the spread of the coronavirus (as well as air pollution) (Kasulis 2020), illustrating that nationalistic and anti-China beliefs are not always tied to anti-mask beliefs, as they tend to be in North America.

Overall, the historical, cultural, and ideological factors in South Korea make it difficult to apply lessons to the North American context. However, the South Korean case study shows the importance of consistent and early public messaging, fostering a collective and non-partisan identity, and behavioral “priming” for future health emergencies—such as the possibility that masks could find a cultural foothold as a popular fashion accessory in North America.

Comparing anti-maskers and anti-vaxxers

Many of the similarities between anti-maskers and anti-vaxxers stem, at least in part, from a degree of shared membership between the two groups. While no survey data currently exists on the extent to which the groups overlap, the websites and Facebook pages of anti-mask groups prominently feature anti-vaccination messages and one of the anti-mask groups that we analyzed received “online leadership training” from a prominent anti-vaccination group (Ireland 2020).

Both anti-maskers and anti-vaxxers distrust the mainstream or consensus views of public health experts and instead appeal to personal experience or anecdotal evidence that tends to be emotionally provocative. Attributes of the psychological profile of anti-vaxxers that may also apply to anti-maskers include: a proclivity for conspiratorial thinking (Hornsey, Harris, and Fielding 2018; Swingle 2018), a susceptibility to confirmation bias (Swingle 2018; Betsch et al. 2010), and a tendency to overestimate the mortality risk associated with a wide range of behaviors (LaCour and Davis 2020). Both anti-maskers and anti-vaxxers emphasize personal choice. Most (but not all) of the individuals in these groups are more concerned about being *forced* to adopt these behaviors by the government than the use of masks and vaccines in general. Libertarians and far-right conservatives are most likely to believe that vaccines should be a parent’s choice (McCoy 2017). However, like anti-mask beliefs, anti-vaccination attitudes have taken root on both the right and left of the political spectrum.

Surveys on anti-vaccination attitudes have found that individuals that identify as “very conservative” and individuals that identify as “very liberal” are one-and-a-half times more likely to believe that vaccines are unsafe than moderate conservatives and moderate liberals (*Ibid.*). While it may be surprising that a small number of individuals on the far-left and far-right have forged an alliance on masks and vaccines, the belief systems of these groups have more in common than one might think. For example, both libertarians and people on the far-left tend to believe that the exercise of power by authority figures is usually illegitimate and should be resisted.¹²

Perhaps less intuitive is the observation that both groups possess similar beliefs about the level of social differentiation in the world (Homer-Dixon 2020b). Social differentiation measures the extent to which a person believes that the differences between groups are large and essential. Closely related to the issue of social differentiation, both groups also believe that the world is a fundamentally dangerous place—and therefore certain actors pose a credible threat to their security. For libertarians, the primary source of this threat is the government, while for people on the far-left, the threat comes from a coalition of corporations, a government that has been co-opted by corporate elites and technocrats, and the hyper-rich. Homer-Dixon (2020b) argues that people’s beliefs about social differentiation and about how dangerous the world is are often linked. He writes:

One of the most common perspectives on social differentiation simply sees society as divided between groups with lots of power and those with little or none [P]eople on both the political

¹² This claim is based on correspondence with Thomas Homer-Dixon, who has mapped libertarian and hyper-progressive ideologies using a 15-dimensional Ideological State Space (ISS). For more information about the ISS, see Cascade Institute (2020) and Homer-Dixon (2020b).

left and the populist right often see themselves as members of such exploited groups, a view that makes it more likely they'll see the world they inhabit as dangerous. When such beliefs are coupled in their worldviews with strong beliefs in objective principles of justice and fairness—principles that the powerful seem to shamelessly violate—people in both groups can feel tremendous grievance and anger (pp. 320).

Studies looking at interventions to address “vaccine hesitancy” show that it is *extremely difficult* to change attitudes about vaccine safety. Attempts to educate people on the nonexistence of a scientifically supported link between vaccines and autism spectrum disorder have proven ineffective (Horne et al. 2015) and can even be counterproductive, reinforcing people’s exaggerated perceptions of the risk (Nyhan et al. 2014). Therefore, one of the main takeaways from the vaccination attitudes literature is that a *containment strategy* that seeks to stop the spread of misinformation and anti-scientific beliefs may be more realistic than an *elimination strategy*. Research shows that anti-vax attitudes increase the more a person views anti-vax materials online (Jacobson, Targonski, and Poland 2007). Therefore, we must prioritize actions that decrease access to misinformation online and contain the spread of anti-mask (and anti-vax) beliefs beyond a small, implacable segment of society.

A final takeaway from our analysis is that the mask issue is far less partisan than it is portrayed to be in the media. In Canada, slightly more Conservatives oppose mandatory mask-wearing policies than people associated with other parties; still, a strong majority of Conservatives favors (or is indifferent towards) universal mask-wearing. In the US, nearly every Democrat supports mask-wearing—but so does a strong majority of Republicans. Support for mask-wearing and other interventions to address COVID-19 in North America is not highly partisan; these interventions should instead be seen as opportunities to mend political divisions and depolarize the public discourse.

Implications for action

We propose a series of recommendations for policymakers, public health authorities, and other community leaders to contain the spread of misinformation and anti-scientific beliefs and to align mask-wearing guidelines with the precautionary principle and the latest scientific evidence.

- **Clarify the differences between surgical masks and cloth masks in public health guidance.** While the latest scientific evidence suggests that cloth masks are certainly “better than nothing,” they appear to be somewhat less effective at protecting others (i.e., at source control) than single-use surgical masks. However, single-use surgical masks are more wasteful than reusable cloth masks. Now that surgical mask shortages are no longer a concern in most parts of North America, policymakers should follow the lead of countries like South Korea and Taiwan and more transparently communicate the pros and cons of surgical and cloth masks, based on the latest research.
- **Target misinformation and conspiracy theories online.** Working with technology companies like Facebook and Google to hold them accountable for the content they allow on their platforms (The Canadian Press 2020) is critical for decreasing the spread of misinformation online. According to network theory, we know

that some people exert far more influence on our beliefs and behaviors than others. Highly connected individuals such as celebrities, political leaders, and “influencers” (i.e., network “hubs”) tend to have a disproportionate impact on people’s attitudes. Prominent figures like President Trump that have supported blatant anti-scientific claims are particularly effective spreaders of misinformation. While public shamings of celebrities, public figures, and athletes over their failure to follow public health guidelines have sometimes crossed a line (e.g., Woodyard 2020), the behavior of influential people should continue to be publicly scrutinized—albeit in a way that is more compassionate and educational.

- **Take a page from the anti-vaxxer playbook.** Anti-vaxxers and anti-maskers tend to be persuaded by emotionally provocative messaging. However, emotionally charged counter-messaging can also be effective. A study by Horne et al. (2015) found that vaccine-hesitant people expressed more positive attitudes towards vaccines after being shown pictures of children with mumps and rubella and letters from the mothers of measles patients. Vaccines have been described as the “victim of their own success,” since very few people have encountered vaccine-preventable diseases (Shield 2020)—and therefore, people underappreciate the harms prevented by mass vaccination. By comparison, reminders of the harms of COVID-19 are everywhere. However, the media has (understandably) shied away from presenting visceral imagery and testimony of individuals with severe cases. While privacy concerns are important when reporting on COVID-19 patients, testimony videos from COVID-19 patients or their loved ones (e.g. Bernstein 2020) are one useful strategy for communicating the harms associated with the virus in an emotionally compelling way.
- **Cultivate “intellectual resilience.”** We should make long-term investments in our education system towards building intellectual resilience against cognitive biases to which we are *all* susceptible. Policymakers should double-down on ongoing efforts to improve social media literacy and critical thinking skills in elementary and high schools.
- **Balance honesty and certainty in science communication.** The transparent communication of uncertainty by scientists is a Catch-22. On the one hand, uncertainty is an unavoidable part of the scientific method. Even well-established, consensus views are not free from some degree of uncertainty. However, studies show that the transparent communication of uncertainty associated with scientific findings decreases the confidence of readers in the strength of those findings (Budescu et al. 2014).¹³ Improved scientific literacy and increased tolerance for uncertainty in expert guidance should also be viewed as key elements of intellectual resilience.
- **Prepare for this “belief profile” to re-emerge in response to other issues.** The common belief profile shared by the anti-masker and anti-vaxxer groups extends to issues such as climate change, 5G mobile networks, and wind turbines, where anti-scientific beliefs fueled by misinformation have gained a foothold. Efforts to combat misinformation online are more likely to succeed if these messages are contained before they reach a wide audience. Policymakers should prioritize foresight activities that aim to anticipate issues that are likely to be the next targets of anti-scientific, conspiratorial thinking.

¹³ Budescu et al. (2014, pp. 1) find that laypeople interpret uncertainty statements as conveying probabilities closer to 50 percent than intended by the authors of Intergovernmental Panel on Climate Change assessment reports.

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The views and opinions expressed in this Brief are those of the authors and do not purport to reflect the opinions or views of the Cascade Institute, its researchers, funders, or affiliated institutions.

Citation Information

Janzwood, Scott and Michelle Lee. 2020. "Behind the mask: Anti-mask and pro-mask attitudes in North America." Inter-Systemic Cascades Brief #6 v.3, *Cascade Institute*: pp. 1-19.

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