



# The Social Distancing Norm Cascade

The role of belief systems in accelerating normative change  
during the COVID-19 pandemic

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CI Technical Paper #2020-1

Version 1.2

April 27, 2020

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## Citation Information

Janzwood, Scott. (2020): "The social distancing norm cascade: the role of belief systems in accelerating normative change during the COVID-19 pandemic." Technical Paper #2020-1, v1.2, Cascade Institute: pp. 1-31.

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# Summary

Over a period of roughly four weeks, from early March to early April 2020, countries around the world experienced rapid and widespread changes in attitudes and behaviours toward social distancing practices, in response to the COVID-19 pandemic. (In Canada, the change occurred in about a week, from March 11 to March 18.) These changes were particularly impressive in liberal democracies that did not implement harsh penalties to enforce compliance with social distancing rules, but instead largely relied on the strategic communication of government guidelines and the voluntary adoption of “encouraged” social distancing practices.

Largescale behavioural change on this scale, without the threat of harsh sanctions for non-compliance, not only requires the effective communication of public health information but also the emergence and rapid dissemination of new social norms. It illustrates the power of emotionally charged ideas and moral persuasion, as well as the capacity of seemingly intractable belief systems to rapidly shift during a crisis. The recent *social distancing norm cascade*, as it is called here, also offers an unprecedented opportunity to analyze shifting worldviews in real-time, an opportunity that may reveal important lessons for encouraging other socially beneficial norm cascades around climate action and the zero-carbon energy transformation.

This Technical Paper analyzes the rapid and widespread changes in attitudes and behaviours toward social distancing practices during the COVID-19 pandemic. While most of the existing literature on norm cascades focuses on the central role of incentives to explain the spread of attitudinal and behavioural changes within a social system, here, I focus on the underexamined role of belief systems.

Using a belief system modeling method called Cognitive-Affective Mapping, this analysis compares the belief systems of young, relatively healthy people heeding government social distancing guidelines (whom I call “Good social distancers”) with three archetypal belief systems of people who have been most resistant to behavioural change, labelled the “Misinformed,” the “Consequentialist-individualist,” and the “Consequentialist-collectivist.” This analysis reveals the importance of targeting resistant groups with a combination of scientific messaging and moral persuasion.

Specifically, many individuals who are reluctant to practice aggressive social distancing measures fixate on the immediate, personal costs of social distancing and lack a sense of broader community responsibility. Effective messaging, for these individuals, emphasizes medium-to-long term impacts on the community and highlights the linkages between collective and personal well-being. Reluctant social distancers also tend to not make connections between the elevated risk posed to elderly and vulnerable people and their own relationships with family and friends. Messaging that prompts people to consider these relationships – even the elderly relatives of their friends – is a potentially effective strategy for shifting their assessment of the costs imposed by the outbreak relative to the narrow, personal costs of social distancing.

The paper also highlights how incentives and social network dynamics interact with belief systems to determine whether or not people act consistently with their underlying beliefs. Belief systems will only motivate pro-social behaviour in situations where the benefits of aligning one’s actions with one’s convictions exceeds the perceived social or reputational costs imposed by members of their social network. Therefore, messaging around social distancing is most effective when it comes from trusted, influential sources within one’s own social network. Governments now face the difficult task of trying to penetrate the social networks where these messages have had the least success and therefore should focus their efforts on influential, well-connected network “hubs” like celebrities, politicians, and religious leaders.

# 1. Introduction

This Technical Paper analyzes the rapid and widespread changes in global attitudes and behaviours toward social distancing practices during the COVID-19 pandemic – what I refer to as the *social distancing norm cascade*. The analysis focuses on countries that have not implemented harsh penalties to enforce compliance with social distancing rules but instead have largely relied on the strategic communication of government guidelines and the voluntary adoption of “encouraged” social distancing practices. These persuasion tactics not only rely on the effective communication of public health information but also the emergence and dissemination of new social norms. The social distancing norm cascade offers an unprecedented opportunity to analyze shifting worldviews in real-time, which may reveal important lessons for encouraging other socially beneficial norm cascades around climate action and the zero-carbon energy transformation.

The term *norm cascade* describes how attitudes about how one ought to behave can spread rapidly throughout a population. While most of the existing literature on norm cascades focuses on the central role of incentives to explain the spread of attitudinal and behavioural changes within a social system, here, I focus on the underexamined role of worldviews. Worldviews can be understood as the amalgamation of the hundreds of distinct belief systems that we construct around particular topics or issues relevant to our lives – like tax policy, abortion, or social distancing. Our belief systems are not static, but rather are dynamic configurations of emotionally charged values and ideas that motivate behaviour. The focus of this paper is the evolution of belief systems during the COVID-19 pandemic and an analysis of the various common belief systems that have either embraced or resisted social distancing measures.

An examination of the belief system dynamics underpinning the social distancing norm cascade provides important insights into the factors that accelerate behavioural change or reinforce resistance. For instance, this perspective helps explain why some people comply with social distancing guidelines, while others do not when presented with the same information and incentives. A belief system perspective on norm cascades highlights the critical role of values as people process new information and evaluate the costs and benefits of various behaviours. Monitoring how belief systems evolve during a crisis also reveals key policy interventions that can be implemented to accelerate and steer norm cascades toward socially beneficial outcomes.

The widescale adoption of social distancing practices in liberal democracies without the threat of harsh sanctions for non-compliance illustrates the power of ideas and moral persuasion, as well as the capacity of seemingly intractable belief systems to rapidly shift during a crisis.

Section 2 begins by explaining the concept of norm cascades and highlighting the important role that belief systems play in stimulating normative change. Section 3 discusses the unfolding social distancing movement around the world, positioning it as a “textbook case” of a norm cascade. Section 4 investigates the widespread shift in belief systems that has underpinned the social distancing norm cascade and discusses how belief systems interact with “external” factors like incentives and social network dynamics to produce behavioural change. The section also evaluates the effectiveness of various public health messaging strategies based on their

ability to shift the beliefs of those who are most reluctant to adopt social distancing practices. And lastly, Section 5 concludes with a brief discussion of the extent to which the lessons from the social distancing norm cascade can be used to stimulate norm cascades around other policy problems like climate change.

## 2. What is a norm cascade?

Generally speaking, the term “norm” refers to “social attitudes of approval and disapproval, specifying what ought to be done and what ought not to be done” (Sunstein 1996, pp. 11). Compared to formal rules like laws, norms are conventionally understood as informal rules or loose guidelines of appropriate behaviour. The term “norm cascade” first appeared in a 1996 article written by the preeminent legal scholar Cass Sunstein to describe instances where societies undergo rapid shifts toward new norms. Sunstein argues that human behaviour is largely a function of prevailing norms and that government has a special role in managing norms to produce socially desirable behaviour. He introduces a related term – the “norm entrepreneur” – to describe the disproportionate ability of certain individuals and organizations to drive normative change. Emphasizing the ways that norms alter people’s calculations of the perceived costs and benefits of their actions, Sunstein also introduces the less-used concept of the “norm bandwagon” to depict situations in which the costs associated with expressing new norms drop suddenly, leading to a “tipping point” where a large number of people rapidly reject old norms and adopt new ones.

For the purpose of this discussion, I merge the concept of norm bandwagon with the broader concept of norm cascade. However, it is important to highlight Sunstein’s reference to social tipping points and the concept of non-linearity more generally. The analysis of norm cascades in this paper emphasizes this key distinction between *rapid and abrupt* norm cascades, and a *slow and incremental* changes to social norms.

The term norm cascade has been applied most extensively in the field of international relations (IR), where the concept is used to explain how normative change influences political outcomes at the level of states and international organizations. The “norm life cycle,” introduced by IR scholars Martha Finnemore and Kathryn Sikkink (1998), describes how norms (such as women’s suffrage and the moratorium on land mines) pass through three distinct stages: norm emergence, norm cascades, and norm internalization. Like Sunstein, IR scholars highlight how norm cascades are preceded by tipping points that signal the moment when norm diffusion accelerates abruptly within a particular population. The IR literature also emphasizes the key role of norm entrepreneurs who advance and popularize new norms, such as the efforts of the International Campaign to Ban Landmines and Canadian Foreign Minister Lloyd Axworthy to promote the mine ban treaty. Other important contributions from IR scholars include research on the entrepreneurial role of transnational advocacy networks (Carpenter 2011) and expert communities (Haas 1992), as well as research highlighting how the acceptance of new norms depends on their “social fitness” within the existing institutional, social, and cultural context (Bernstein 2001).

Elsewhere, researchers have developed complex models to explain the dynamics of norm emergence and diffusion. Economic and game-theoretical models focus on the role played by incentive systems that encourage compliance or punish non-compliance with norms (e.g. Berger et al. 2012; Winter, Rauhut, and Helbing 2012; Axelrod 1997, 1984), while social-influence models incorporate more complex social network dynamics like homophily and preferential attachment between nodes to explain why some norms “take root” while others do not (e.g. Wimmer and Lewis 2010; Deffuant, Huet, and Amblard 2005). Dirk Helbing and his colleagues (2014) provide a particularly valuable model that uses complex network dynamics to explain the manner in which new norms emerge in a sub-population and spread through a larger population. They capture the complexity of real-world social systems by emphasizing randomness, non-linearity, self-organization, and emergence.

While these models shed light on some of the conditions that make a norm cascade more or less likely to occur, such as the level of “cultural conformity” within a network (De et al. 2018), none of these models dive into the underlying belief systems within these social networks. In fact, the existing literature on norm cascades focuses almost exclusively on environmental or “external” factors like incentives and social network structure and largely ignores dynamics associated with the ideology and psychology of groups and individuals. Even the scholarship highlighting how norm adoption depends on their “social fitness” does not explore the “fitness” of new norms within prevailing belief systems.

The primary focus of this Technical Paper is the underlying changes in belief systems behind the rapid adoption of new norms concerning social distancing amidst the ongoing COVID-19 pandemic. Incentive systems (such as social pressure or sanctions) and network dynamics (such as homophily and preferential attachment) provide valuable insights into how and why norms around social distancing have spread so rapidly and widely. However, in contrast to other treatments of rapid normative change, the focus of this paper is on the content of belief systems at the individual and collective level, a factor that is equally important for explaining the speed and extent of the social distancing norm cascade. The belief system perspective provides a valuable link between people’s most cherished ideas and values, individual behavioural change, and the collective changes necessary to effectively contain a pandemic on a global scale.

### 3. Is the social distancing movement a norm cascade?

#### 3.1 What is social distancing?

Social distancing describes the broad class of behaviours that reduce interactions between people in a community in which people may be infectious but have not yet been identified (and as a result are not isolated). These behaviours include decreasing one’s physical proximity to other people, eliminating all forms of physical contact (both with others and with one’s own face), increasing the frequency of handwashing, and reducing contact with surfaces that may be contaminated. In the field of public health, “isolation” (either coerced or voluntary) refers to the separation of people exhibiting symptoms associated with an infectious disease from non-infected or asymptomatic people, while “quarantine” (either coerced or voluntary) is the separation of

asymptomatic people who are believed to have been exposed to an infectious disease from the rest of the population (Wilder-Smith and Freedman 2020).

During the COVID-19 pandemic, many people have been encouraged to “self-quarantine” even if there is no reason to believe that they may have been exposed to the virus (confusingly, this behaviour is often referred to as “self-isolation”). Here, I distinguish between “moderate” social distancing behaviours, which include small adjustments that people make to decrease contact with others in public spaces, and “aggressive” social distancing behaviours, which describe strategies to avoid spending unnecessary time outside of one’s home altogether. I also make a distinction between “mandated” behaviours that are enforced by governments, employers, and retailers, and “encouraged” behaviours that are strongly recommended by public health experts and other authorities. The key distinction is that mandated social distancing practices are legally enforceable, whereas encouraged practices are only loosely enforced by social censure (if at all). A list of social distancing practices divided into these categories is provided in Table 1.

	Encouraged	Mandated
Moderate	<ul style="list-style-type: none"> <li>• Frequent hand washing and sanitization</li> <li>• Closing public toilet seats before flushing</li> <li>• Voluntary self-isolation / quarantine <i>with</i> symptoms</li> <li>• Maintaining a 2 metre distance from other people at all times</li> </ul>	<ul style="list-style-type: none"> <li>• Personal protective equipment (PPE) for all “frontline” workers</li> <li>• Mandatory symptom screening at hospitals and airports</li> <li>• Limiting number of customers allowed in retail stores</li> </ul>
Aggressive	<ul style="list-style-type: none"> <li>• Voluntary self-isolation / quarantine <i>without</i> symptoms</li> <li>• Avoiding retail stores (including grocery stores)</li> <li>• Avoiding non-essential travel</li> <li>• Avoiding gatherings with family and friends</li> </ul>	<ul style="list-style-type: none"> <li>• State-mandated self-isolation / quarantine</li> <li>• Curfews</li> <li>• Closing of non-essential businesses</li> <li>• Banning non-essential travel</li> <li>• Banning gatherings</li> <li>• Closing provincial/national borders</li> </ul>

Table 1: Social Distancing Practices

### 3.2 Has there been a rapid shift to a new system state?

The first case of COVID-19 in Canada was confirmed on January 25, 2020 (Government of Canada 2020). Over the last three months, a number of deeply engrained patterns – ranging from how people work, educate their children, move around, travel, shop, exercise, and interact with one another – have all undergone a profound shift. These attitudinal and behavioural changes are unique not only because of how drastic and widespread they are, but also due to the speed at which they occurred. In Canada, the first six weeks of the outbreak (from around late-January to mid-March) saw government authorities monitoring new cases more aggressively, canceling large social gatherings, and discouraging people from travelling internationally. However, many of the behaviours that we associate with voluntary social distancing practices – such as people working from home, maintaining a 2

metre distance from others, and choosing to only leave their homes to buy groceries – went from fringe to mainstream within a matter of two to three weeks from approximately mid-March to early-April. While the timelines differ slightly in other countries depending on the date of the first confirmed case of COVID-19 (and the first case of community spread), a similarly rapid “uptake” of social distancing practices has occurred in many parts of the world.

The focus of this paper is the role of belief systems in triggering norm cascades (as opposed to the implementation of effective incentive systems). It therefore pays special attention to voluntary or encouraged social distancing behaviours rather than those enforced by government decree. While the Chinese government has had success containing the outbreak by confining travelers returning to China into state-run quarantine centres, implementing curfews, limiting freedom of movement, and sealing off entire apartment buildings (Wu 2020), countries such as Canada and the US, where norms around individual liberty and freedom of movement prevail, have relied on strongly worded public health messaging and persuasion tactics to encourage social distancing practices. The remarkable behavioural change around social distancing in liberal democratic countries that lack the threat of harsh sanctions for non-compliance may reveal generalizable mechanisms for how seemingly intractable belief systems can rapidly shift during a crisis.

For the social distancing movement to qualify as a norm cascade, it must fulfill two conditions. First, the changes in attitudes and behaviours must constitute a qualitative shift to a new system “state” and second, the shift must be non-linear. While the accumulation of anecdotal evidence from government statements, media reports, and first-hand observations seems to provide overwhelming support that both of these conditions have been satisfied, some empirical evidence is emerging that confirms that the shift in attitudes and behaviours has indeed been both sudden and significant. A survey conducted in mid-March shows that 70% of Canadians believed that it was “unreasonable” to attend a gathering of ten people or fewer and 78% of Canadians believed it was unreasonable to visit elderly relatives (Canseco 2020). A similar study of the effectiveness of government messaging on social distancing in Italy found that a significant percentage of people across all demographics were following government advisories in mid-March (despite slightly lower compliance among young adults) (Barari et al. 2020). This data points to a qualitative shift in attitudes and behaviour across significant portions of the population in multiple countries.

Meanwhile, some evidence of the rapid, non-linear nature of the social distancing movement can be found in studies on movement patterns in major cities that use cell phone data to track the “average mobility” of people. For instance, a significant change in mobility patterns occurred in the US over a period of 24 days from March 11 to April 3. During that period, the “average mobility” and number of “non-essential visits” in the US both decreased by approximately 45%, suggesting that social distancing practices have been adopted both widely and rapidly (Unacast 2020). As more empirical data emerges in the coming months, we will likely see that the extent and speed of this behavioural change – and shifts in underlying attitudes and beliefs – are truly unprecedented. In the meantime, it is reasonable to conclude that the social distancing movement undoubtedly constitutes a norm cascade.

However, it should be briefly mentioned that the new system “state” brought on by changes in social distancing practices around the world is likely to be highly unstable. When certain “necessary conditions” that have been responsible for triggering this norm cascade are removed – such as the perceived risk associated with infection, hospitalization, and death – it seems reasonable to anticipate that many of the newly adopted norms associated with social distancing will quickly disappear. In fact, the “fickleness” of social distancing norms is, to some extent, a desirable characteristic since governments will eventually need to encourage people to incrementally abandon aggressive social distancing practices and resume normal activities in order to balance efforts to contain the outbreak with economic recovery. However, it is possible that some of these norms may persist even after an effective treatment or vaccine is discovered – for better or worse. Examples of the norms that are likely to be more persistent include working from home, avoiding handshakes and utilizing delivery services rather than in-store shopping.

#### 4. From resistance to enthusiastic compliance: examining belief system change during the social distancing norm cascade?

A worldview is the amalgamation of the hundreds of distinct belief systems that we construct around particular topics or issues relevant to our lives. Each topic-specific belief system is a dynamic configuration of emotionally charged values and ideas that can be held by an individual or shared with a larger group (Homer-Dixon et al. 2014). This interplay between ideas and values influences how we interpret the world and evaluate the costs and benefits associated with different actions – like whether or not to practice aggressive social distancing. Ideas and values are mutually constitutive. Our values (i.e. our convictions about morally permissible and impermissible behaviour and desirable and undesirable outcomes) help determine which ideas we gravitate towards and how we interpret them. New ideas, in turn, force us to evaluate and sometimes revise our values in light of perceived changes to our environment. The final key ingredient in a belief system is its emotional or affective content. Emotions regulate the relationship between values and ideas and serve as the spark that “operationalizes” our values and translates them into action.

While this section focuses on the role of belief systems in the social distancing norm cascade, it is important to briefly highlight some of the ways that “external” or environmental factors like incentives and social network dynamics can be entangled with belief systems.

The incentives that a person faces are often linked to their personal circumstances, such as their age, health, education level, employment status, financial situation, their ability to work from home, and who they are connected with. For instance, elderly or vulnerable people may adopt social distancing practices to mitigate a significant risk of dying or becoming seriously ill. Meanwhile, people that are unable to pay their rent or do not have the option of working from home may face strong incentives to ignore or oppose aggressive social distancing practices. These personal circumstances also influence the two core components of peoples’ belief systems: their dominant ideas about COVID-19 and social distancing, and their underlying values. The ability for people to access and understand new scientific information and have that information influence their dominant

ideas about the outbreak or social distancing is linked to factors like socioeconomic status and education level. Meanwhile, our deeply held values are socially constituted by influential actors in our social networks like family members, role models, and religious leaders, and are regularly reinforced by formal and informal incentive systems like laws or social pressure. Therefore, it is important to consider belief systems within the larger context of these environmental factors, which is the main task of Section 5.

#### **4.1 Belief system archetypes**

The “uptake” of new norms within a population or organization is highly context-dependent. A norm introduced successfully in one group may not necessarily take root in another group that has a different incentive system or social network structure. The context-specific nature of normative change is equally significant when looking at changes taking place at the level of belief systems. Two individuals with the exact same understanding of a problem may behave in completely different ways depending on how their understanding interacts with their fundamental values – a situation illustrated by the divergence in beliefs about social distancing despite the fact that some opposing groups possess the same basic understanding of the problem.

That being said, one does not need to analyze the belief system of every person to gain insights into the underlying ideological and psychological dynamics that are driving the social distancing norm cascade. Attempts to identify generalizable models (or archetypes) of belief systems – while imperfect – can illuminate some of the common mechanisms responsible for shifting attitudes and behaviours around social distancing. In order to focus specifically on the role of ideas and values in influencing behavioural change, these archetypes focus on groups of people that face similar incentives. To “control” for the influence that different incentive systems might play on people’s behaviour, these archetypes reflect people that lack strong personal incentives to adopt social distancing like frontline workers, the elderly, and vulnerable peoples. The archetypes all reflect the belief systems of relatively young and healthy adults (20-40 years old) with a median (Canadian) income and thus do not face an immediate trade off between complying with government guidelines and survival.

A useful starting point for exploring shifts in belief systems during the social distancing movement is to identify the common beliefs of people that are heeding government guidelines and are practicing aggressive social distancing behaviours – an archetype I call the “Good Social Distancer” (GSD). While recent studies show that the risk of becoming seriously ill when contracting the virus facing young adults may be significantly higher than what was reported in the earlier stages of the outbreak (Maragakis 2020) and many younger adults are taking the risk to their personal health seriously, this group tends to believe that personal social distancing practices are largely to protect other people or society at large rather than themselves (Moore et al. 2020). Despite widespread reporting of instances where people in this demographic have ignored government social distancing guidelines, attending parties and congregating on beaches (Cummins 2020), the vast majority of this group has adopted stringent social distancing practices (Weinberg 2020). The following profile is based on a belief system broadly reflective of this group that is consistent with the public health messaging issued by the Canadian government (Table 2).

	Belief system characteristics
The "Good Social Distancer"	Dominant ideas <ol style="list-style-type: none"> <li>1. Believes that her/his personal risk of becoming seriously ill if infected is non-negligible</li> <li>2. Understands the links between widescale adoption of social distancing practices, reducing the risk to the elderly and vulnerable, and reducing the risks associated with overloading the health system</li> <li>3. Sees a direct and personal connection between the risk to the elderly and vulnerable and her/his own relationships with family and friends</li> <li>4. Possesses a positive attitude towards social distancing in general and towards practicing aggressive social distancing her/himself</li> </ol>
	Dominant values <ol style="list-style-type: none"> <li>1. Focuses on medium-to-long-term and collective impacts when assessing the costs and benefits of personal social distancing behaviour</li> <li>2. Believes that (s)he is personally responsible for "doing her/his part" to flatten the curve</li> <li>3. Believes that defying public health guidelines around social distancing is morally wrong</li> </ol>

Table 2: The Good Social Distancer

To illustrate the shift or reorientation of previously dominant norms towards the GSD, we must identify a number of common starting points or typical belief systems of people that have been reluctant adopters of aggressive social distancing practices. While some of the most publicized resisters are individuals or groups motivated by religious beliefs or political ideological commitments, particularly in the US (Coppins 2020), here, I focus on what I consider to be the most common "resistance profiles." These resistance profiles are based on an analysis of op-eds and commentary featuring critiques of social distancing from the early stages of the social distancing movement in mid-to-late March (Table 3). Again, these archetypes assume that these individuals are relatively young and healthy adults. The profiles present stylized or exaggerated belief systems. In reality, most people formerly or currently resistant to adopting aggressive social distancing behaviours possess attributes of more than one resistance profile.

Resistance profile	Belief system characteristics
The "Misinformed"	Dominant ideas <ol style="list-style-type: none"> <li>1. Believes that her/his personal risk of becoming seriously ill if infected is negligible (often using comparisons between COVID-19 and the common flu)</li> <li>2. Understands the risk to the elderly and vulnerable but tend to not understand the risks associated with overloading the health system (and the concept of "flattening the curve")</li> <li>3. Does not make a direct and personal connection between the risk to the elderly and vulnerable and her/his own relationships with family and friends</li> <li>4. Possesses a negative attitude towards social distancing in general and towards practicing aggressive social distancing her/himself</li> </ol> Dominant values <ol style="list-style-type: none"> <li>1. Focuses on immediate and personal costs of social distancing on personal freedom, personal well-being, and her/his ability to see family and friends</li> <li>2. Blames public health experts for stoking fear and panic</li> <li>3. Believes that defying public health guidelines around social distancing is morally permissible</li> </ol>

<p>The “Consequentialist- individualist”</p>	<p>Dominant ideas</p> <ol style="list-style-type: none"> <li>1. Believes that her/his personal risk of becoming seriously ill if infected is non-negligible</li> <li>2. Understands the links between widescale adoption of social distancing practices, reducing the risk to the elderly and vulnerable, and reducing the risks associated with overloading the health system</li> <li>3. Does not make a direct and personal connection between the risk to the elderly and vulnerable and her/his own relationships with family and friends</li> <li>4. Possesses an ambiguous or even positive attitude towards social distancing in general but a negative attitude towards practicing aggressive social distancing her/himself</li> </ol> <p>Dominant values</p> <ol style="list-style-type: none"> <li>1. Focuses on immediate and personal costs of social distancing on personal freedom, personal well-being, and her/his ability to see family and friends</li> <li>2. Understands the importance of “flattening the curve” but believes that her/his contribution to flattening the curve is too insignificant to justify assuming large personal costs</li> <li>3. Believes that defying public health guidelines around social distancing is morally permissible</li> </ol>
<p>The “Consequentialist- collectivist”</p>	<p>Dominant ideas</p> <ol style="list-style-type: none"> <li>1. Believes that her/his personal risk of becoming seriously ill if infected is negligible (often using comparisons between COVID-19 and the common flu)</li> <li>2. Understands the risk to the elderly and vulnerable but tend to not understand the risks associated with overloading the health system (and the concept of “flattening the curve”)</li> <li>3. Does not make a direct and personal connection between the risk to the elderly and vulnerable and her/his own relationships with family and friends</li> <li>4. Possesses an ambiguous attitude towards social distancing in general towards and towards practicing aggressive social distancing her/himself</li> </ol> <p>Dominant values</p> <ol style="list-style-type: none"> <li>1. Focuses on medium-to-long-term and collective impacts when assessing the costs and benefits of personal social distancing behaviour</li> <li>2. Believes that the economic and human costs of aggressive social distancing practices exceed the economic and human costs of relaxing social distancing practices and allowing the outbreak to “run its course”</li> <li>3. Believes that (s)he is personally responsible for “doing her/his part” to stimulate the economy</li> <li>4. Believes that defying public health guidelines around social distancing is morally permissible</li> </ol>

Table 3: Resistance Profiles

#### 4.2 Mapping shifts in belief systems

To better understand how the belief system of each resistance profile can evolve or transform to more closely resemble the GSD, we require a better understanding of the similarities and differences between these profiles. I use a belief system modeling method called Cognitive-Affective Mapping to visualize and analyze the belief systems of the GSD, the Misinformed, the Consequentialist-individualist (C-I), and the Consequentialist-collectivist (C-C). Each cognitive-affective map (CAM) depicts the conceptual structures that individuals or groups use to represent important aspects of the world (Homer-Dixon et al. 2014). CAMs model belief systems as networks of interconnected concepts related to a particular topic or issue – in this case, the COVID-19 pandemic and social distancing.

Unlike conventional cognitive maps, CAMs also assign each concept an emotional (affective) valence, reflecting the psychological and social effects that emerge when configurations of ideas are “charged” with emotional values. However, CAMs are still limited in their ability to fully capture the role of complex emotional drivers in belief systems, as they only differentiate between “positive,” “negative,” and “ambiguous” emotions. All emotional states do not exert an equal influence on actions. For example, a person whose anger is amplified by a powerfully negative emotion like disgust may be compelled to take actions that an ordinarily angry person would not. However, due to the limitations of the method, the following analysis focuses primarily on the dominant ideas and values in each belief system archetype. A deeper exploration of the underlying emotional mechanisms driving belief system transformation around social distancing is, however, an important avenue for further research.

In the following CAMs, green concept nodes signify a positive emotional valence (the individual/group attaches positive emotions to that concept), red nodes signify a negative emotional valence, and purple nodes signify an ambiguous (or variable) emotional relationship with the concept. Solid “links” (the lines connecting concepts) represent concordant or mutually supportive relationships between concepts, while dashed links represent discordant or unsupportive relationships.

#### *The Good Social Distancer (GSD)*

Beginning with the GSD, the four interconnected concepts at the top of Figure 1 illustrate the connections that the GSD makes between the spread of COVID-19 and its three main negative outcomes: deaths of the elderly and vulnerable, health system overload, and economic insecurity. The CAM of the GSD belief system can be interpreted similarly to a neural network model where different parts of the brain are “activated” or “light up” when performing different cognitive tasks. By thinking about any one concept, connected neighbouring concepts are simultaneously activated. For example, for the GSD, the thought of the health system becoming overloaded triggers a broader problem understanding, that includes the closely connected concepts of “the spread of COVID-19,” “deaths of the elderly and vulnerable,” “health system overload,” and “economic insecurity.”

The positive, concordant links between these concepts show that they have mutually supportive relationships (e.g. the spread of COVID-19 is supportive of health system overload and vice versa). The negative outcomes “deaths of the elderly and vulnerable” and “health system overload” are connected with discordant links to neighbouring positive concepts like “flattening the curve” and “social distancing,” which reflects how flattening the curve and social distancing are at odds with those negative outcomes. Meanwhile, social distancing has a concordant link with economic insecurity, as the GSD acknowledges that prolonged, aggressive social distancing will inflict harm on the global economy. However, this link is de-emphasized compared to the links between social distancing and the other negative outcomes associated with COVID-19, as well as the links between health system overload and deaths with economic insecurity.

The GSD belief system also positions “flattening the curve” as a mediating concept that connects personal social distancing behaviour to the problem of health system overload. This mediating concept allows the GSD to connect personal social distancing behaviour to the key outcomes of slowing the rate of spread and reducing the

risk of hospital inundation, thereby significantly reducing the net human and economic costs of the outbreak (even if the same number of people are eventually infected). Taken together, the GSD belief system reflects a comprehensive scientific understanding of the causes, impacts, and solutions associated with the COVID-19 pandemic.

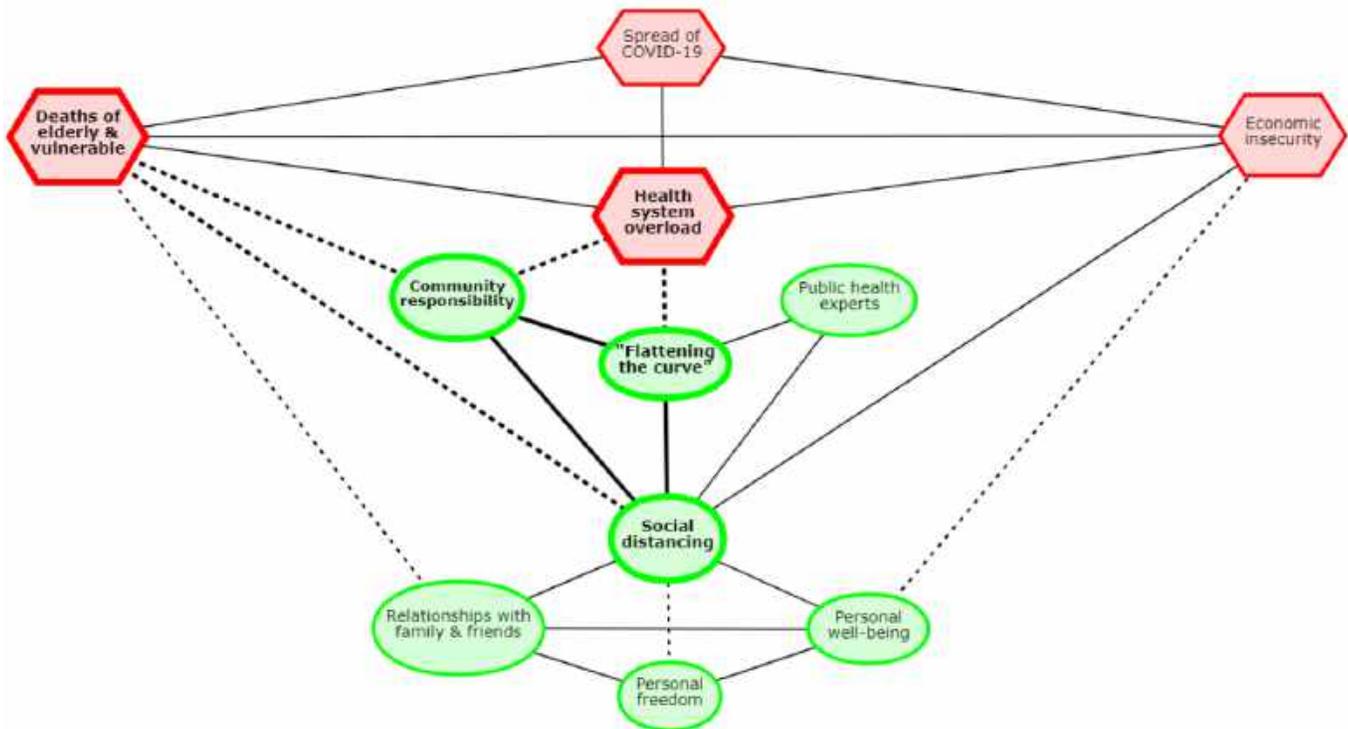
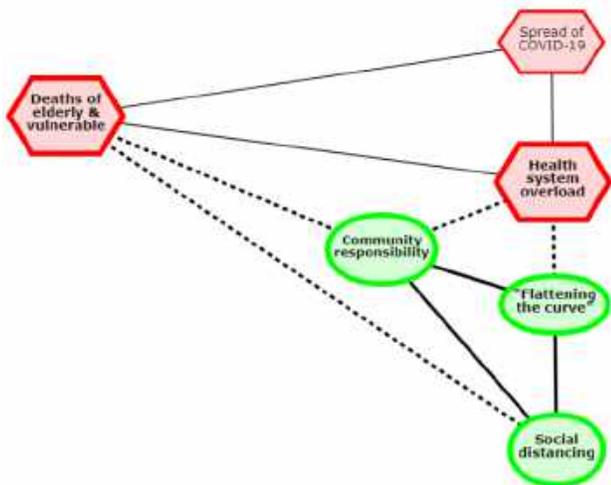


Fig. 1: CAM of the GSD belief system (key concepts and links emphasized in **bold**)

The key concept that reflects the dominant values of the GSD belief system is the sense of “community responsibility” that reinforces the link between personal social distancing behaviour on the one hand and the deaths of the elderly and vulnerable and health system overload on the other (Fig. 2). The GSD is driven by an empathetic or altruistic duty to other members of their community (local, national, or global) that emphasizes the costs or harms inflicted upon others, while de-emphasizing personal costs created by adopting aggressive social distancing behaviour. This sense of responsibility to others is captured by the following quote from a 17-year-old student in South Korea:



“I saw on social media that students were sending thanks to medical workers and restaurants struggling to keep their business afloat were sending food to hospitals. It made me feel a sense of community that's stronger than fear or feeling of powerlessness. It made me hope that we will overcome this crisis if we all take precautions and care for each other (Sarmiento 2020).”

Fig. 2: sense of community responsibility links personal social distancing practices with key outcomes While the GSD attaches a strong, positive emotional valence to actions that improve outcomes at the community level, they are also concerned about outcomes like personal freedom, personal well-being, and maintaining relationships with family and friends. While there is a discordant link between social distancing and personal freedom (reflecting the unavoidable physical restrictions imposed by aggressive social distancing practices), the GSD has concordant links between social distancing and both their personal well-being and their relationships with loved ones. These supportive links reflect the GSD’s emphasis on positive medium-to-long-term outcomes and the interconnections between their personal well-being and the collective well-being of their community. For instance, columnist Sarah-Vaughan Brakman writes:

Social distancing really can save lives and protect long-term health. In other words, we really shouldn’t think of it as an optional act that we perform out of the kindness of our hearts. The downsides of not social distancing can be so severe that we need to think of it as an ethical duty to our fellow human beings (Brakman 2020).

To the GSD, social distancing imposes short-term costs on their ability to see their family and friends, but these costs are dwarfed by the benefits of protecting these relationships and allowing them to flourish in the future. Similarly, social distancing imposes costs on personal well-being, such as the negative impacts of isolation on mental health (Brooks et al. 2020) – but the GSD would find it challenging to find any sense of personal well-being in a world where the outbreak has inflicted serious, irreversible harm on their community.

The GSD belief system can reflect either a consequentialist or deontological moral perspective. From a consequentialist perspective that focuses on the balance of costs and benefits produced by their actions, the GSD adopts aggressive social distancing practices because they believe this strategy (if adopted by most people) has the greatest likelihood of protecting their community and loved ones, which ultimately produces the greatest amount of benefits for both the community and the GSD. From a more deontological perspective that sorts actions into starker categories, the GSD sees compliance with social distancing guidelines as “morally permissible” and violating them as “morally impermissible.” This stance may reflect the broader belief that

disobeying the government is fundamentally wrong or, alternatively, the belief that putting the lives of elderly and vulnerable people at risk is fundamentally wrong.

### *The Misinformed*

The Misinformed resistance profile describes the belief system that was most common at the beginning of the social distancing movement, characterized by an incomplete or flawed understanding of the causal model linking the pandemic to its negative outcomes, as well as the role of social distancing in minimizing or avoiding those outcomes. While there are many pre-existing beliefs that may explain why early messaging around social distancing was ineffective on certain individuals – including religious beliefs and political allegiances – the Misinformed profile is based off of the much larger group of people that were either not exposed to early messaging around the outbreak or that possess a moderate level of distrust in public health experts and government.

The most noticeable difference between the CAM of the Misinformed belief system and the CAM of the GSD is that a number of key concepts and links that are present in the GSD are missing from the Misinformed (Fig. 4). The Misinformed lacks an understanding of the significance of the “flattening the curve” concept and the health system overload problem more generally, focusing instead on the deaths of the elderly and vulnerable, and the negative economic impacts associated with the pandemic and aggressive social distancing. Also missing from the Misinformed CAM is an important link connecting potential deaths of the elderly and vulnerable to their own relationships with family and friends. This failure to attach personal meaning to the negative outcomes of the outbreak serves to minimize the perceived costs of allowing the outbreak to “run its course.” Lastly, the central concept of community responsibility is absent from the Misinformed belief system – which is not to say that they lack a sense of community responsibility in general but only that the concept is not evoked when thinking about the COVID-19 pandemic specifically. For the Misinformed, the absence of a sense of community responsibility is likely the result of an incomplete understanding of the seriousness of the outbreak and an underappreciation of the causal link between personal behaviours and collective outcomes.

The Misinformed also believes that the risk of getting infected and becoming seriously ill themselves is negligible, which they reinforce with the erroneous comparison between COVID-19 and the seasonal flu. For instance, during a Fox News town hall on March 24, US President Donald Trump declared: “We lose thousands of people a year to the flu. We never turn the country off” (The Whitehouse 2020). Since the Misinformed believes that the costs associated with the outbreak are minimal, they view public health experts negatively and connect them with inciting panic, which leads to economic insecurity.

The key sub-structure in the Misinformed belief system is the set of discordant relationships between the strongly negative concept of social distancing and the strongly positive concepts of personal freedom, personal well-being, and relationships with family and friends, reflecting a focus on immediate and personal costs produced by aggressive social distancing. This sub-structure is shared with the C-I belief system (Fig. 3). While elements of the Misinformed resistance profile are still evident in the minority of individuals still not complying

with social distancing guidelines, many of the people not taking public health advisories seriously more closely resemble the C-I resistance profile.

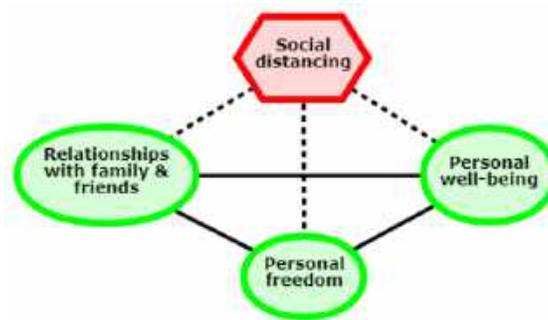


Fig. 3: Misinformed and C-I beliefs around the personal costs of aggressive social distancing

### *The Consequentialist-individualist*

Unlike the Misinformed, the C-I belief system reflects a more complete understanding of the links between social distancing, flattening the curve, and decreasing the strain on the healthcare system – which more closely mirrors the GSD. However, the C-I's main point of departure from the GSD is their lack of a compelling sense of community responsibility linking personal social distancing behaviour with collective outcomes like reducing deaths of the elderly and vulnerable, flattening the curve, and preventing health system overload. Therefore, compared with the Misinformed whose main distinction from the GSD is their lack of exposure to (or understanding of) scientific information (i.e. their dominant ideas), the key difference between the GSD and the C-I is their divergent values. A comparison between the C-I and GSD CAMs is presented in Figure 4. While the GSD appeals to a sense of duty or responsibility to the broader community that compels them to “do their part,” the C-I sees the costs associated with aggressive social distancing as prohibitively high to their individual well-being (narrowly defined). The C-I also sees their personal contribution to flattening the curve and reducing the risk of negative collective outcomes by forgoing visits with loved ones as relatively insignificant – or, as has been suggested by some experts, they overrate their own ability to avoid getting sick (Pinsker 2020). Therefore, they see the violation of aggressive social distancing norms as morally permissible, as long as they are reasonably cautious (only interacting with “trusted” people outside of the home). Of course, if everyone were to behave this way, it is unlikely that the outbreak could be quickly or effectively contained.

The Misinformed and the C-I share an emphasis on the immediate and personal negative impacts from social distancing. For the Misinformed this emphasis stems from a misunderstanding of the seriousness of the outbreak and the link between personal behaviours and preventing undesirable collective outcomes. For the C-I, this sub-structure of beliefs can be attributed to three other factors.

First, the C-I's analysis of the relative costs and benefits associated with the decision to self-quarantine is skewed by an informational bias that fixates on short time horizons and direct personal impacts. Even if we disregard the potential intrinsic benefits that one might derive from engaging in altruistic or empathetic

behaviour, the C-I excludes any consideration of how disastrous outcomes at the collective level – like a significant number of deaths or the collapse of their community’s healthcare system – will impose significant negative costs on their own life in the medium-to-long term. The CAM of the C-I belief system also lacks a direct link between the deaths of the elderly and vulnerable and their own loved ones. However, even if the C-I lacks any close relationships with people belonging to those groups, the C-I belief system fails to appreciate the near-certainty that one of their family members or friends are closely connected to someone else that will be negatively impacted by the virus. Therefore, the C-I fails to connect indirect harms imposed on their loved ones to the quality of their own life going forward.

Second, the C-I lacks the moral imperative to sacrifice their immediate personal well-being for the well-being of the community. While the GSD belief system can be interpreted from either a consequentialist or deontological perspective, the C-I is locked into a self-centered consequentialist calculus that does not appreciate the positive feedback effects between collective and personal well-being. Taking actions to strengthen one’s community – particularly those actions that involve some level of personal sacrifice – increases social cohesion and other public goods like trust and security. Even from a consequentialist perspective, these public goods have important amplification effects within social systems – and therefore, small personal sacrifices can be considered smart investments that pay large dividends over time to both the community and the individual. Moreover, countless studies illustrate the personal psychological benefits of empathy, altruism, and charity (e.g. Batson, Ahmad, and Stocks 2016; Coplan and Goldie 2011) that are forfeited by the C-I.

Third, the C-I may not necessarily underestimate the negative costs associated with the outbreak, but they instead believe that the advantages of free riding on the social distancing behaviours of others justifies the costs of shirking one’s responsibilities to the community. Since the primary goal is to slow the spread of the virus until an effective treatment or vaccine is developed (Allain 2020), then the priority of governments is to persuade a sufficient number of people (i.e. nearly everyone) to comply with aggressive social distancing guidelines to reduce the number of new cases as much as possible. If the C-I believes that a sufficient number of other people within their community are engaging in aggressive social distancing practices, they may decide that their decision to “defect” or not comply with guidelines will have no impact on collective outcomes. Essentially, the C-I may believe that they can accrue the benefits of congregating with family and friends and travelling, as well as the benefits of avoiding the worst outcomes of the outbreak – so long as a sufficient number of their community members choose not to defect and free ride as well. From this perspective, the COVID-19 pandemic can be viewed as a Tragedy of the Commons (Cashore and Bernstein 2020). Alternatively, the C-I may possess a more cynical perspective and believe that some of the worse outcomes are unavoidable and therefore, any sacrifice to their immediate personal well-being is futile. For instance, a survey conducted between March 19 and 21 found that only 59% of Canadians and 44% of Americans believed that the government social distancing measures would be effective (Bricker 2020).

#### *The Consequentialist-collectivist*

The C-C is clearly the most “stylized” of the three resistance profiles. It aims to highlight a small number of influential voices that emerged in late-March, including the Prime Minister of the UK, Boris Johnson, the President

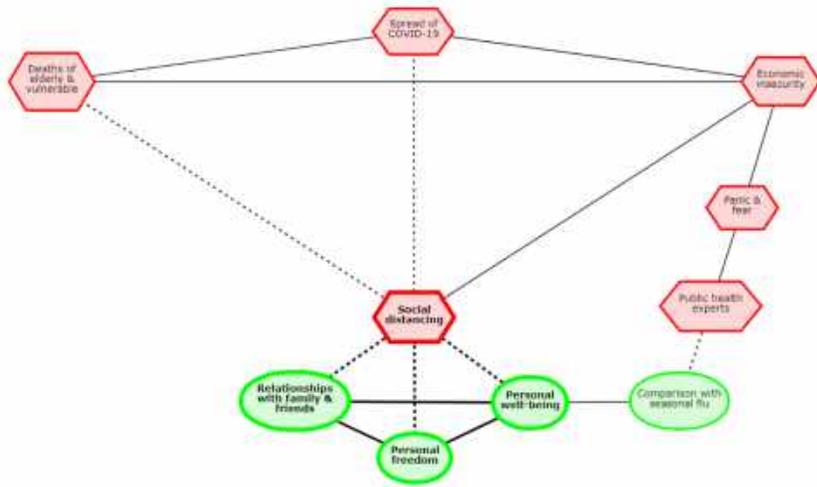
of the US, Donald Trump, and a handful of other conservative American political leaders and commentators. This perspective is epitomized by the a March 22 tweet by Trump that stated: “We cannot let the cure be worse than the problem itself” (Samuels and Klar 2020). While many of these people have, at various points, possessed characteristics of the Misinformed and C-I belief systems, the C-C resistance profile assumes that, like the GSD, these people not only have a comprehensive understanding of the outbreak and the necessity of prolonged and aggressive social distancing to avoid its worst impacts but they also have a compelling sense of responsibility to protect the most vulnerable members of their community and the long-term interests of society at large.

However, the difference between the CAM of the C-C belief system and the CAM of the GSD belief system is the C-C's emphasis on the link between social distancing and economic insecurity (Fig. 5). By comparison, the GSD places greater emphasis on the links between deaths and health care costs with economic insecurity. Both the C-C and the GSD identify two central problems that both have the potential to produce a large amount of suffering: the outbreak and its associated human and economic costs on the one hand and prolonged, aggressive social distancing and its associated human and economic costs on the other. While the GSD sees the former outweighing the latter, the C-C sees the latter outweighing the former. For example, in a March 20 op-ed published by the New York Times, David L. Katz writes: “I am deeply concerned that the social, economic and public health consequences of this near total meltdown of normal life – schools and businesses closed, gatherings banned – will be long lasting and calamitous, possibly graver than the direct toll of the virus itself” (Katz 2020).

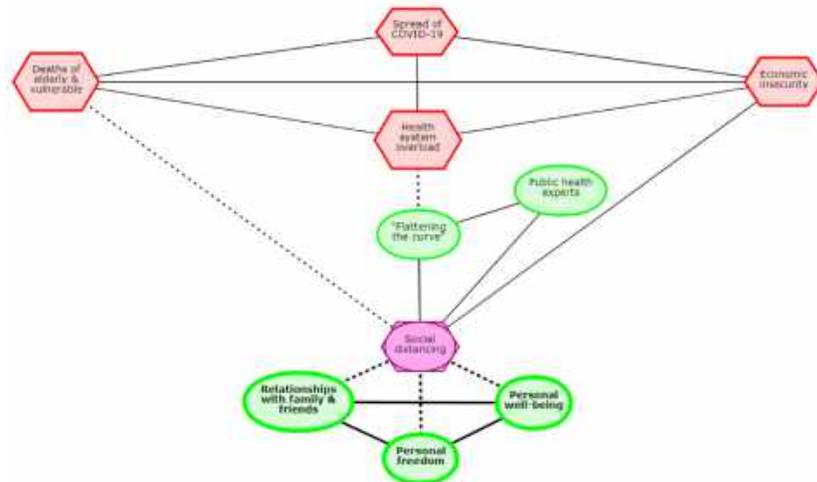
However, the belief that the costs associated with continuing to pursue aggressive social distancing practices until the infection rate has been controlled exceed those of relaxing these guidelines and resuming normal economic activity significantly underestimates the combined human and economic costs that such a strategy would entail. For instance, writing in the New York Times on March 24, Eduardo Porter and Jim Tankersley argue that there is currently a widespread consensus among economists and public health experts that abruptly lifting the restrictions would impose massive costs on the economy stemming from additional lives lost to the virus and overburdened healthcare systems (Porter and Tankersley 2020). They also quote the economist Justin Wolfers who argues that “[while] it's useful to adopt the cost-benefit frame ... the moment you do that, the outcomes are so overwhelming that you don't need to fill in the details to know what to do.” While it may be the case that some people reflecting the C-C belief system genuinely believe that the (indirect) loss of lives from an economic collapse produced by prolonged social distancing rivals or even exceeds the loss of lives from abruptly relaxing guidelines and reopening the economy, most of the individuals expressing this perspective seem to emphasize net decreases in economic well-being over the mortality rate.

The divergence between the C-C and the GSD is, first and foremost, the result of different dominant ideas about the relative costs of prolonged social distancing versus immediately reopening the economy. However, there is also a small but significant divergence in values. The GSD emphasizes the moral impermissibility of the large number of deaths directly linked to abandoning social distancing measures, which reflects a health-based conceptualization of human well-being. Meanwhile, the C-C focuses on decreases in well-being stemming from economic collapse, which reflects an more economic-based conceptualization of human well-being. However, even if one were to accept the economic-based conceptualization, the C-C fails to understand that net decreases in economic well-being will be much worse if social distancing measures are abandoned before the outbreak is under control.

### The Misinformed



### The Consequentialist-individualist



### The Good Social Distancer

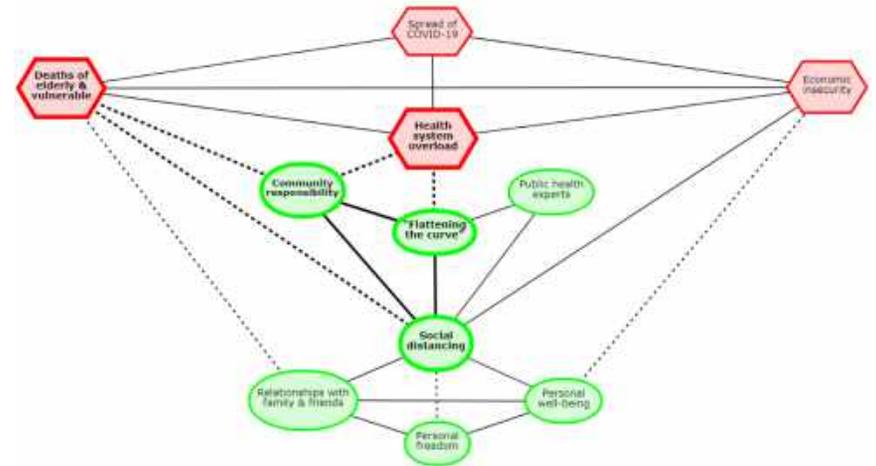
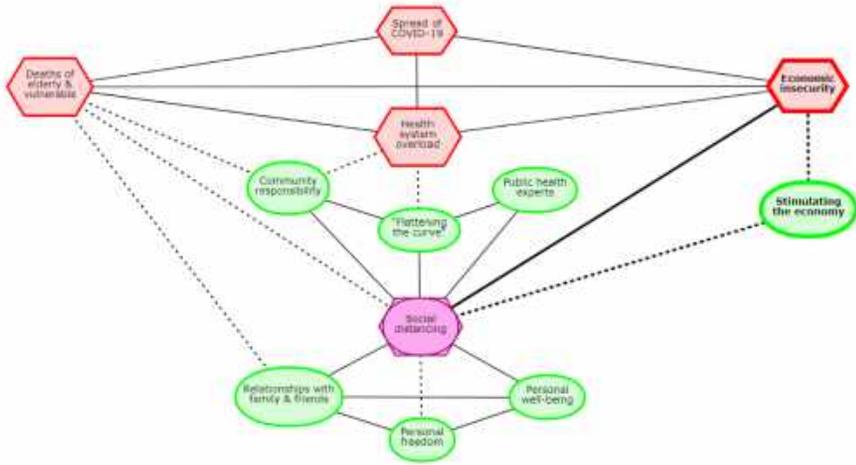


Fig. 4: Comparison between the Misinformed belief system (top left), the Consequentialist-individualist belief system (bottom left) and the Good Social Distancer belief system (right)

The Consequentialist-collectivist



The Good Social Distancer

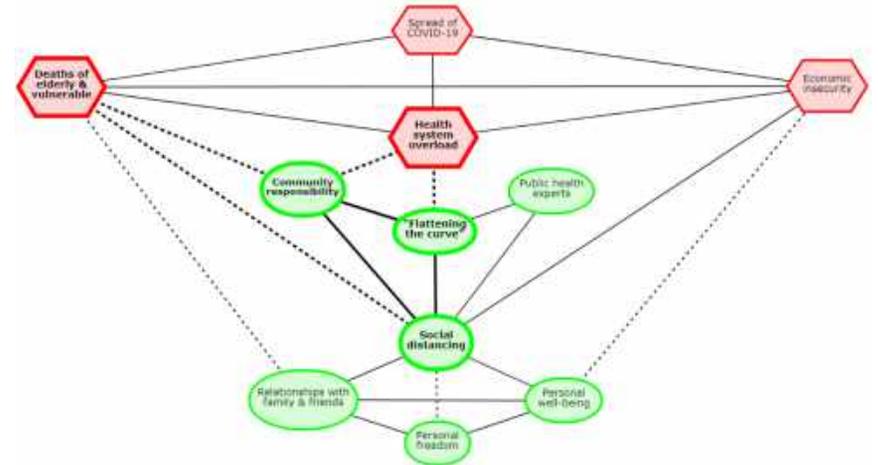


Fig. 5: Comparison between the Consequentialist-collectivist belief system (left) and the Good Social Distancer belief system (right)

### *Shifting belief systems with informational and moral messaging*

Belief system models lay bare the underlying structure of the emotionally charged concepts that motivate compliance or resistance with social norms, and thus reveal how these systems can be effectively shifted to stimulate normative change. The obvious intervention to shift the Misinformed belief system towards the GSD is providing them with comprehensive and comprehensible information on the pandemic and social distancing. Informational messaging (i.e. messaging focused on accurately communicating the relationship between causes, outcomes, and solutions) continues to be the primary focus of health authorities and governments and has been largely effective at increasing compliance with government guidelines. Effective messaging must be consistent with the principles of good public health communication during an emergency, such as accessibility, relevance, comprehensibility, credibility, timeliness, and actionability (WHO 2020).

Meanwhile, the C-I largely understands the seriousness of the pandemic and the link between social distancing and avoiding the worst outcomes of the outbreak. Therefore, simply ensuring that they have accurate information about the outbreak and social distancing is a *necessary but insufficient condition* for shifting their belief system towards the GSD. Instead, the C-I requires some form of moral persuasion that highlights the linkages between collective and personal well-being and inspires a sense of community responsibility. A recent study comparing the effectiveness of different types of moral messaging on influencing social distancing attitudes found that compared to non-moral messages, deontological arguments stressing one's duty and responsibility toward family, friends and fellow citizens had a modest, positive effect on encouraging people to spread the message to others (Everett et al. 2020). While the same study found that broad utilitarian or consequentialist arguments were less effective, they found that one dimension of consequentialist messages – an emphasis on generating concern for the “greater good” – was strongly and positively associated shifting beliefs.

Both the Misinformed and the C-I fail to link the possibility of a large number of deaths of elderly and vulnerable people to their own relationships with family and friends. Messaging that prompts people to consider these relationships has both an informational and moral component since it asks people to make a new connection between familiar ideas (informational) and to shift their focus from themselves to the well-being of others (moral). A recent study found that the number of elderly people that a person knows is the most significant predictor of their attitudes towards social distancing (Rieger 2020). Messaging that forces individuals to seriously consider their relationships with people in these groups – even the elderly relatives of their friends – may shift their assessment of the costs imposed by the outbreak relative to the personal cost of social distancing.

Another important lesson for how to package informational and moral messaging is to carefully communicate expectations around the duration of the outbreak and how long people will need to remain in self-quarantine. A recent study found that government communications updating how long Italians were being instructed to remain at home that were shorter than expected (a positive surprise) led to improved attitudes and compliance with quarantine directives, while updates that were longer than expected (a negative surprise) were associated with a lower willingness to comply with directives (Briscese et al. 2020). While this may be interpreted as an incentive for governments to make frequent, short extensions to “stay home” directives, this strategy would quickly undermine the government's credibility. Therefore, it is important for governments to carefully monitor the

expectations of their citizens around timelines and to communicate clear updates and justify them using the best knowledge available.

Meanwhile, shifting the C-C towards the GSD belief system requires an informational correction on the relative costs and benefits associated with prolonged social distancing on the one hand and completely abandoning aggressive social distancing behaviours on the other. An even better approach is to communicate information that discards this oversimplified framing of the problem and replaces it with a more nuanced portfolio of policy options that includes variable responses that allow different elements of the economy to be incrementally “turned back on” or “scaled back” depending on infection and hospitalization rates (Coyne 2020). Effective informational messaging around the potentially staggering human and economic costs of abandoning social distancing practices seems to have successfully influenced the approach taken by the UK government. In mid-March, Prime Minister Boris Johnson briefly considered reopening the UK economy and letting the outbreak run its course until “herd immunity” was achieved but was swayed by studies projecting the direct and indirect costs such a strategy would produce (Yong 2020).

Since the C-C is already focused on medium-to-long term collective impacts of the COVID-19 pandemic, the same moral messaging that may effectively shift the C-I is not necessarily an effective strategy for improving the C-C’s support of social distancing. However, moral persuasion that emphasizes the direct human cost of abruptly scaling back social distancing measures that reflects a health-focused conceptualization of well-being and emphasizes the sanctity of human life may be effective at shifting the C-C’s belief system away from its narrow focus on economic well-being. While some of the current proposals to rapidly reopen the economy do not stand up to scrutiny even from a purely economic perspective, down the road we may be confronted with more ambiguous trade-offs between saving lives and rebuilding the economy. In these situations, messaging that seeks to expand people’s notions of well-being may be an effective strategy to preserve a balance between protecting lives and economic recovery.

Lastly, government communication strategies should be tailored to their target audience. If policy makers and public health authorities believe that most people failing to comply with social distancing guidelines resemble the Misinformed profile, their strategy should focus predominantly on informational messaging. Groups reflecting the C-I profile should be targeted with moral persuasion tactics that evoke a sense of collective identity and duty. And people reflecting the C-C profile that are most concerned about the economic costs of prolonged social distancing should be made aware of the large number of studies pointing to the disastrous economic (and human) consequences of reopening the economy too soon, reinforced by a strong moralistic message about the sanctity of human life. The comparison of dominant ideas, values, and effective policy levers is summarized in Table 4.

		Good Social Distancer	Misinformed	Consequentialist - individualist	Consequentialist - collectivist
Ideas	Good scientific understanding	Yes	No	Yes	Yes
	Good estimations of economic impacts	Yes	-	-	Yes
Values	Long-term vs. short-term focus	Long-term	Short-term	Short-term	Long-term
	Community vs. individual well-being	Community	Individual	Individual	Community
	Health vs. economic well-being	Health	Either	Either	Economic
Most effective policy lever		-	Informational messaging	Moral persuasion	Informational messaging and moral persuasion

Table 4: Comparison between archetypal belief systems and policy responses

### 4.3 From belief to behaviour: incentives, social influence and second-order beliefs

While a widespread shift towards belief systems that focus on medium-to-long-term and collective outcomes, emphasize a sense of community responsibility, and are better aligned with the facts of the COVID-19 outbreak has certainly played a key role in the social distancing norm cascade, changes in beliefs do not always produce corresponding changes in behaviour. Incentives play an important role in determining whether or not people's actions are aligned with their convictions.

While countries like Canada and the US have been reluctant to punish non-compliance with social distancing guidelines, other powerful informal incentives can have a considerable influence on our actions. For example, the fear of being accused of acting selfishly or irresponsibly may compel people to adopt aggressive social distancing practices even if they are resistant to them. Conversely, an individual that believes that they have a moral duty to practice social distancing may be pressured into violating social distancing guidelines and attending a family gathering with the threat of reputational costs.

To illustrate this idea, imagine that there are numerical values representing the benefits one derives from acting in accordance with one's beliefs and the benefits and costs from incentives imposed by others. For example, on a five-point Likert scale (from -2 to +2) where positive values represent benefits and negative values represent costs, an individual might derive +1 benefits for practicing social distancing based on their beliefs about COVID-19 and their sense of duty to the community. However, they may perceive the reputational costs of not attending a family gathering to be -2, which creates an incentive for them to behave in a way that is misaligned with their beliefs.

However, unlike formal incentives with specified consequences for compliance and non-compliance, these informal calculations of the possible social and reputational costs that may be imposed on us by other members of our community are completely speculative. In fact, our estimates of potential costs that might be imposed by other people are actually based upon our beliefs about the beliefs of others – what are referred to as second-order beliefs. An individual's estimation of the social costs they may face for not attending a family gathering will be based upon their beliefs about what their family members believe about the importance of aggressive social distancing. For instance, if their convictions around social distancing have produced benefits of +1 but they believe that the average family member's beliefs about the same behaviour is -2, they may predict that the family will view their decision to not attend the gathering as alarmist or fearful, producing reputational costs that may exceed the benefits from holding true to their convictions.

However, studies show that our second-order beliefs are often inaccurate (Mildenberger and Tingley 2019). It may turn out that other members of the family are also silently in favour of avoiding social gatherings and the estimation of potential reputational costs was mistaken. This miscalculation could have been prevented if these members of the family had simply communicated their beliefs to one another – either explicitly or through their actions. However, simply communicating (or exposing) one's beliefs to others – particularly to individuals that one suspects may possess opposing beliefs – may impose significant costs as well. Therefore, people typically base their actions on unverified (and sometimes erroneous) second order beliefs.

Intuitively, we know that not all individuals are equally capable of imposing social costs upon us. For instance, an Internet “troll” disparaging someone online is unlikely to have the same influence as a close friend or role model. Here, network theory can help explain why some social relationships have a disproportionate role in shaping our attitudes and behaviours. The term *homophily* describes how within social networks, people tend to have connections with people that are similar to them in “socially significant” ways like ethnicity, language, income level, education, political opinions, and geographical proximity. Therefore, if people are socially distant from public health experts and other people taking social distancing seriously, not only are they less likely to receive informational and moral messaging but they are more likely to face steep social costs for complying with those guidelines. A social network map depicting a tightly connected social group with common beliefs about their responsibility to the community and the legitimacy of scientific knowledge would likely see social distancing norms spread almost instantaneously throughout the entire network – whereas an individual whose social network is dominated by people reflecting the Misinformed or C-I belief systems might find themselves in a relatively hostile environment for acting on their beliefs.

The other useful concept from network theory to explain why the social context might restrict whether an individual's beliefs are translated into actions is *preferential attachment*. Most social networks have a handful of members that possess a disproportionately large number of social connections than the average member of the network. Preferential attachment describes how as a network evolves, the nodes with the most connections maintain their inherent advantage for developing further connections. In other words, connections beget connections. The result is that a relatively small number of people tend to exert a disproportionate influence over many networks. The main lesson for public health authorities is that informational and moral interventions will have different levels of impact depending on which parts of social networks they target. Since the people that

continue to ignore government guidelines on social distancing have proven to be the most difficult to reach and influence, informational and moral messaging needs to become increasingly targeted at the most highly influential individuals within these hard-to-reach social networks, such as religious and political leaders, celebrities, and athletes.

To summarize, just because people believe in the logic and moral value of aggressive social distancing does not mean that they will necessarily adopt these norms. They must also find themselves in a conducive social context where the benefits of aligning their actions and their convictions exceeds the perceived social costs imposed by influential members of their social networks – calculations that are based upon their fallible second order beliefs.

## 5. Conclusion: from social distancing to climate action?

The social distancing norm cascade has seen an abrupt, widespread, and unprecedented shift in attitudes and behaviours in how people work, educate their children, shop, and interact with loved ones. For some people, the decision to radically shift their way of life and adopt aggressive social distancing measures has been the result of a simple analysis of the costs and benefits associated with the risk of infection, serious illness, and death. For elderly or vulnerable people (or those that live or work with elderly or vulnerable people), the incentives for staying home are decisive. For many other people, particularly young and healthy adults, the decision to adopt aggressive social distancing practices has been the result of a shift towards beliefs that are informed by the latest science, reflect a deep commitment to community well-being, and acknowledge the link between collective and personal impacts.

For the minority of people that are still reluctant to comply with government social distancing guidelines, government communication should be tailored to the most prevalent belief systems in this group and use a combination of informational messaging and moral persuasion. However, these tools should not be used indiscriminately. No matter how perfectly crafted these messages are, it is equally important that they come from trusted sources within one's social network. Governments now face the difficult task of trying to penetrate the social networks where these messages have had the least success and therefore should focus their efforts on influential, well-connected network "hubs" like celebrities, politicians, and religious leaders.

While the social distancing norm cascade has seen a remarkable shift in attitudes and behaviour, it has benefited from a relatively simple message: "stay home and keep yourself and your community safe." As governments continue to see meaningful decreases in the case rate and begin to incrementally send people back to work and their children back to school, the message will inevitably become more complicated. Monitoring and analyzing the evolution of dominant belief systems should be seen as an important tool for anticipating normative change and tailoring policies to accelerate and steer norm cascades toward socially beneficial outcomes.

Public health is not the only area where rapid and profound shifts in attitudes and behaviours on a global scale are desperately needed. Climate change is another pressing global challenge that not only requires largescale

systemic changes orchestrated by governments, corporations, and international organizations, but also a cumulative shift in the voting patterns, consumer habits, and transportation decisions of billions of people around the world. For example, many groups have called for an abandonment of outdated norms around private car ownership. While a shift away from these entrenched norms requires significant investment in public transportation infrastructure and divestment away from legacy systems, it also requires a similarly significant shift in underlying belief systems. The widespread belief in North America that a privately-owned car is a necessary tool for exercising one's personal freedom is a significant obstacle to the willingness of governments to make these investments.

But perhaps the lessons of the social distancing norm cascade can be usefully applied to generate similarly radical attitudinal and behavioural changes to avoid the worst impacts of climate change. The COVID-19 pandemic and climate change have some important similarities. For instance, both problems require behavioural change from a significant majority of people on Earth. On the one hand, this fact can help foster a sense of global solidarity and the feeling that we are "all in this together." However, with both infectious disease outbreaks and climate change, people fixating on immediate, personal costs of adapting their behaviour may be tempted to defect from pro-social norms and free ride.

One strategy that appears to be useful for addressing the free riding problem with social distancing is to personalize the issue and emphasize people's personal relationships with elderly or vulnerable people, bringing the problem "closer to home." Indeed, it has been shown that emphasizing the immediate, local impacts of climate change can successfully increase people's sense of urgency around adopting pro-climate behaviours (Hine et al. 2016). This strategy of pointing to tangible impacts on people's local environments will surely become an even more effective tool as the impacts of climate change continue to mount.

Another strategy that has been used by public health authorities and organizations trying to motivate climate action is using a combination of informational and moral messaging. While accurate, digestible, and relevant information about climate change is a necessary condition for motivating climate action, it is considerably more effective when combined with moral messaging that links personal well-being to collective impacts and emphasizes one's duty to their community (Wolsko, Ariceaga, and Seiden 2016). Moral messaging that frames individual actions as a way of exercising our duty to our communities, our children, and to future generations serves to deemphasize the fixation on personal costs and frames free riding as selfish and anti-social.

However, there are reasons to believe that the success of the social distancing norm cascade cannot be replicated for pro-climate behaviours. While the attitudinal and behavioural changes around social distancing occurred in just a matter of weeks, the outbreak could have been more effectively contained if aggressive social distancing had begun a week or two earlier. In many jurisdictions, this delay was partially the result of government mismanagement and a lack of testing. Inaccurate data arising from the lag between the time when asymptomatic carriers first become infected and when the people they contact start showing symptoms also served to delay the onset of aggressive social distancing. However, the delay in the COVID-19 response also illustrates how it is difficult to compel behavioural change until a majority of people feel that the situation has become an acute, impending emergency. For many people (and governments) the virus had to have arrived in

their local community before they were willing to take aggressive action – and by that time, the virus had already spread widely within the community. With climate change, if we wait until the worst impacts begin to be “felt” in our communities, it will be far too late to take meaningful action to prevent or adapt to many of the consequences. While the COVID-19 pandemic response could have benefited immensely from more pre-emptive and precautionary action, climate change absolutely demands it.

But the experience with the COVID-19 outbreak and response may have helped laid the groundwork for pro-climate norms to take root. First, the social distancing norm cascade shows just how malleable our belief systems can be, challenging the conventional wisdom that attitudes and behaviours can only be shifted incrementally over years or decades. Second, trust in expertise appears to have increased in many parts of the world where it has been waning in recent years. While effectively containing the outbreak and avoiding the worst projections ironically serves to bolster the claims of those denying the severity of the crisis, the status of scientists and other experts in the public discourse has generally improved, which may create a more receptive audience for climate science. And lastly, many people’s previously unwavering belief in the upward trajectory of human well-being has been deeply shaken. For years, the message that catastrophic risks – particularly those that can only be addressed by proactive, scientifically informed, globally coordinated action – may be lurking just beyond the horizon has been largely ignored. However, today these realities may enjoy a more receptive (and captive) audience than ever before.

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