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Features

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editors' note

In this spotlight issue of *Behavioral Science & Policy*, we present a broad set of articles in which behavioral science insights are used to confront myriad issues created by the COVID-19 crisis. The pandemic has upended some of the most stable features of modern life—from social interactions with friends, to working in an office, to business transactions, to everyday rituals—which now cannot be undertaken without first donning a face mask. Decisionmakers in governments and organizations at all levels and individual citizens have had to adapt to the challenges presented by the pandemic's new normal. In March 2020, *Behavioral Science & Policy* issued a call for abstracts, asking for articles that would apply behavioral science to the public health and economic challenges posed by the pandemic. Our reviewers assessed well over 100 submissions and scrutinized articles in a streamlined peer-review process organized by Jehan Sparks (University of California, Los Angeles). Manuscripts were guest-edited by Gretchen Chapman (Carnegie Mellon University), Thomas D'Aunno (New York University), Jason Doctor (University of Southern California), George Loewenstein (Carnegie Mellon University), and Mitesh Patel (University of Pennsylvania), with assistance from *Behavioral Science & Policy* founding co-editor Craig Fox.

The articles were written by authors from a number of countries and tackle a variety of complex topics, including how to produce effective health messages, ways to increase preventive behaviors, actions organizations can take, the pandemic's effects on different social groups, mental health effects, and the importance of learning from the experiences of others. By addressing the multifaceted nature of the pandemic and amplifying diverse perspectives, this spotlight issue can help decisionmakers respond effectively to the current crisis, adapt as it evolves, and chart a way forward.

Four articles explore how policymakers can more effectively communicate health messages about COVID-19 to the public. Tyler Davis, Mark LaCour, Micah Goldwater, Brent Hughes, Molly E. Ireland, Darrell A. Worthy, Nick Gaylord, and Jason Van Allen apply insights from research on inductive reasoning to provide advice on crafting effective public health communications. The authors show that the way public health officials communicate about a disease's origin—for example, saying that it originates in an exotic species as opposed to a more common species—can affect how members of the public generalize from the information to assess the risks of contracting the disease from various animals. Understanding how people use inductive reasoning to draw conclusions about health risks represents a creative application of cognitive and behavioral science that can generate actionable policy solutions in response to the current crisis.

William Ryan and Ellen Evers present four studies suggesting that public communications involving graphs about COVID-19 should use linear scales whenever possible. Compared with viewing logarithmic graphs, viewing linear graphs leads people to express more support for policy interventions, report more intention to engage in protective behaviors, and make more accurate predictions of COVID-19's spread.

Jiaqian Wang and Angela Y. Lee report on their investigation into the persuasiveness of "stay healthy" (that is, health-promotion) messages versus "keep safe" (that is, disease-prevention) messages that encourage people to adopt social distancing measures. Drawing on regulatory fit theory, Wang and Lee show that the intention to social distance is maximized by messages that combine a health-promotion goal with an emphasis on benefits to the individual or combine a disease-prevention goal with an emphasis on benefits to a broad group of people, such as Americans.

Eugene Chan presents evidence that health announcements communicated in a low voice pitch are more persuasive than those delivered in a high pitch. In an experiment using a student sample from Australia, Chan found that health messages delivered in a low pitch increased participants' sense of power and perceived behavioral control, which ultimately increased their likelihood of using hand sanitizer.

A second set of articles focuses on how to encourage behaviors meant to prevent the spread of COVID-19—especially social distancing and mask wearing—using means beyond health messaging and communication. Stephen B. Broomell, Gretchen B. Chapman, and Julie S. Downs report that whether people practice social distancing, respiratory hygiene (such as handwashing and coughing into a tissue), or mask wearing is strongly predicted by the practice's perceived effectiveness in preventing COVID-19 (and moderately predicted by anxiety about COVID-19 and perceived behavioral norms). These findings imply that success at shifting perceptions of effectiveness may be critical for behavior change. The authors offer policy suggestions for how to boost perceptions of effectiveness, such as by highlighting that certain behaviors are the norm.

Hilde Mobekk and Laila Stokke tested two nudges to increase hand sanitizer use. One involved a strategically placed dispenser with a sign emphasizing that hand sanitizer use is the norm ("Here we use HAND DISINFECTANT"), and the other was identical except that it also included an altruistic motive ("Here we use HAND DISINFECTANT . . . to protect your relatives"). Both nudges increased hand sanitizer use compared with a control condition involving dispensers without a sign, although the altruistic motive did not boost compliance beyond the level generated by the sign emphasizing the norm.

Several articles highlight strategies that organizations and managers can apply to adapt to the current crisis. Nicole Gillespie, Rosalind Searle, Stefanie Gustafsson, and Veronica Hope Hailey draw on research into employee trust to outline how to preserve—or even enhance—employees' trust in their organization during the COVID-19 crisis. Trust is critical during a crisis because it creates a climate for constructive problem solving, which helps build organizational agility and resilience. The authors identify practical ways organizations can shift employee mindsets so that employees who are feeling overwhelmed or worrying about losing their jobs can transition to feeling that they understand what is going on, can take action to navigate the crisis, and have a clear understanding of how these actions may help to build resilience for the future.

Isabel Bilotta, Shannon K. Cheng, Linnea C. Ng, Abby R. Corrington, Ivy Watson, Eden B. King, and Mikki R. Hebl examine research into perceptions of justice to offer behavioral science–backed policy recommendations that managers can use to buffer some of the negative effects that layoffs have on both employees and organizations. The authors recommend that organizations communicate clearly about how they will provide support and resources to their laid-off employees (distributive justice), deliver layoff decisions in a transparent and logical manner (procedural justice), and demonstrate concern for their employees' well-being (interactional justice).

Ellen Ernst Kossek and Kyung-Hee Lee argue that the COVID-19 crisis provides an opportunity to improve U.S. employment policy on work–life balance. The authors propose three evidence-based national initiatives to support work–life balance: paid sick leave and family leave, emergency backup staffing, and the legal right to request flexible work schedules. Matthew B. Perrigino and Roshni Raveendhran offer managers actionable insights into how they can assess, create, and support work-from-home practices that address employees' challenges in managing work–home boundaries.

In the final article relating to organizations, Vicki Whiting, Brian Wierman, and Phillip Whiting make the case that U.S. Air Force Special Ops Command (AFSOC) pararescue teams offer a model of best practices that could be adapted by other organizational leaders during the COVID-19 crisis. For example, AFSOC teams understand that operating effectively in situations of

uncertainty and complexity requires time for reflection and clear, accountable leadership.

A fourth subset of articles focuses on issues relating to racism, gender, and community. Mikki Hebl, Abby Corrington, Linnea C. Ng, Ivy Watson, Isabel Bilotta, Shannon K. Cheng, and Eden King describe the increase in discrimination that Asian communities have experienced since the pandemic's onset. The authors suggest policies that organizations can implement to protect their Asian employees and customers.

Irmak Olcaysoy Okten, Anton Gollwitzer, and Gabriele Oettingen present three studies demonstrating that women practice more COVID-19 preventive behaviors than men do. In Study 1, women self-reported engaging in more social distancing and hygiene practices. In Study 2, a greater percentage of women were observed wearing face masks in public. In Study 3, which presented correlational evidence, U.S. counties with a greater percentage of women exhibited greater social distancing as tracked by geolocation data from about 15 million GPS smartphones per day. The authors offer suggestions for targeting preventive health messages to men to maximize their compliance.

Timothy R. Hannigan, Milo Shaoqing Wang, Christopher W. J. Steele, Marc-David L. Seidel, Ed Cervantes, and P. Devereaux Jennings present a community-based sociocultural network approach to addressing COVID-19 contagion. The authors suggest that researchers and policymakers use social units (like households) as the unit of interest and conceive of the social units as being part of a larger community within a regional or national culture. Using this approach to modeling the spread of COVID-19, the authors present simulation results and offer suggestions tailored for analysts, policymakers, and practitioners.

Mental health during the pandemic is addressed by two articles, which approach the issue from different angles. Kelly A. Nault, Benjamin A. Rogers, Ovul Sezer, and Nadav Klein review evidence on the negative effects of loneliness and offer behavioral science–based suggestions on how to build and enhance social connections despite social (or, as they put it, physical) distancing. The authors also discuss how governments and organizations can help motivate people to adopt these practices in ways that balance the risks posed by COVID-19 against those posed by loneliness.

Christina K. Zigler, Nicole Lucas, Debra M. Henke, and Ilona Fridman report results from a nationwide survey investigating how emotional factors, including anxiety, affect compliance with the protective behaviors recommended by the U.S. Centers for Disease Control and Prevention. The authors find a positive association between anxiety, perceived risk, and compliance with hygiene behaviors such as handwashing (but not with social distancing behaviors). They recommend that policymakers monitor emotional reactions toward communications to better understand when those reactions are helpful and when they are counterproductive.

The final two articles consider the importance of learning from the experiences of others. Christopher G. Myers argues that health professionals need to learn vicariously—that is, learn from others' experiences—to adopt best practices for pandemic care and avoid costly mistakes. Meyers outlines ways that leaders and policymakers can use technology and social media to improve vicarious learning among health professionals. Ning Zhang shares practices that China used to successfully contain COVID-19 to help other countries learn from China's experience.

The varied entries in this special issue speak to several critical aspects of the pandemic. We hope that decisionmakers can draw insights and ideas from the nuanced, complex picture that emerges and can use the tools that these articles provide to shape public policy and managerial responses to the pandemic and to adapt effectively as the outbreak continues to unfold.

Jehan Sparks, Gretchen Chapman, Thomas D'Aunno,
Jason Doctor, George Loewenstein, & Mitesh Patel
Spotlight Editors

proposal

Communicating about diseases that originate in animals: Lessons from the psychology of inductive reasoning

Tyler Davis, Mark LaCour, Micah Goldwater, Brent Hughes, Molly E. Ireland, Darrell A. Worthy, Nick Gaylord, & Jason Van Allen

abstract

Many emerging diseases (diseases that are increasing or likely to increase in prevalence) are *zoonotic*: that is, transmitted between animals and people. Behavioral science researchers have only begun to examine how health communications influence the public's response to zoonotic diseases. In this article, we discuss how cognitive research on inductive reasoning—that is, on how people make generalizations from evidence—might be leveraged to craft public health communications that most effectively encourage people to engage in behaviors that limit the spread of zoonotic diseases, including COVID-19. Before describing the relevant research, we present experimental data demonstrating that the way communications describe the animal source of a zoonotic disease can affect how people generalize from the information to infer whether other animals may be susceptible, what their own risks are, and what actions they should take to limit disease transmission. We then propose various strategies that public health communicators can enact to encourage broad or narrow generalization, depending on the target audience and the context.

Davis, T., LaCour, M., Goldwater, M., Hughes, B., Ireland, M. E., Worthy, D. A., Gaylord, N., & Van Allen, J. (2020). Communicating about diseases that originate in animals: Lessons from the psychology of inductive reasoning. *Behavioral Science & Policy 6*(2), 1–11. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

In January 2020, after the first cases of COVID-19 were identified in the United States, many media outlets reported that the coronavirus responsible for the disease possibly originated in an animal; some speculated that the likely source was snakes, such as Chinese cobras or kraits.[1] As of this writing, the virus's origin remains unknown, although evidence indicates that it may have spread from bats to humans, possibly via pangolins (scaly anteaters).[2,3]

COVID-19's possible link to animals raises the question of how communications that discuss the animal, or *zoonotic,* origin of a new disease can affect people's behavioral responses to the threats posed by the disease. Specifically, how do reports of the animal origins of COVID-19 affect responses to the current pandemic? After reading about Chinese cobras being a possible COVID-19 vector, for instance, do people assume that many other species of snakes also pose a risk and thus shun all snakes, or do they avoid only Chinese cobras?

Answering such questions is critical for determining how governmental and public health leaders can craft messages that will convince the public to take appropriate actions to limit the spread of COVID-19 and other zoonotic diseases, or *zoonoses*. As many as 60% of emerging diseases—diseases that are increasing or likely to increase in prevalence—originate in animals.[4] How such origins are described, in terms of which animals are said to carry the infection and which practices are highlighted as potential methods of transmission from animals to humans, influences the public's perception of their own risks, of which animals can play a role in transmission, and of what actions should be taken to protect themselves and others.

A key factor influencing these perceptions is the extent to which people generalize from the information delivered in communications. For instance, highlighting exotic (nonnative) species such as pangolins or rare snakes as potential coronavirus hosts could lead the public to infer that few species can transmit COVID-19 and to conclude that their own risk of contracting the disease is low. That is, if only snakes from faraway lands are identified as possibly being coronavirus hosts, people may think, "This is just a foreign snake problem that's not relevant to people like me." Indeed, in a March press briefing, Senator John Cornyn promoted this kind of thinking when he described the pandemic as being related to certain Chinese culinary practices, such as eating exotic snakes, while neglecting to mention that the risk of catching a variety of diseases from animals is not restricted to China and, further, that snakes are also prepared as food in his home state of Texas.[5]

It should also be kept in mind that longer or more information-dense communications that require more effort to process tend to be read less attentively.[6] Further, messages that list every potential source of infection can cause economic harm if people then mistakenly generalize from the animals listed to economically important animals that are unlikely to be carriers. For example, given that many animal species are potential carriers of coronaviruses, communications could, in theory, enumerate all possible sources of COVID-19, including cattle and pigs; however, if these species are unlikely to be sources of the disease, such thoroughness may create unnecessary fear of animals that are important sources of food.[6]

Generalizing from a known situation to another situation is termed *inductive reasoning*. Relatively little research has been conducted on the risk-related generalizations people make from communications about zoonotic diseases, but clues can be gleaned from extensive cognitive psychology research into *category-based induction,* the cognitive processes people use to generalize from their knowledge of properties of some category members (such as bats) and infer that other members of the category (such as animals or mammals) have the same properties.

Although not intended to inform public health research per se, category-based inductive reasoning research on judgments of interspecies disease transmission has been conducted for decades.[7,8] Interspecies disease transmission makes a compelling test bed for scientific theories of inductive reasoning because of the many complex ways people can reason about diseases.

Research has shown, for instance, that people with expert knowledge about a topic differ from nonexperts in the way they reason about the topic. People with rich, in-depth knowledge of wildlife generalize from real-world knowledge about disease ecology (how the environment influences disease spread) and epidemiology (the determinants of a disease's spread in a population) to infer the likelihood that a given disease will move readily from one organism to another in a particular environment.[9,10] For example, because tuna preys on and shares territory with herring, a marine biologist or seasoned fisherman may reason that tuna are susceptible to diseases that afflict herring.[11] In contrast, nonexperts, lacking sophisticated knowledge, tend to make judgments based on intuition or superficial perceptions of similarity.[8] For instance, a typical member of the general public, knowing that birds and bats both have wings, is more likely than a biologist to infer that bats (which are mammals) are more susceptible to bird diseases than are mammals that lack wings.[12]

In this article, we briefly summarize research that offers insight into how communications about the causes of zoonotic diseases, including COVID-19, affect people's beliefs about the dangers posed by those diseases and the behaviors they should perform to prevent contracting or transmitting infection. This research includes a report on a new study we conducted that is not about COVID-19 but illustrates the influence of category-based induction on how people reason about risks when they read communications about zoonotic diseases. We then highlight research into generalization that is relevant to the public's interpretation of health communications and conclude by proposing ways that policymakers can tailor public health messages to prompt desired generalizations and avoid undesirable ones. We begin with the description of our study and its findings.

Our Experiment

Method & Results

Our study focused on communications about leptospirosis, a bacterial infection that is common throughout the world and can spread to humans from a range of animal species (see the Supplemental Material for full methods and results). It can be contracted by working outdoors or with infected animals, swimming or wading in contaminated waters, and interacting with infected pets.[13,14] We recruited 153 participants from Amazon's Mechanical Turk (see Table 1 for demographics) to read communications about leptospirosis that mentioned a few potential sources of the bacterium. The participants then answered questions about which other species (not described in the original message) might be susceptible to leptospirosis and whether it would be safe to interact with and swim in water near the animals' habitats. The only difference across conditions in our study was that half of the participants were randomly assigned to read that common domesticated, or farm, animals ("pigs, cattle, and horses") were potential sources of leptospirosis, whereas the other participants read about wild, or forest, animals ("rats, raccoons, and deer"). Otherwise,

Table 1. Participant demographics

Demographic category	*M* (*SD*)	*n* (%)
Age in years	35.9 (10.9)	
Sex		
Male		84 (52.2%)
Female		76 (47.2%)
Prefer not to say		1 (0.6%)
Ethnicity		
Asian American		12 (7.5%)
Black or African American		6 (3.7%)
Hispanic		7 (4.3%)
Native American or Alaskan Native		1 (0.6%)
White or Caucasian American		132 (82%)
Other/prefer not to say		3 (1.9%)
Education		
High school diploma		18 (11.2%)
Some college		67 (41.6%)
College degree		65 (40.4%)
Some postgraduate work		3 (1.9%)
Postgraduate degree		8 (5.0%)
Political orientation		
Very liberal		26 (16.1%)
Somewhat liberal		61(37.8%)
Neither liberal nor conservative		35 (21.7%)
Somewhat conservative		29 (18.0%)
Very conservative		10 (6.2 %)

Note. SD = standard deviation.

the communications were worded the same way, and both emphasized that "many mammals can be reservoirs for human infection."

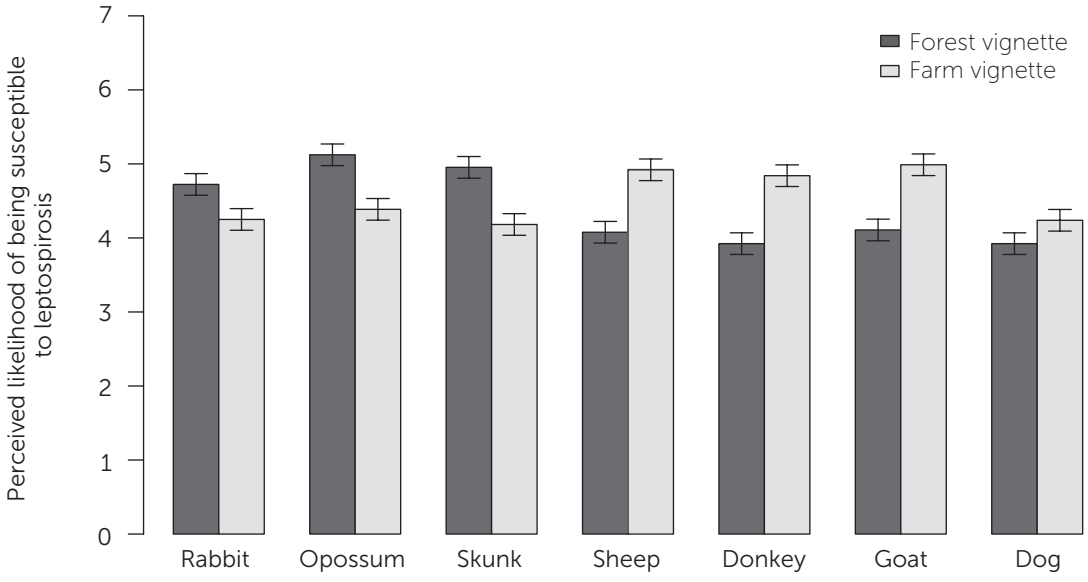
The participants' judgments about whether animals not described in the original message (dogs, sheep, donkeys, goats, rabbits, opossums, and skunks) were susceptible to leptospirosis tracked with the judgments that would be expected if participants were generalizing on the basis of the property of *ecological similarity* (that is, perceived similarity of the animals' habitats; see Figure 1). Reading about farm animal susceptibility led to greater generalization to other farm animals, $t(151) = 3.004$, $p = .003$ (dogs, sheep, donkeys, and goats), and reading about forest animal susceptibility led to greater generalization to other forest animals, $t(151) = 2.532$, $p = .012$ (rabbits, opossums, and skunks). (See note A for information about the statistics mentioned in this article.)

Further, the participants' generalizations affected their perceptions of the safety of behaviors that could potentially affect health (see Figure 2). Participants who generalized most from the farm animal passage and gave farm animals the highest ratings for susceptibility to leptospirosis also gave the lowest safety ratings to swimming or wading near or interacting with farm animals (swimming $r = -.276$, $p < .001$; interacting $r = -.202$, $p = .012$). The same pattern occurred in ratings of forest animals' susceptibility to leptospirosis and ratings of the safety of swimming or wading near and interacting with forest animals (swimming $r = -.331$, $p < .001$; interacting $r = -.256$, $p = .001$).

Discussion

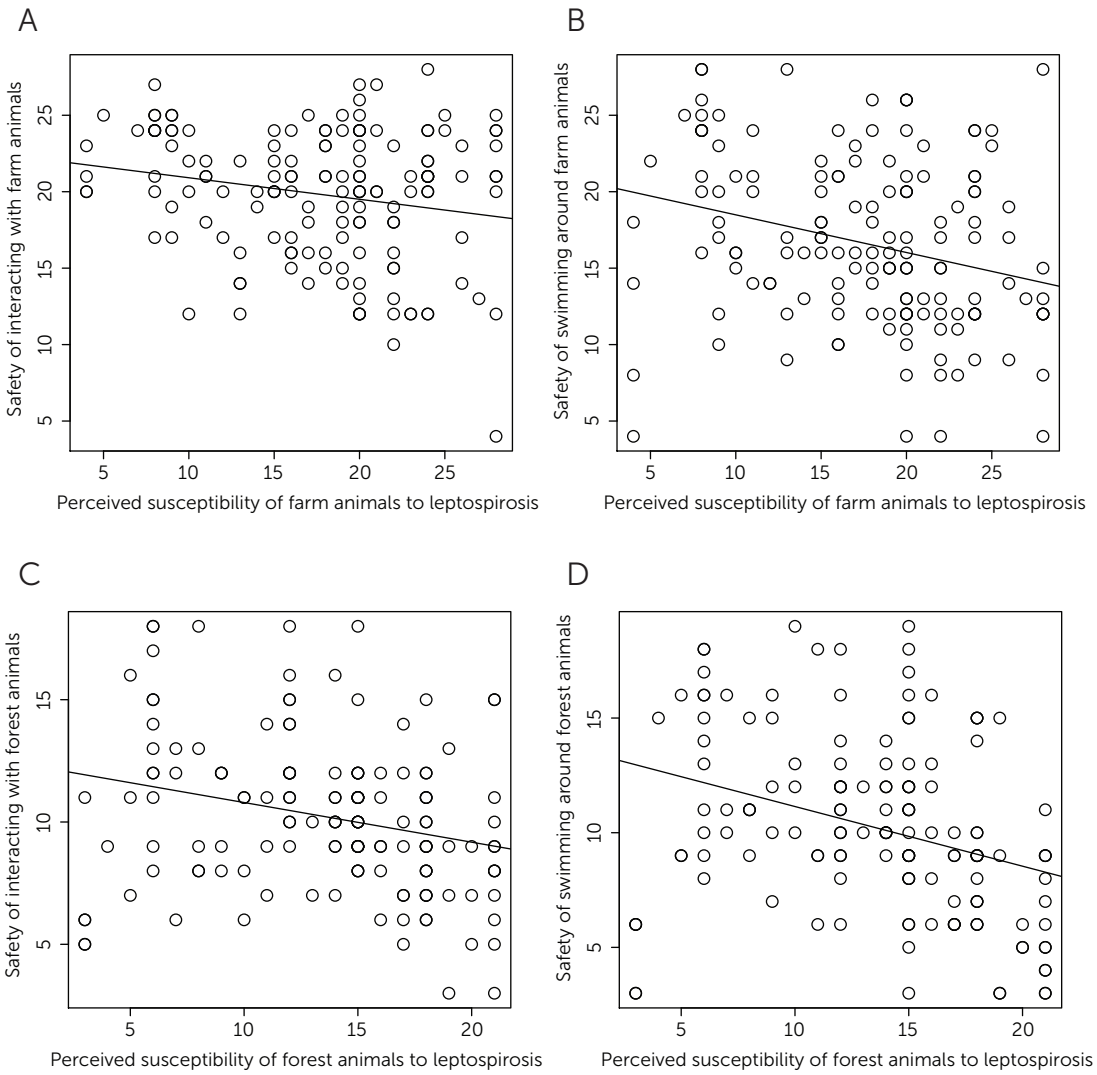
Our results are consistent with the predictions of research on category-based induction: When people read communications about the risks of acquiring an infection from a specific species, they are more likely to generalize from that information to infer that species that are related in some way (such as in terms of their ecology) will pose the same threat. The similarity does not need to be real for such generalization to

Figure 1. Evidence that people generalize the likelihood of being susceptible to leptospirosis from known susceptible animals to those that live in the same environment



Note. Participants read vignettes saying that either forest animals (rats, raccoons, and deer) or farm animals (pigs, cattle, and horses) were susceptible to leptospirosis and then rated the likelihood that the species on the graph were susceptible to leptospirosis. Ratings ranged from 1 = *very unlikely* to 7 = *very likely* and were averaged. The forest animal vignettes resulted in greater generalization to other forest animals (rabbits, opossums, and skunks) than to farm animals (sheep, donkeys, goats, and dogs), and the farm animal vignettes resulted in greater generalization to other farm animals. Error bars depict 95% confidence intervals.

Figure 2. Relationship between the perceived disease susceptibility of forest & farm animals & people's safety ratings for interactions with those animals & for swimming in their habitats



Note. Participants rated the safety of interacting with each animal listed in Figure 1 and how safe it would be (in terms of getting a disease) to swim or wade in water near the animal's habitat on a scale ranging from 1 = *very unsafe* to 7= *very safe*. Each circle shows the sum of a participant's ratings for all of the forest or all of the farm animals. The lines show the trends revealed by least squares regression predictions. The more strongly participants believed that farm animals were susceptible to leptospirosis, the lower they rated the safety of interacting (A) or swimming or wading near (B) farm animals, and the same pattern held for forest animal susceptibility and ratings of the safety of interactions (C) and swimming or wading (D).

occur; it just needs to be perceived. In fact, modern farms typically do not have sheep, goats, and cattle sharing a common environment (such as a pen or pasture), and opossums, skunks, and deer are unlikely to interact or form groups outside of fiction.

Our study offers an intuitive illustration of how category-based induction can influence the messages people glean from communications about zoonotic diseases. Of course, not all instances of category-based induction are as straightforward, and people's generalizations based on perceived similarities can have more far-reaching effects than our study has documented.

Unfortunately, the empirical literature on category-based induction has, until now, remained relatively siloed in cognitive

psychology, and researchers have studied stimuli that bear little resemblance to real-life health communications. Thus, previous findings may not map directly onto everyday health behaviors or communications. Next, we review the category-based induction effects that are most relevant to public health communications; for a more exhaustive general review of inductive reasoning research, see the 2010 and 2018 review articles on the topic by Brett K. Hayes and colleagues.[8,15]

Insights From Past Research

As our leptospirosis study illustrated, research consistently finds that people do not always follow rational principles when generalizing from communications. For instance, in our study, both of the communications presented to participants said that "many mammals" were possible sources of leptospirosis infections, and both communications described only mammals. If participants were being purely rational, they would not have limited their generalizations to mammals in similar ecological niches; they would have concluded that mammals are all equally susceptible to leptospirosis. This failure to generalize to all members of a group that would be logical to include is known as *nonnormative generalization*.

Other lapses of logic have been identified as well. People are more likely to generalize from an example to its broader category (such as from dogs to mammals) than they are to generalize from one example of a broad category to another member of the same category (such as from dogs to pangolins), even though both members are encompassed by the wider generalization (in this case, mammals).[16] People also tend to generalize more from homogeneous groups than from heterogeneous ones. For instance, they are more likely to infer that properties of mammals also occur in dogs than they are to infer that properties of animals also occur in dogs, even though dogs are both mammals and animals.[17]

Given that people's generalizations are not always entirely logical, when crafting public health communications, it is important to know which factors promote broad generalization and which do not. The aim in the communication should be to be truthful while at the same time encouraging the kind of generalization that is the best fit for the context and audience. In contexts where a zoonotic disease is actively spreading from animals to humans and the origin species is unknown, policymakers may want the populace to be wary of interacting with a large range of animals. Where active spread from animals to humans is unlikely or the origin species of a disease is more certain, policymakers may want to limit generalizations to a narrow range of animals to avoid fear of and retaliation against endangered, ecologically important, or commercially relevant species.

When broad generalization is the goal, one way to achieve it is to provide examples that are perceived to be typical of a category.[7,16] For example, compared with learning that pangolins carry a disease, learning that dogs are carriers is more likely to lead to the conclusion that other mammals are also susceptible. Another straightforward strategy would be to list a number of species as potential carriers.[16] All things being equal, greater numbers of examples tend to promote wider generalization.

Another approach, which capitalizes on what is known as *premise diversity*,[18,19] has been studied in the context of communicating about zoonotic disease. A recent study using wording taken from real-life health communications by the U.S. Centers for Disease Control and Prevention and the World Health Organization found that describing diverse animals as possible carriers of the Ebola virus (forest antelope, porcupines, monkeys, and bats)—as opposed to describing more ecologically similar animals (fruit bats, gorillas, monkeys, and chimpanzees)—led to greater generalization to other nonlisted animals as potential sources of Ebola (including some birds). That description also led to increased intentions to avoid wild game meat and to report animal bites to medical professionals.[20] Other studies have corroborated that individual differences in the belief that a disease can be transmitted between diverse species (such as from birds to mammals) can affect people's perceptions of how safe it is to

eat the meat of common North American game animals.[21]

Research has also provided insight into how to avoid causing people to make undesirably broad generalizations—such as inferring that a wide range of species are possible sources of a disease or overestimating the risk of animal-to-human contagion. One way to limit such similarity-based generalization in responses to public health communications is to emphasize the specific mechanism responsible for the transmission of an infection from animals to people.[22,23] As is true of many zoonoses,[24] COVID-19 probably jumped to humans when people prepared or ate wild game meat.[25] Highlighting these actions as the specific driver of disease spread, rather than focusing on the specific kinds of animals that are involved, can focus people's attention on avoiding risky practices like eating wild game meat and thus prevent people from unnecessarily avoiding or harming species they perceive as potential disease sources.[26,27] Indeed, limiting similarity-based generalizations may be particularly important when communicating about bats,[12] which, although a key source of a number of zoonoses, also play an important role in many ecosystems and help to control insect populations that drive the spread of other zoonotic diseases.[28]

The finding that emphasizing a specific practice related to disease spread can lead people to focus on the practice rather than on misguided generalizations about which species to fear has implications for deciding how to construct COVID-19-related public health messages in different parts of the world. In a place such as Wuhan, China, from which COVID-19 seems to have emerged, communicating the origin species could be wise if doing so motivated people in that area to avoid interacting with the bats, pangolins, or other local animals believed to be sources of the virus. Beyond the geographical area from which a zoonotic disease emerged, communicating the origin species may be largely irrelevant for containing the disease's spread; at a global level, describing how preparing and consuming wild game meat can drive the emergence of zoonotic disease may be a better strategy for convincing people across the world to avoid those actions as a way of avoiding future pandemics.[29]

Describing causal pathways of a novel emerging zoonosis is not without risk, however—particularly when the description is coupled with information about geographic origins and origin species. One potential concern is that such communication will lead to increased discriminatory behavior and an increase in stigma associated with a disease. Associating geographical identifiers with diseases, such as referring to a disease as the Mexican flu (as happened during the H1N1 flu outbreak), is known to increase discriminatory behaviors against and stigmatization of people who are perceived as being from the identified region.[30,31] Similarly, highlighting a practice in a way that reinforces stereotypes—as when Senator Cornyn attributed COVID-19 to the consumption of exotic snakes in China—can also lead to discriminatory behaviors. For example, in a recent study,[32] our group had people read a mock news article that described either an exotic animal, such as a snake, or a more familiar animal, such as a pig, as the source of COVID-19. The stories attributing the disease to an exotic animal led to increased intentions to engage in preventive behaviors (such as handwashing) but also to increased intentions to avoid people of Asian descent (presumably because COVID-19 is believed to have originated in China), foreign travelers, and animals and animal products more generally. These xenophobic and discriminatory intentions were associated with COVID-19 stigma (the feeling that participants would be ashamed to tell others that they had contracted the disease), which can lead people to conceal illness and fail to seek needed treatment.[33]

Conclusion

Depending on the specific circumstances, policymakers and public health communicators may want their messages to elicit either broad or narrow generalization. If a specific driver of a zoonosis (such as wild game meat consumption) is likely to account for an outbreak but an origin species has not been identified, wide generalization may be appropriate to prompt

people to limit interactions with animals until the origin species is known. Conversely, limiting generalization may be desirable to mitigate far-reaching economic and social impacts of zoonosis, such as effects on food production, retaliation against putative origin species, and discrimination against cultures perceived to be associated with the zoonosis. Cross-species generalization can be limited by focusing on an ecologically similar set of origin species or by emphasizing specific causal mechanisms underlying a zoonosis outbreak (such consumption of wild game meat) that commonly operate across cultures and pandemics.

Different zoonotic diseases may also require different communication strategies, and the utility of a specific strategy may change as more knowledge is gained about a disease or an outbreak. For zoonotic pathogens such as leptospirosis and hantavirus, which spread to humans primarily through contact with animals, communicating about origin species may be important for controlling an outbreak. For other pathogens, including the bacterium (*Yersinia pestis*) responsible for pneumonic plague and the coronavirus behind COVID-19, transmission can be heavily driven by person-to-person contact, and the zoonotic origin does not influence who becomes afflicted outside of the geographic location where the disease originated. Public health communicators may wish to avoid discussing animal origins if that information is not expected to promote specific behaviors relevant to containing a disease outbreak.

When a zoonotic disease moves from animal-to-animal to person-to-person transmission, public health officials must shift to communicating about health behaviors that limit person-to-person transmission. Although research extending inductive reasoning principles to public health is only in its infancy, it may be applicable to efforts to limit disease transmission among humans. With respect to COVID-19, in places where active person-to-person transmission is occurring, it may be useful to communicate about the diverse places in which people have contracted the disease (such as bars, restaurants, churches, gyms, and political rallies) so as to encourage people to make the generalization that meeting with people in enclosed spaces is risky. Likewise, it makes sense to mention a wide range of known symptoms of COVID-19 (such as fever, congestion, diarrhea, and loss of smell) to prompt at-risk individuals to take any symptom seriously and seek medical advice at early stages of an infection.

Findings from inductive reasoning research may also help policymakers craft effective communications in a number of public health domains. For example, to promote obesity prevention, they might want to develop communications that list a range of calorie-dense foods to avoid (such as meats, nuts, avocados, and ice cream) instead of speaking of an individual food or a type of food (such as fast food or desserts).

Going forward, it is important to not only consider the possible effects that category-based inductive reasoning might have on how people generalize from communications about emerging zoonotic diseases but to also test how strategies meant to evoke particular generalizations affect the spread of disease in a community. Research suggests that category-based inductive reasoning influences people's beliefs about cross-species and human susceptibility to infectious diseases as well as their intentions to engage in a number of health-relevant behaviors. Nevertheless, it is not clear whether such intentions will translate to actual behaviors and, if they do translate, whether the actions will fundamentally change the course of a new epidemic.

In conclusion, how people generalize from the information in public health communications about zoonotic diseases affects how they perceive risks to themselves and to other animals as well as the actions they take to protect themselves and others. Being aware of how inductive reasoning shapes such generalizations can help public health communicators craft messages that lead, as appropriate, to broad or narrow generalizations and can help policymakers themselves generalize productively from current pandemics to future outbreaks.

endnote

A. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. An *r* value represents the correlation between two variables; values can range from –1 to 1, with 0 indicating no correlation, 1 indicating a perfect positive relationship, and –1 indicating a perfect inverse relationship. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis. Standard deviation is a measure of the amount of variation in a set of values. Approximately two-thirds of the observations fall between one standard deviation below the mean and one standard deviation above the mean. A 95% confidence interval for a metric indicates that in 95% of random samples from a given population, the measured value will fall within the stated interval.

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supplemental material

- http://behavioralpolicy.org/publications
- Methods & Analysis

references

1. Guo, H., Luo, G. "G.", & Gao, S.-J. (2020, January 24). *Snakes could be the source of the Wuhan coronavirus outbreak.* Retrieved from CNN. https://www.cnn.com/2020/01/22/health/snakes-wuhan-coronavirus-outbreak-conversation-partner/index.html
2. Zhang, T., Wu, Q., & Zhang, Z. (2020). Probable pangolin origin of SARS-CoV-2 associated with the COVID-19 outbreak. *Current Biology, 30,* 1346–1351. https://doi.org/10.1016/j.cub.2020.03.022
3. Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., . . . Niu, P. (2020, February 20). A novel coronavirus from patients with pneumonia in China, 2019. *New England Journal of Medicine, 382,* 727–733. https://doi.org/10.1056/NEJMoa2001017
4. Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2008). Global trends in emerging infectious diseases. *Nature, 451,* 990–993.
5. Mekelburg, M. (2020). *Checking Cornyn on Chinese culture and coronavirus.* Retrieved from Politifact. https://www.politifact.com/factchecks/2020/mar/26/john-cornyn/checking-cornyn-chinese-culture-and-coronavirus/
6. Okuhara, T., Ishikawa, H., Okada, M., Kato, M., & Kiuchi, T. (2017). Designing persuasive health materials using processing fluency: A literature review. *BMC Research Notes, 10,* Article 198. https://doi.org/10.1186/s13104-017-2524-x
7. Rips, L. J. (1975). Inductive judgments about natural categories. *Journal of Verbal Learning and Verbal Behavior, 14,* 665–681.
8. Hayes, B. K., Heit, E., & Swendsen, H. (2010). Inductive reasoning. *Wiley Interdisciplinary Reviews: Cognitive Science, 1,* 278–292.
9. Medin, D. L., Ross, N., Atran, S., Burnett, R. C., & Blok, S. V. (2002). Categorization and reasoning in relation to culture and expertise. In B. Ross (Ed.), *Psychology of learning and motivation* (Vol. 41, pp. 1–41). Academic Press.
10. Proffitt, J. B., Coley, J. D., & Medin, D. L. (2000). Expertise and category-based induction. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26,* 811–828.
11. Shafto, P., & Coley, J. D. (2003). Development of categorization and reasoning in the natural world: Novices to experts, naïve similarity to ecological knowledge. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 29,* 641–649.
12. Davis, T., Goldwater, M. B., Gaylord, N., Worthy, D. A., Otto, A. R., Glass, B. D., & Davis, T. (2013). The cognitive psychology of human–bat interactions: Implications for ecological policy and zoonotic disease transmission. In G. A. Geyer (Ed.), *Bats: Phylogeny and evolutionary insights, conservation strategies and role in disease transmission* (pp. 1–7). Nova Biomedical.
13. World Health Organization. (n.d.). *Leptospirosis.* https://www.who.int/topics/leptospirosis/en/
14. Centers for Disease Control and Prevention. (2020). *Leptospirosis fact sheet.* https://www.cdc.gov/leptospirosis/resources/leptospirosis-fact-sheet.html
15. Hayes, B. K., & Heit, E. (2018). Inductive reasoning 2.0. *Wiley Interdisciplinary Reviews: Cognitive Science, 9*(3), Article e1459.
16. Osherson, D. N., Smith, E. E., Wilkie, O., Lopez, A., & Shafir, E. (1990). Category-based induction. *Psychological Review, 97,* 185–200.
17. Sloman, S. A. (1998). Categorical inference is not a tree: The myth of inheritance hierarchies. *Cognitive Psychology, 35,* 1–33.
18. Rhodes, M., Brickman, D., & Gelman, S. A. (2008). Sample diversity and premise typicality in inductive reasoning: Evidence for developmental change. *Cognition, 108,* 543–556.
19. Feeney, A., & Heit, E. (2011). Properties of the diversity effect in category-based inductive reasoning. *Thinking & Reasoning, 17,* 156–181.
20. Davis, T., Goldwater, M. B., Ireland, M. E., Gaylord, N., & Van Allen, J. (2017). Can you catch Ebola from a stork bite? Inductive reasoning influences generalization of perceived zoonosis risk. *PLOS ONE*, *12*(11), Article e0186969. https://doi.org/10.1371/journal.pone.0186969
21. Tapp, W. N., Miller, M. F., Gaylord, N., Goldwater, M. B., Ireland, M. E., Van Allen, J., & Davis, T. (2018). The impact of beliefs about cross-species disease transmission on perceived safety of wild game meat: Building a psychological approach to meat safety. *Meat and Muscle Biology, 1*(2). https://doi.org/10.22175/rmc2016.004
22. Rehder, B. (2006). When similarity and causality compete in category-based property generalization. *Memory and Cognition, 34,* 3–16.
23. Lassaline, M. E. (1996). Structural alignment in induction and similarity. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22,* 754–770.
24. Kurpiers, L. A., Schulte-Herbrüggen, B., Ejotre, I., & Reeder, D. M. (2016). Bushmeat and emerging infectious diseases: Lessons from Africa. In F. M. Angelici (Ed.), *Problematic wildlife: A cross-disciplinary approach* (pp. 507–551). Springer.
25. Volpato, G., Fontefrancesco, M. F., Gruppuso, P., Zocchi, D. M., & Pieroni, A. (2020). Baby pangolins on my plate: Possible lessons to learn from the COVID-19 pandemic. *Journal of Ethnobiology & Ethnomedicine, 16,* Article 19. https://doi.org/10.1186/s13002-020-00366-4
26. López-Baucells, A., Rocha, R., & Fernández-Llamazares, Á. (2018). When bats go viral: Negative framings in virological research imperil bat conservation. *Mammal Review*, *48,* 62–66.
27. MacFarlane, D., & Rocha, R. (2020). Guidelines for communicating about bats to prevent persecution in the time of COVID-19. *Biological Conservation, 248*, Article 108650. https://doi.org/10.1016/j.biocon.2020.108650
28. Food and Agriculture Organization of the United Nations. (2011). *Investigating the role of bats in emerging zoonoses: Balancing ecology, conservation and public health interest* (FAO Animal Production and Health Manual No. 12). https://www.fao.org/3/i2407e/i2407e00.htm
29. Horby, P. W., Hoa, N. T., Pfeiffer, D. U., & Wertheim, H. F. L. (2014). Drivers of emerging zoonotic infectious diseases. In A. Yamada, L. H. Kahn, B. Kaplan, T. P. Monath, J. Woodall, & L. Conti (Eds.), *Confronting emerging zoonoses: The one health paradigm* (pp. 13–26). Springer.
30. McCauley, M., Minsky, S., & Viswanath, K. (2013). The H1N1 pandemic: Media frames, stigmatization and coping. *BMC Public Health, 13,* Article 1116. https://doi.org/10.1186/1471-2458-13-1116
31. Hoppe, T. (2018). "Spanish flu": When infectious disease names blur origins and stigmatize those infected. *American Journal of Public Health, 108,* 1462–1464.

32. LaCour, M., Hughes, B., Goldwater, M. B., Ireland, M. E., Worthy, D. A., Van Allen, J., Gaylord, N., Van-Hoosier, G., & . . . Davis, T. (2020). *The double bind of communicating about zoonotic origins: Describing exotic animal sources of COVID-19 increases both healthy and discriminatory avoidance behaviors*. https://doi.org/10.31234/osf.io/948qn

33. Stangl, A. L., Earnshaw, V. A., Logie, C. H., van Brakel, W., Simbayi, L. C., Barré, I., & Dovidio, J. F. (2019). The health stigma and discrimination framework: A global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas. *BMC Medicine, 17,* Article 31. https://doi.org/10.1186/s12916-019-1271-3

finding

Graphs with logarithmic axes distort lay judgments

William H. Ryan & Ellen R. K. Evers

abstract

Graphs that depict numbers of COVID-19 cases often use a linear or logarithmic scale on the *y*-axis. To examine the effect of scale on how the general public interprets the curves and uses that understanding to infer the urgency of the need for protective actions, we conducted a series of experiments that presented laypeople with the same data plotted on one scale or the other. We found that graphs with a logarithmic, as opposed to a linear, scale resulted in laypeople making less accurate predictions of how fast cases would increase, viewing COVID-19 as less dangerous, and expressing both less support for policy interventions and less intention to take personal actions to combat the disease. Education about the differences between linear and logarithmic graphs reduces but does not eliminate these effects. These results suggest that communications to the general public should mostly use linear graphs. When logarithmic graphs must be used, they should be presented alongside linear graphs of the same data and with guidance on how to interpret the plots.

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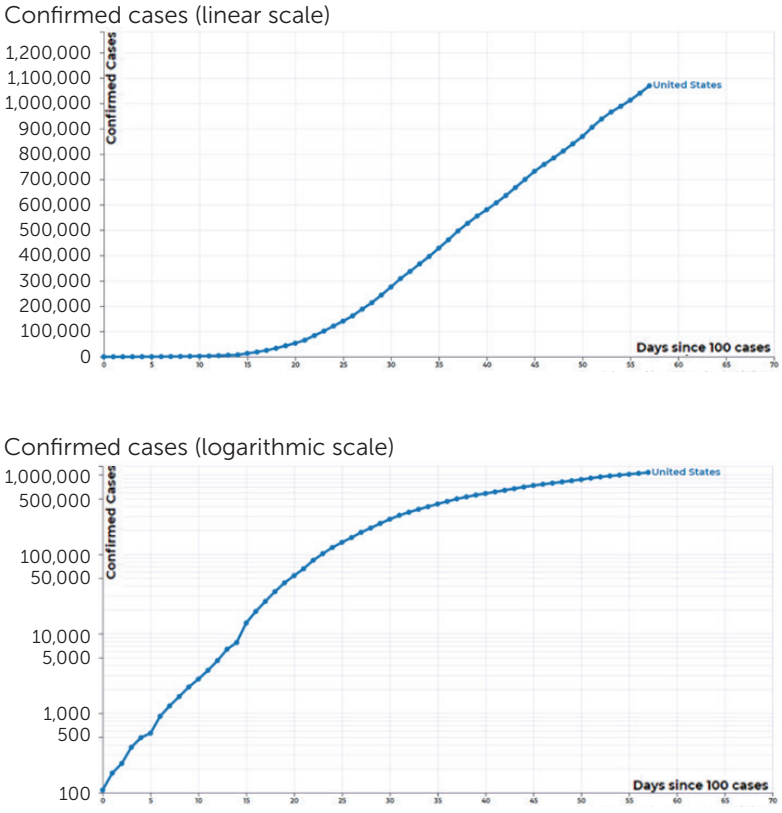
In responding to the public's hunger for information about the global COVID-19 epidemic, policymakers, public health experts, and journalists need to decide how to present data on the growth rate of infections in a way that lay audiences can understand easily. Even though the objective reality described by the data may be identical in different presentations, the choice of the scale used on the *y*-axis can greatly influence interpretations of how quickly the number of cases is changing. Being aware of the way that scale influences these interpretations is critical, because incorrect understandings can affect the public's beliefs about the urgency of the need to take precautions to protect themselves and others.[1]

When presenting data on disease growth, scientists generally use either a linear or a logarithmic *y*-axis. A linear axis is divided into equal increments, going, say, from 100,000 cases at the first tick mark to 200,000, then 300,000, and so on. A logarithmic *y*-axis tracks the logarithms of values—which means that each interval on the graph corresponds to an order of magnitude increase in values rather than to a fixed increment. Thus, a jump from 100 (10^2) to 1,000 (10^3) COVID-19 cases near the bottom of an axis and the jump from 1,000 cases to 10,000 (10^4) cases a little higher up will be represented by the same vertical rise on a curve, even though the numbers of cases represented by that spatial range differs enormously. See Figure 1 for an

Figure 1. Linear & logarithmic graphs of COVID-19 cases in the United States as of May 1, 2020



Note. These graphs, from the data-visualization website https://91-divoc.com, demonstrate the difference in the appearance of curves when identical data are plotted using a linear versus a logarithmic *y*-axis. Titles have been added above plots and the *x*-axis labels have been revised for clarity. Data displays from the 91-DIVOC website have been shared virally online and used in briefings by the governors of Kentucky[13] and Washington.[14] The linear graph is adapted from "An Interactive Visualization of the Exponential Spread of COVID-19," by W. Fagen-Ulmschneider, May 1, 2020 (https://91-divoc.com/pages/covid-visualization/?chart=countries&highlight=United%20States&show=highlight-only&y=both&scale=linear&data=cases&data-source=jhu&xaxis=right#countries). CC BY 4.0. The logarithmic graph is adapted from "An Interactive Visualization of the Exponential Spread of COVID-19," by W. Fagen-Ulmschneider, May 1, 2020 (https://91-divoc.com/pages/covid-visualization/?chart=countries&highlight=United%20States&show=highlight-only&y=both&scale=log&data=cases&data-source=jhu&xaxis=right#countries). CC BY 4.0.

illustration of the difference between a linear and a logarithmic graph.

Logarithmic axes can be useful because they make it easier to compare exponential growth rates and to see whether case rates in different places are accelerating or decelerating similarly over time. They are also helpful when comparing countries with cases that are an order of magnitude different from one another. If one country, for example, has 10,000 cases and a second country has only 100 cases, the curve for the second country would be so tiny on a linear graph as to be unreadable. Linear graphs present case counts more directly, however, which can make them easier to grasp.

In the studies presented in this article, we asked whether the general public is more likely to misconstrue data presented on a logarithmic scale than data presented on a linear scale. We explored this possibility in part because we know of at least two cognitive processes that could contribute to such misunderstandings.

First, individuals are notoriously bad at numerical thinking in general—that is, at interpreting probabilities and other mathematical information. Numerical thinking is often measured using a test known as an *objective numeracy scale,* which includes math problems such as the question, "Which of the following numbers represents the biggest risk of getting a disease: 1 in 100, 1 in 1,000, or 1 in 10?" In one study, 16%–20% of participants failed to answer the simplest questions correctly.[2] This difficulty can carry over to the interpretation of logarithmic scales, because people tend to be less familiar with logarithmic than linear scales and less able to extrapolate from the slopes they see, particularly when confronted with the exponential growth often found in data describing the numbers of people afflicted by a disease.[3,4]

Second, even if individuals are able to correctly interpret logarithmic scales, they may not be motivated to do so, instead preferring to avoid numeric computations—a tendency demonstrated by an experimental tool known as the *subjective numeracy scale.*[5–7] Studies using this instrument have found that rather than relying on active computation, people often use intuitive, so-called system 1–like, judgments, which are more likely to be biased (that is, systematically incorrect in one direction or another).[8] Because of this intuitive processing, their judgments can be influenced by design choices.[9] For example, identical growth data in the same type of graph can yield different inferences regarding growth rates if the aspect ratio of the graph is changed to make a curve's slope appear more or less steep.[10,11] Even many experts can misunderstand graphs that use nonstandard design approaches.[12] Such findings suggest that consumers of COVID-19-related data may tend to misjudge the severity of the pandemic when those data are presented using a logarithmic scale.

In spite of the challenges posed by logarithmic graphs, government leaders and media outlets use both types of graphs in communicating with the public about COVID-19, as seen in presentations given by the governors of Kentucky[13] and Washington.[14] In a further example, when we reviewed graphs in three major newspapers—the *Financial Times, The New York Times,* and *The Wall Street Journal*—we found that although linear scales were most common in articles, all three publication also used logarithmic scales. Notably, the *Financial Times* presented its primary COVID-19 tracker in a logarithmic format. In addition, logarithmic graphs are omnipresent in online scientific communications, which laypeople are increasingly accessing directly via social media and preprint services[15]—such as the medical site medRxiv, which saw its number of visitors increase 100-fold between December and April.

In this article, we present four studies investigating the accuracy of predictions made by participants on the basis of each type of graph. Collectively, the studies assessed participants' perceptions, after viewing the graphs, of the danger posed by COVID-19 and the importance of governments' and individuals' taking action against the spread of the disease. Overall, we found that people are reliably less accurate in their predictions of the growth rate and believe that COVID-19 is less dangerous when data are presented using a logarithmic rather than a linear scale. Additionally, this belief correlates

with less inclination to support protective behaviors recommended or mandated by governments and less inclination to adopt such behavior oneself. The Supplemental Material provides additional details on these studies' methods and results, supplementary analyses, and information about three additional studies we conducted; also see note A.

Studies 1A & 1B: Effects on Predictions of Future Cases

Overview

In Studies 1A and 1B, we tested whether the use of logarithmic or linear scales affected the accuracy of individuals' predictions of the future rate of growth of a disease. In Study 1A, participants saw graphs displaying total COVID-19 cases in real countries and extrapolated to predict case counts in the future (see note B). Because it was possible that a country could change the criteria for counting cases during the course of a study, we also ran Study 1B:, a conceptual replication in which we presented participants with hypothetical growth data for an imaginary disease and compared their predictions of future case counts with the number of cases that the equation behind the graph would predict.

Method

Participants. Participants were U.S.-based Mechanical Turk workers, who are paid to participate in research or do other online tasks. Study 1A was completed by 266 people (mean age = 38 years; 40% were female). Study 1B was completed by 403 people (mean age = 36.7 years; 37% were female).

Procedure. Both studies involved two conditions: one using a linear scale and one using a logarithmic scale. The graphs were similar to those in Figure 1. In Study 1A, each participant was shown a graph indicating case numbers up to the present for a succession of four countries (the United States first and then three others in random order). In Study 1B, participants saw a graph for one hypothetical country. In both studies, after participants viewed the graphs, they predicted the number of cases that would be seen one, three, five, and 10 days from the present for each country shown.

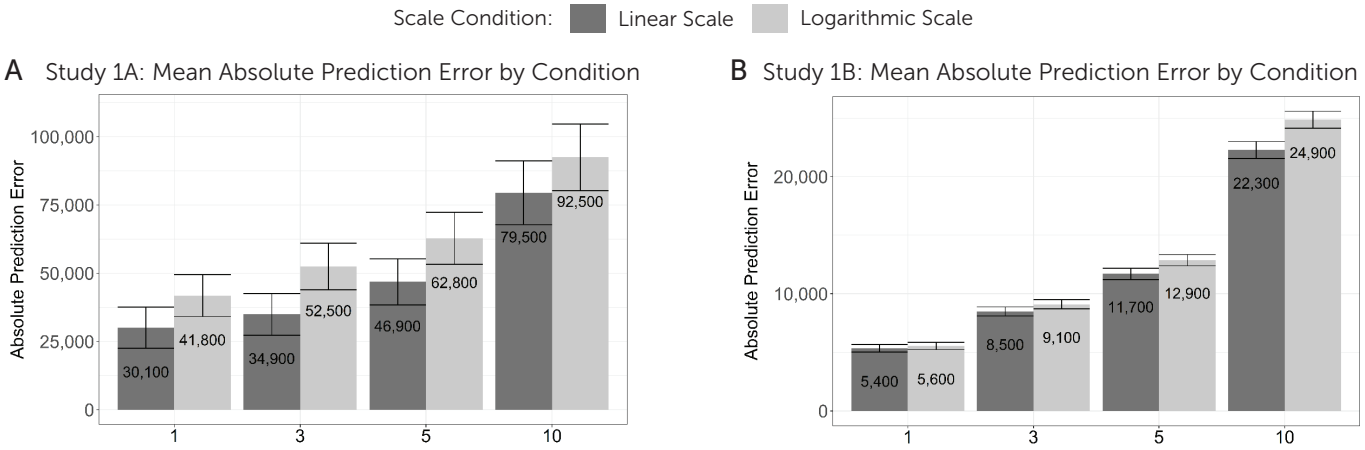
In Study 1B, we also measured judgments of the danger posed by COVID-19. Studies 2 and 3 also addressed this judgment; details of the measures used are included later in this article and in the Supplemental Material.

Results

Overall, the mean absolute error in participants' predictions was higher in the logarithmic condition than in the linear condition in Studies 1A and 1B (see Figure 2).

The results of Studies 1A and 1B suggest that logarithmic scales tend to make laypeople's

Figure 2. Errors in predicting cases one, three, five, & 10 days ahead, in Studies 1A & 1B



Note. In both studies, for each prediction, the error is greater in the logarithmic condition. Here and in the following figures, error bars are calculated as the population-level standard error for the measure.

judgments about growth more variable than the judgments induced by linear graphs and thus less accurate. The greater variance could stem from the lower granularity in the logarithmic scale. At values above 10 cases, a given physical distance on the curve often corresponds to a greater absolute change in cases when the *y*-axis is logarithmic rather than linear. This feature may make it more difficult to accurately infer the number of cases higher up on the logarithmic scale.

Average variance is not the only way to measure the accuracy of participants' interpretations. One could also ask whether presenting the data in a logarithmic format creates systematic over- or underestimation in the logarithmic group by biasing most people's interpretations in one direction or the other. We tested this possibility but did not find a consistent pattern. We also did not find that the extent of people's inaccuracy in predicting future case counts correlated well with their judgments of danger. It is possible that such a correlation exists but that we lacked the statistical power to detect it. Additional details on the accuracy analyses for these and the following studies can be found in the Supplemental Material.

Study 2: Influences on Beliefs & Attitudes

Overview

Of course, laypeople are not usually asked to predict the spread of a disease. What is most important for policy and for communicating with the public about COVID-19 is how the scale of linear and logarithmic graphs affects people's perceptions of threat and need for a response. In Study 2, we looked more directly at how the choice of scale in data displays influenced participants' judgments of not only the COVID-19 growth rate but also the threat posed by the disease and whether these judgments influenced attitudes regarding how individuals and governments should respond.

We deemed these direct measurements of views of the threat posed by COVID-19 and of the need for action to be critical because, as Study 1B suggested, it is not safe to infer such views on the basis of people's predictions of future cases. For instance, some individuals' judgments may be more affected by the total number of cases they foresee in the near future, whereas others may be more affected by anticipated growth rates. In addition, if some people overestimate future numbers considerably but most people underestimate the numbers slightly, the group average may suggest that people are making accurate judgments when in fact most people are underestimating the future trend and are therefore inclined to underreact to the threat of COVID-19.

Method

Participants. The study was completed by 891 U.S.-based Mechanical Turk workers (mean age = 37.9 years; 48% were female).

Procedure. The participants were presented with true disease data for the United States and then disease data for three other countries in succession in either linear or logarithmic formats and were asked questions about future case numbers in each country. Because it is possible that individuals make more accurate projections when data are embedded in a larger context,[16] we also varied whether participants saw data of the case prevalence of only a single country or saw a country's data on one graph that included the data for 10 additional countries.

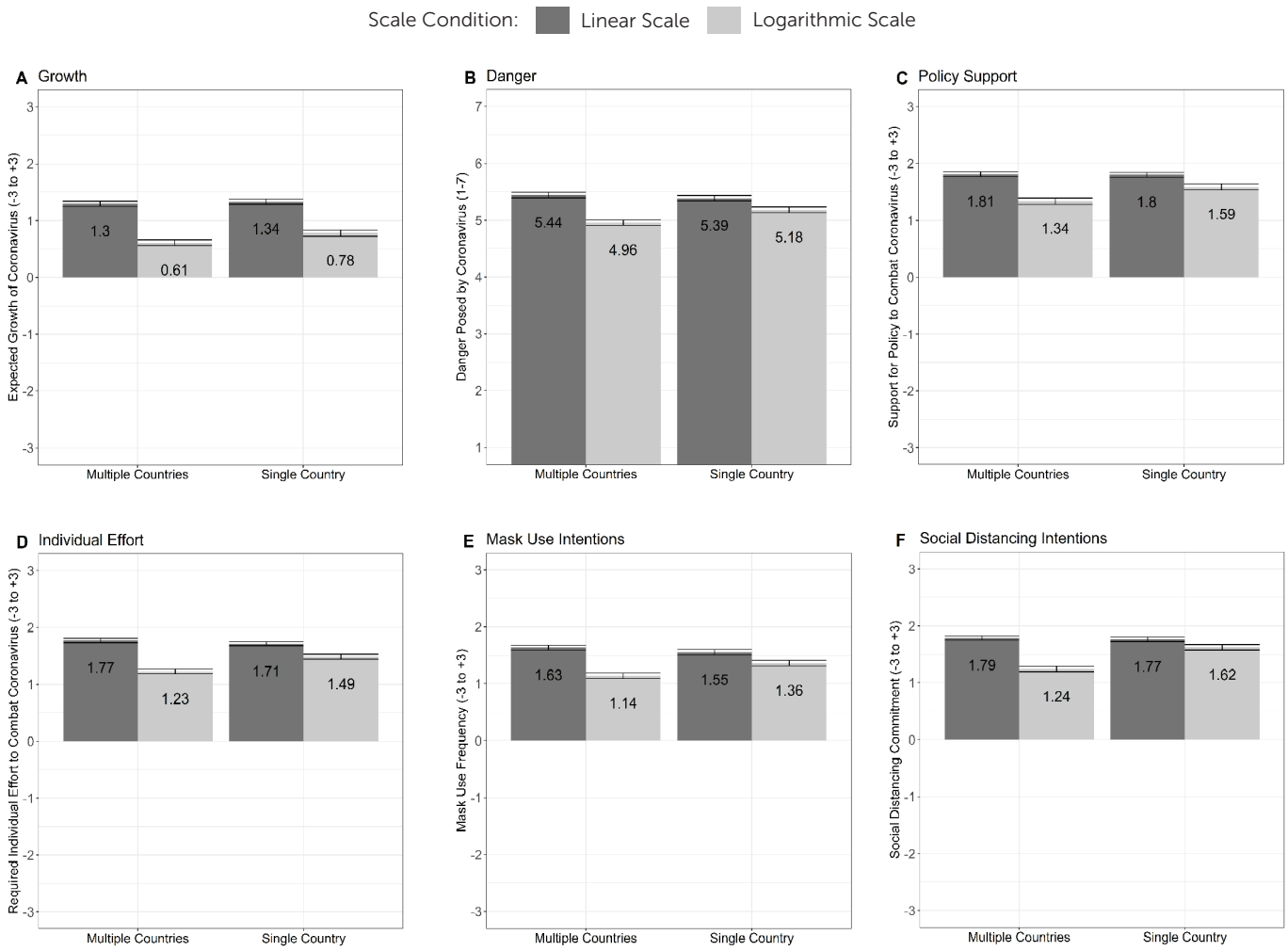
To assess participants' inferences about the growth rate of COVID-19 cases, we asked them to indicate how much they expected the rate to change using a scale ranging from *Decrease significantly* to *Increase significantly. T*he perceived threat was measured by having participants rate COVID-19 on a scale ranging from *Not at all dangerous* to *Extremely dangerous. T*o measure views of what governments should do, we had participants use a scale ranging from *Disagree strongly* to *Agree strongly* to indicate agreement with the statement that the country depicted in the graph "should ban public gatherings, close non-essential businesses, and ask all citizens to stay at home unless they are going to work or carrying out necessary errands." We also asked participants to consider all the efforts people were taking to combat the coronavirus in each depicted country and to indicate whether

the people were exerting the right amount of effort; participants used a scale ranging from *Significantly decrease* to *Significantly increase* to indicate how they thought people should adjust their efforts. In addition to that item, we had participants indicate whether, on the basis of what they saw on the graphs, they would increase or decrease their own mask use and adherence to social distancing. (See Figure 3 for the numerical ranges of the scales.)

Results

Judgments of growth rate, danger, appropriate policy response, and required individual effort to combat COVID-19 were all lower when logarithmic scales were used, regardless of

Figure 3. Differences in data interpretations, attitudes, & behavioral intentions, Study 2



Note. The plots show mean responses to questions answered on the basis of viewing graphs of COVID-19 cases in multiple or single countries. Regardless of the number of countries represented on the graphs, use of a logarithmic versus a linear scale led to lower judgments of the future growth in COVID-19 cases (A), the danger posed by the disease (B), the need for policy response by governments (C), and the need for individual effort (D); it also resulted in lower intentions to use masks (E) and socially distance (F). The questions and range of replies follow:. Except for B, all answers used a 7-point scale ranging from –3 (at the bottom of the axis) to 3 (at the top). A. "How do you expect the growth rate of cases, i.e. the number of new cases per day, to change in [COUNTRY]?" Range: from –3 = *Significantly fewer new cases/day* to 3 = *Significantly more new cases/day*. B. "How dangerous do you believe Coronavirus is to [COUNTRY] and its citizens?" Range: from 1 = *Not at all dangerous* to 7 = *Extremely dangerous*. C. "How much do you agree with the policy: [COUNTRY] should ban public gatherings, close non-essential businesses, and ask all citizens to stay at home unless they are going to work or carrying out necessary errands?" Range: from –3 = *Disagree strongly* to 3 = *Agree strongly*. D. "Think of all the efforts the people in [COUNTRY] may be doing to try to stop the disease, such as social distancing, wearing face masks, and avoiding non-essential travel. Based on this graph, how do you think people in [COUNTRY] should change the amount of effort they put into these actions?" Range: from –3 = *Significantly decrease effort* to 3 = *Significantly increase effort*. E and F (relating to U.S. data): "Based solely on this graph, do you see yourself wearing a mask more or less often than you do now?" (E) and "Based solely on this graph, do you see yourself being significantly more or less careful about social distancing relative to now?" (F). Range: –3 = *Significantly less often* to 3 =*Significantly more often*.

the number of countries presented, as Figure 3 shows. Alarmingly, relative to the reports of participants in the linear condition, those who saw logarithmic graphs indicated that they would wear masks less often and be less committed to social distancing. Presenting additional countries for context reduced the perception of the danger posed to the target country in both conditions, probably because the additional countries shown all had high case counts, making the target country's case count seem smaller in comparison.

Study 3: Education's Ability to Reduce Prediction Errors

Some media outlets have begun educating their audience about how to correctly interpret logarithmic graphs. In Study 3, we evaluated whether this instruction brings interpretations of disease growth rates and the threat posed by COVID-19 made on the basis of logarithmic graphs in line with the interpretations made on the basis of linear graphs.

Method

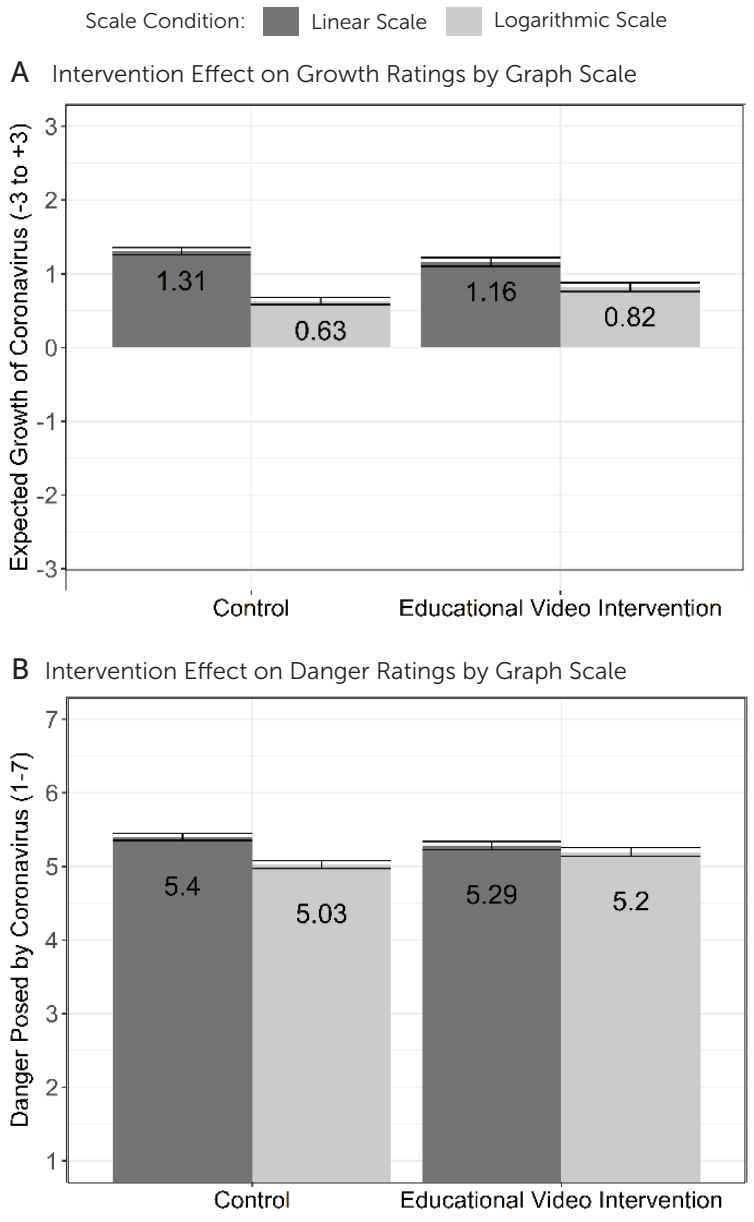
Participants. This study was completed by 739 Mechanical Turk workers (mean age = 40.3 years; 50.2% were female).

Procedure. We divided the participants into two groups. One group saw linear graphs and the other group saw logarithmic graphs showing COVID-19 case data for four countries in succession. Before viewing the graphs, half of the participants in each group watched a "debiasing" video explaining how to correctly interpret linear and logarithmic graphs, and the other half of the participants—those in the control condition—watched an unrelated video of equal length about painting. The debiasing video was a 1 minute 45 second clip from the second section of a Vox Media video (available at https://youtu.be/O-3Mlj3MQ_Q?t=65.) After viewing the videos and the graphs, participants used the same scales as in Study 2 to indicate how much they expected growth rates to change and how dangerous COVID-19 seemed to them.

Results

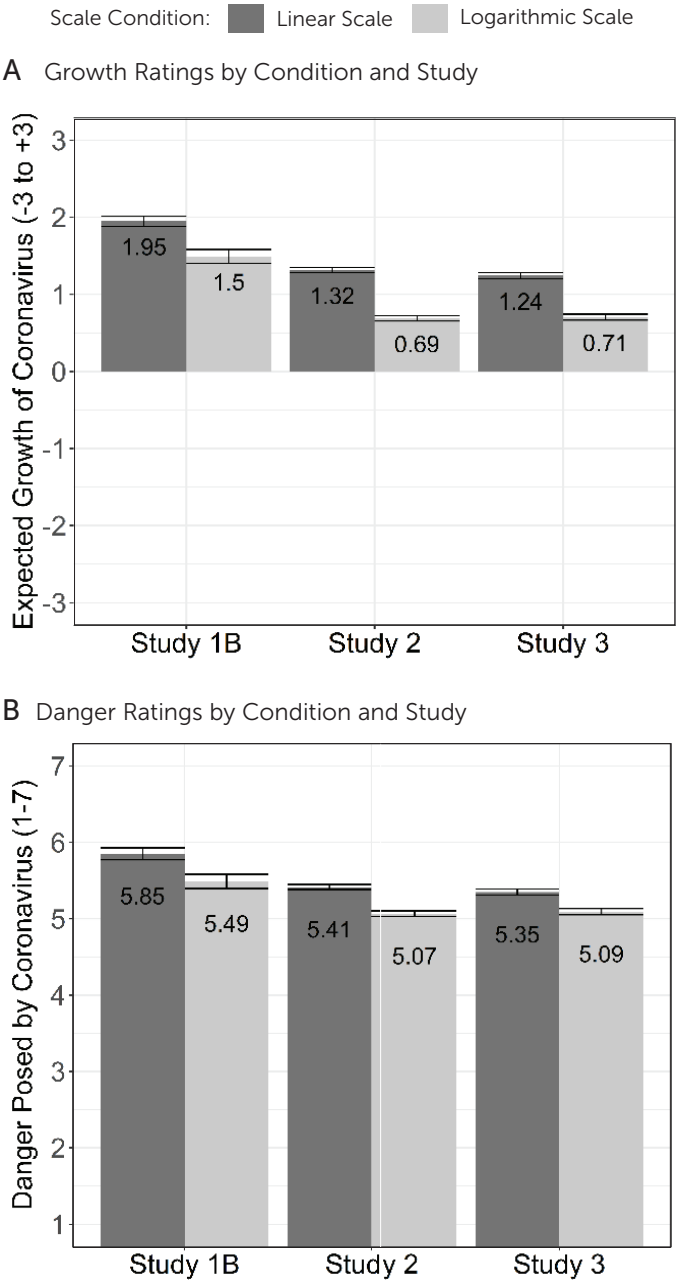
The results are depicted in Figures 4 and 5. Informing participants about the pitfalls of logarithmic graphs reduced the difference in perceptions of growth and danger; however, those who saw logarithmic graphs still perceived lower growth and less danger than did those who saw linear graphs. That is, education helped

Figure 4. Effects of education in graph reading, Study 3



Note. A and B show mean responses to the same questions asked about growth and danger in Study 2. Education about how to interpret logarithmic and linear graphs reduced differences in growth and danger ratings by those who viewed logarithmic graphs but did not eliminate the gaps.

Figure 5. Summary results from Studies 1B, 2, & 3



Note. The bars show mean responses to the growth and danger survey items. The logarithmic scale led to lower estimates of growth and danger in all three studies. The growth and danger questions were the same in all three studies.

to decrease the effects of logarithmic scales on judgment but did not eliminate them (see Note C).

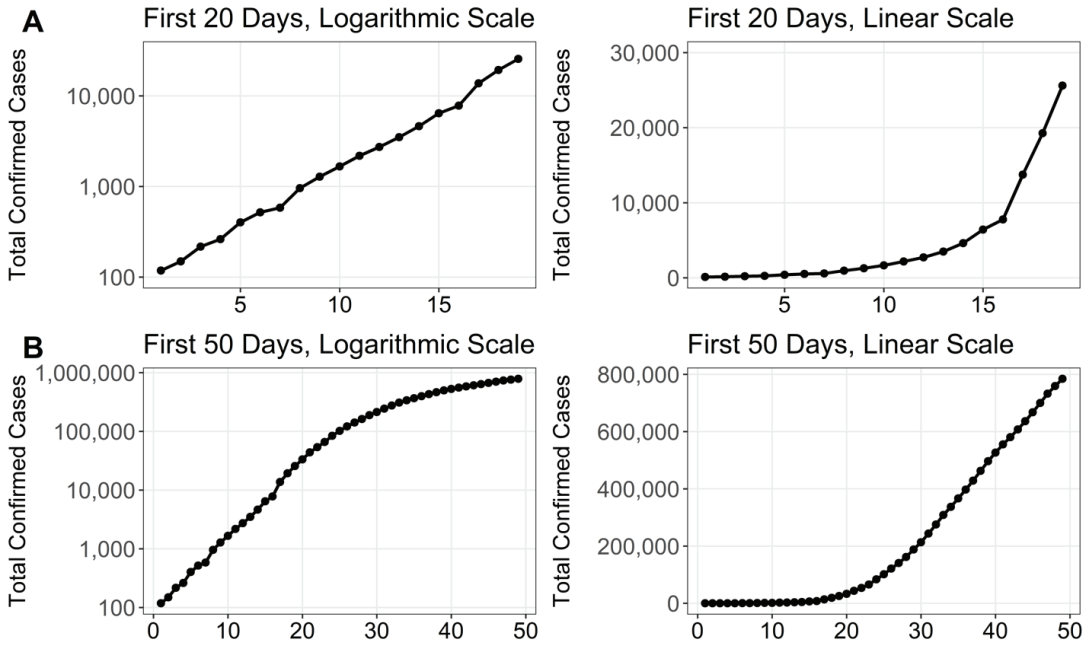
General Discussion

In the studies reported in this article, we found consistent evidence that the public formed less accurate impressions of the current COVID-19 situation when data were presented using a logarithmic scale as compared with a linear scale. Logarithmic scales also led participants to believe the pandemic was less severe and less dangerous than linear scales did. Figure 5 summarizes the growth ratings and danger perceptions reported in Studies 1B, 2, and 3. Individuals presented with logarithmic graphs were less supportive of government policies aimed at reducing the growth in cases and less likely to take individual actions such as mask wearing and social distancing.

We also explored whether a couple of interventions would minimize the misleading influences of seeing logarithmic graphs. Providing data on multiple countries did not reduce the differences between the effects of the two types of graphs, and educating participants about how to read the graphs reduced but did not eliminate the differences. We did not establish that inaccuracy in predicting future cases on the basis of seeing logarithmic plots led directly to behavior change meant to limit COVID's spread. These two effects of reading the graphs might be independent, but researchers conducting future work should examine this issue in more detail.

We did not extensively test whether the actual growth of the outbreak could influence difference in interpretations of the two types of graphs, but we conducted one test of the possibility (as is described in Appendix Study 1 in the Supplemental Material.). To understand how the actual numbers might have an effect, consider Figure 6, which illustrates the differences between the looks of the curves depicting the first 20 days versus the first 50 days of the outbreak in the United States. Row A shows the first 20 days of the outbreak in logarithmic and linear formats, and row B adds in the next 30 days. The logarithmic and linear graphs look more similar in row A, when growth rates are still climbing, than they do in row B, when the rates have stabilized or decreased. To test whether the actual pattern of the outbreak could moderate the effects documented in this article, we ran a simple conceptual replication of the growth and danger components of Study 2, only this time we chose countries whose growth rates fit one of the two patterns in Figure 6. We

Figure 6. Total confirmed cases of COVID-19 in the United States by the number of days since 100 cases were confirmed



Note. These graphs illustrate why using a logarithmic scale to plot the growth of cases can lead the public to make lower predictions of growth than a linear-scale plot would. In row A, from early in the pandemic, both graphs give the visual impression that cases are rising, but the linear scale (right) more intuitively conveys that the rise is becoming steeper at day 15. In row B, from later in the pandemic, the linear scale (right) again gives the impression of a rise, but the logarithmic scale now appears to be starting to curve downward—which could lead some people to mistakenly assume that the number of cases is about to decline. In both cases, the logarithmic scale may lead to lower judgments of growth.

found that the logarithmic axes led to underestimation of growth and threat regardless of the slope of the actual growth.

In two of our studies, we conducted added analyses to examine whether various individual differences could influence the degree to which people struggle with logarithmic graphs. Surprisingly, we found that greater objective facility for working with numbers did not result in increased accuracy in interpreting logarithmic scales relative to linear scales. In fact, sometimes more numerate individuals fared worse than others who were less numerate. (See the Supplemental Material for a fuller discussion of the individual differences we measured.)

The skeptical reader may argue that we stacked the deck against logarithmic scales by concentrating on their influence on impressions of risk and danger rather than on their value for highlighting differences in the growth rates of cases. We argue that the choice of graph type should depend on the needs of the audience. Comparing growth rates between countries is certainly important for epidemiologists and politicians who are in a position to implement and evaluate high-level policies. For them, logarithmic graphs may be most useful. For the general public, however, graphs should be designed to enable viewers to accurately estimate risk and respond accordingly. Indeed, when we ran a test in which we expected logarithmic graphs might result in laypeople making more accurate interpretations of growth rates, we found that the claimed advantages of logarithmic graphs did not appear: for a lay audience, logarithmic graphs did not improve accuracy of comparative growth judgments. (See Appendix Study 2 in the Supplemental Material.)

Recommendations

Overall, our findings make it clear that officials' and media's decision to use either logarithmic or linear axes in graphs can influence public

response to COVID-19. When people are presented with graphs with logarithmic instead of linear axes, they make less accurate predictions of future growth; view COVID-19 as less of a threat; and, accordingly, are less supportive of governmental and individual action against COVID-19. Education can reduce these effects, but it cannot eliminate them.

Logarithmic graphs still have significant value for presenting scientific data. However, on the basis of our research, we recommend using them for the general public only when they are truly the most reasonable option. And when they are used, presenters should spend significant time explaining how to read the graphs and should supplement the logarithmic graphs with linear displays of the data.

end notes

A. Full materials, preregistrations, and data for the studies described in this article and for additional studies we conducted can be found at https://osf.io/zqut5/?view_only=3aa66d592dd2495ca508b4fa8729381a.

B. In Study 1A, actual case counts were derived from the COVID-19 data repository maintained by the Center for Systems Science and Engineering at John Hopkins University, available from https://github.com/CSSEGISandData/COVID-19.

C. It is conceivable that people who judge COVID-19 to pose a low degree of danger on the basis of seeing logarithmic graphs are more accurate in their threat assessment than are people who view the same data on linear graphs. We do not think that they are more accurate, however. When people are taught how to read logarithmic graphs, their sense of danger does not fall; rather, it rises.

supplemental material

- http://behavioralpolicy.org/publications
- Methods & Analysis

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references

1. Chapman, G. B., & Coups, E. J. (2006). Emotions and preventive health behavior: Worry, regret, and influenza vaccination. *Health Psychology, 25,* 82–90. https://doi.org/10.1037/0278-6133.25.1.82
2. Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical Decision Making, 21,* 37–44. https://doi.org/10.1177/0272989x0102100105
3. Wagenaar, W. A., & Sagaria, S. D. (1975). Misperception of exponential growth. *Perception & Psychophysics, 18,* 416–422. https://doi.org/10.3758/bf03204114
4. Wagenaar, W. A., & Timmers, H. (1979). The pond-and-duckweed problem; Three experiments on the misperception of exponential growth. *Acta Psychologica, 43,* 239–251. https://doi.org/10.1016/0001-6918(79)90028-3
5. Schwartz, L. M., Woloshin, S., Black, C., & Welch, H. G. (1997). The role of numeracy in understanding the benefit of screening mammography. *Annals of Internal Medicine, 127,* 966–972. https://doi.org/10.7326/0003-4819-127-11-199712010-00003
6. Zikmund-Fisher, B. J., Smith, D. M., Ubel, P. A., & Fagerlin, A. (2007). Validation of the Subjective Numeracy Scale: Effects of low numeracy on comprehension of risk communications and utility elicitations. *Medical Decision Making, 27,* 663–671. https://doi.org/10.1177/0272989x07303824
7. Peters, E., Hibbard, J., Slovic, P., & Dieckmann, N. (2007). Numeracy skill and the communication, comprehension, and use of risk-benefit information. *Health Affairs, 26,* 741–748. https://doi.org/10.1377/hlthaff.26.3.741
8. Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*(4), 25–42. https://doi.org/10.1257/089533005775196732
9. Zacks, J., & Tversky, B. (1999). Bars and lines: A study of graphic communication. *Memory & Cognition, 27,* 1073–1079. https://doi.org/10.3758/bf03201236
10. Beattie, V., & Jones, M. J. (2002). The impact of graph slope on rate of change judgments in corporate reports. *Abacus, 38,* 177–199. https://doi.org/10.1111/1467-6281.00104
11. Cleveland, W. S., & McGill, R. (1987). Graphical perception: The visual decoding of quantitative information on graphical displays of data. *Journal of the Royal Statistical Society, Series A, 150,* 192–229. https://doi.org/10.2307/2981473
12. Fischer, H., Schütte, S., Depoux, A., Amelung, D., & Sauerborn, R. (2018). How well do COP22 attendees understand graphs on climate change health impacts from the fifth IPCC assessment report? *International Journal of Environmental Research and Public Health, 15,* Article 875. https://doi.org/10.3390/ijerph15050875
13. Beshear, A. [Governor Andy Beshear]. (2020, April 5). *Update on COVID-19 in Kentucky—4.5.2020* [Video file]. YouTube. https://www.youtube.com/watch?v=gSzUuOTzGE8&feature=youtu.be&t=1595
14. Inslee, J. [GovInslee]. (2020, March 26). GovInslee was live [Video file]. https://twitter.com/GovInslee/status/1243237794895413249
15. Yan, W. (2020, April 14). Coronavirus tests science's need for speed limits. *The New York Times.* https://www.nytimes.com/2020/04/14/science/coronavirus-disinformation.html
16. Wagner, S. H., & Goffin, R. D. (1997). Differences in accuracy of absolute and comparative performance appraisal methods. *Organizational Behavior and Human Decision Processes, 70,* 95–103. https://doi.org/10.1006/obhd.1997.2698

finding

Keeping safe versus staying healthy: The effect of regulatory fit on social distancing

Jiaqian Wang & Angela Y. Lee

abstract

Some states' COVID-19 social distancing directives spotlight the goal of health promotion (that is, staying healthy), whereas others underscore illness prevention (that is, keeping safe). Regulatory fit theory holds that persuasiveness is influenced by how well the framing of a message resonates with fundamental motivations that influence recipients' behavior. People who are motivated to approach desirable outcomes generally respond best to health messages having a promotion frame, whereas people who are motivated to avoid undesirable outcomes respond best to health messages having a prevention frame. In the research presented in this article, we show that the effectiveness of COVID-19-related directives is influenced by the fit between promotion or prevention framing and the recipients' identity—whether they view themselves as independent actors or as part of a larger community. We found that an appeal that highlighted health promotion and benefits to the individual (as in "what you can do to help you stay healthy") or one that highlighted disease prevention and protection of society (as in "what you can do to keep America safe") led to greater intent to practice social distancing than did appeals using other pairings of framing and identity, particularly in people who were not already practicing rigorous social distancing. The findings suggest that policymakers should consider regulatory fit—and specifically, the pairings described above—when designing public health communications relating to COVID-19 and other directives.

Wang, J., & Lee, A. Y. (2020). Keeping safe versus staying healthy: The effect of regulatory fit on social distancing. *Behavioral Science & Policy 6*(2), 25–34. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

Public health experts have determined that social distancing is important to slowing the spread of COVID-19. After the declaration of a national emergency on March 13, 2020, many state and local governments issued stay-at-home or shelter-in-place orders. Some directives have used a "stay healthy" appeal, emphasizing *health promotion* (as has occurred in Arizona,[1] Kentucky,[2] Nebraska,[3] and Washington[4]), but others have used a "keep safe" appeal, emphasizing *disease prevention* (as in Connecticut,[5] Michigan,[6] Utah,[7] and Vermont[8]). In this article, we report on two experiments that draw on regulatory fit theory to examine whether the effectiveness of such appeals also depends on which of the participants' identities is made salient—that is, on whether the recipients' view of themselves as either an independent actor or a part of a larger, interdependent community is emphasized. The studies were conducted nine days apart in March 2020.

Regulatory fit theory posits that people become more engaged in pursuing a goal when their goal-pursuit strategy matches their *regulatory orientation*: the motivation that guides their attention, attitudes, and behaviors. For instance, some people are driven primarily by approaching desirable outcomes (that is, they are *promotion oriented*), whereas other people are driven by avoiding undesirable outcomes (that is, they are *prevention oriented*). The regulatory fit literature indicates that communications do a better job of persuading people to act if they are framed to match the recipients' regulatory orientation.[9,10] For example, people who are motivated to attain desirable outcomes would respond best to health-promotion-oriented "stay healthy" messages, whereas those who are motivated to avoid undesirable outcomes would respond best to disease-prevention-oriented "keep safe" messages.

In the studies reported in this article, we hypothesized that the persuasiveness of messaging that emphasized health promotion or disease prevention would be influenced by whether the language appealed to a particular aspect of the recipients' identity—that is, their view of themselves as independent actors or as part of a larger, interdependent community. We based our proposal in part on past research showing that people who view themselves as an independent, autonomous individuals tend to be more promotion oriented and that people who view themselves as interdependent with others in a social collective tend to be more prevention oriented.[11] Consequently, appeals that make an individual identity salient while advocating a promotion goal or appeals that make a group identity salient while advocating a prevention goal should be more persuasive than appeals that mismatch identity and goal.[12]

In the first experiment, we explored whether a "stay healthy" health-promotion-oriented COVID-19 appeal would be more effective in spurring people to practice social distancing if distancing was highlighted as a benefit to the individual (as in "what you can do to stay healthy") rather than as a benefit to a larger group (as in "what you can do to help America stay healthy"). Likewise, we explored whether a "keep safe" COVID-prevention-oriented appeal would be more effective if social distancing was highlighted as a benefit to the group (as in "what you can do to keep America safe") rather than to the individual (as in "what you can do to keep you safe"). It turned out that, indeed, the most effective messages either paired an emphasis on staying healthy with an appeal to people's concerns about themselves or paired an emphasis on keeping safe with an appeal to people's concerns about the safety of their fellow Americans.

In the second experiment, we added another prediction. Prior research had suggested that people who are already adopting a recommended action are less sensitive to whether a message's promotion or prevention focus matches their inclination to seek positive outcomes or avoid negative ones.[13,14] We proposed that the regulatory fit effect on people's intention to comply with social distancing guidance would be strongest among people who were not already practicing social distancing rigorously. The results support this notion.

For both studies, we preregistered a primary plan of examining people's perceptions of the pandemic and the effect of regulatory fit on the

adoption of various precautionary measures (see note A). After we collected the data, we decided to concentrate on social distancing intentions as our primary outcome. We also made the decision to examine the moderating role of current social distancing practice after the data had been collected. See the Supplemental Material for fuller details of the procedures and analyses discussed in this article and for findings related to outcomes other than social distancing.

Experiment 1

Method

In Experiment 1, our main objective was to examine how the salience of participants' identity influenced their responses to an appeal that emphasized health promotion ("stay healthy") or disease prevention ("keep safe") as the goal of adopting precautionary measures against COVID-19 advocated by the U.S. Centers for Disease Control and Prevention (CDC). We fielded the experiment on March 18, 2020, delivering an online survey through CloudResearch.[15] The cumulative numbers of infections and deaths in the United States on that day were reported as 7,624 and 115, respectively.[16] After removing responses that could have been duplicates, we ended up with 1,201 participants. The mean age of the participants was 39.89 years (range: 18–78 years); 51% of the participants were male.

Participants responded to all survey items using interval scales. We first asked them to judge the seriousness of the risk posed by COVID-19 to themselves, their community, and the United States separately. They also estimated the number of confirmed cases and deaths and reported the outbreak's perceived emotional, economic, and social impact on them. Then they indicated the extent of their current adherence to recommended public health guidelines, such as various social distancing and hygiene measures (by responding "yes," "trying to," or "no" to each measure; see the Supplemental Material for the full list of items).

Next, all participants read the same message describing what the government was doing to curb the spread of COVID-19 and outlining the CDC guidelines on social distancing and other precautionary measures. This message was presented under one of six headlines. Half of the participants saw a headline that emphasized the goal of health promotion but varied in the highlighted audience; it said, "Here's what you can do to help _____ stay healthy," with either *you*, *your community*, or *America* appearing in the blank. The other half of the participants saw a headline that emphasized illness prevention. It said, "Here's what you can do to keep _____ safe," with again either *you*, *your community*, or *America* appearing in the blank. Participants then indicated their intention to practice a number of precautionary measures: staying home more; reducing in-person socializing; increasing socializing by phone or online; washing hands for 20 seconds; using hand sanitizer; sneezing or coughing into their elbow or a tissue; and avoiding touching their eyes, nose, and mouth. (These outcome measures were rated on a scale ranging from 1 = *do much less* to 11 = *do much more*.) Finally, participants reported demographic information, including their political party affiliation.

Analyses & Results

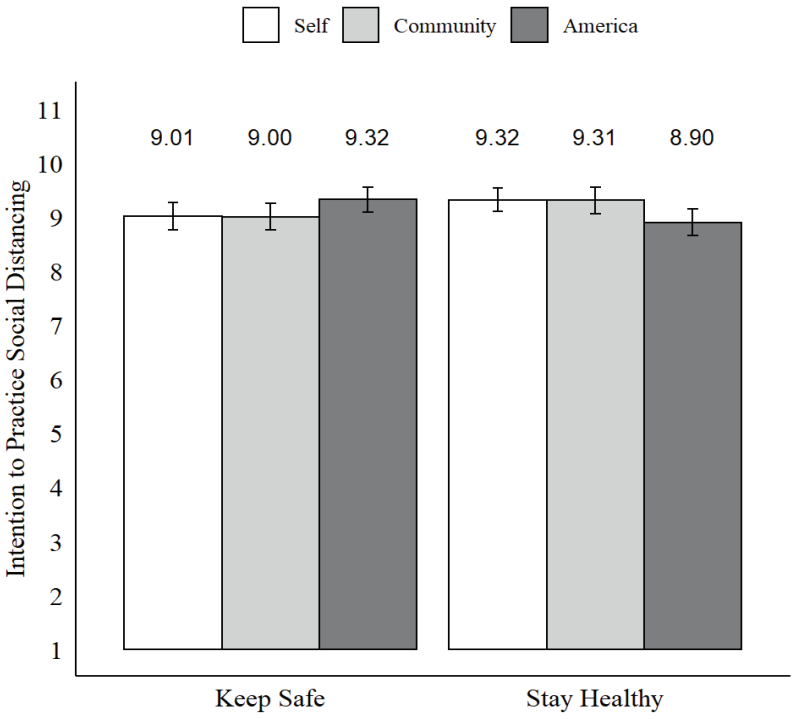
After we collected the data, we decided to focus on participants' intentions to social distance as the key outcome measure, because social distancing is considered the best way to reduce the spread of COVID-19;[17] social distancing intentions can also serve as a proxy for recipients' intentions to adopt other precautionary measures. We assessed this outcome by averaging the responses to the items that measured intentions to stay home, to socialize with friends online or by phone, and to socialize with friends in person (which was reverse-coded so that greater compliance with CDC recommendations was indicated by a higher score, as with the other two items). See the Supplemental Material for the results relating to the other precautionary measures.

We ran regression analyses to examine whether appeals that matched identity and benefit led to better outcomes than did those that mismatched identity and benefit. We also directly compared the outcomes when each of the two framing

approaches ("stay healthy" and "keep safe") was paired with each of the three highlighted identities (individual, community, America).

As predicted, we found that an appeal that matched a promotion benefit to an individual identity and one that matched a prevention benefit to the group identity of America were most effective in persuading participants to practice social distancing (b = 0.73, 95% CI [0.26, 1.21], p = .002). (See note B for information about the statistical notations used in this article.) More specifically, as Figure 1 shows, when the message highlighted an individual identity (emphasizing consequences to the self), participants expressed higher intentions to social distance if the appeal also advocated a promotion ("stay healthy") benefit (M = 9.32) rather than a prevention ("keep safe") benefit (M = 9.01, d = 0.19, p = .072). In contrast, when the message highlighted America as a group identity (emphasizing consequences to America), participants expressed higher intentions to social distance if the appeal also advocated a prevention ("keep safe") benefit (M = 9.32) rather than a promotion ("stay healthy") benefit (M = 8.90, d = 0.25, p = .013). Looked at from a different perspective, the results indicated, as predicted, that in the context of a health-promotion ("stay healthy") appeal, the message was more effective in persuading participants to social distance when their individual identity was highlighted than when their American identity was highlighted (d = .25, p = .013). Also as predicted, in the context of a disease-prevention ("keep safe") appeal, giving salience to participants' American identity resulted in higher social distancing intentions than did giving salience to their individual identity (d = .18, p = .071).

Figure 1. Mean social distancing intention as a function of frame & identity (Experiment 1)



Note. Pairing a "keep safe" messaging frame with an emphasis on recipients' identity as Americans ("Here's what you can do to keep America safe") led to a greater intention to practice social distancing than did pairing this frame with an emphasis on the self ("Here's what you can do to help you keep safe"), or on being a part of a community ("Here's what you can do to help your community keep safe"). A "stay healthy" messaging frame was most effective when paired with an emphasis on the self ("Here's what you can do to help you stay healthy") or on the community ("Here's what you can do to help your community stay healthy"). Error bars indicate 95% confidence intervals.

However, contrary to our predictions, when participants' community group identity was highlighted, the effect of frame was similar to when participants' individual identity was highlighted. Specifically, the appeal advocating a promotion benefit (M = 9.31) led to higher intentions to practice social distancing than did that advocating a prevention benefit (M = 9.00, d = 0.17, p = .077). Perhaps the reason for the unexpected results is that participants were reflecting more on themselves when the message referenced the community. Given this pattern of findings, we do not discuss the community-related outcomes in the text that follows (see details on community-related data in the Supplemental Material).

Because political party affiliation might influence people's perception of the pandemic and their social distancing practices, we examined participants' party affiliation as a potential moderator of the proposed regulatory fit effect for framing and identity. In general, Democrats perceived themselves to be more vulnerable to COVID-19 than Republicans and those with other affiliations did, and a higher percentage of Democrats (78.8%) reported that the pandemic had led them to stay home more compared with Republicans (65.9%) and those with other affiliations (69.0%; see Tables S1–S2 in the Supplemental Material). However, the regulatory

fit effect on social distancing intention was not contingent on party affiliation; none of the interactions among identity, message frame, and political party were significant (all *p*s > .31).

Experiment 2

Method

We launched Experiment 2 on March 27, 2020, to see if the findings would confirm the effect of regulatory fit on people's intentions to take precautions against COVID-19. After removing duplicates and one respondent who was not a U.S. resident, we had a final sample of 998 participants. The mean age of the participants was 39.54 years (range: 19–84 years); 45% were male. The cumulative number of infections and deaths in the United States exceeded 86,000 and 1,300, respectively, on the day of survey launch.[16]

We followed procedures similar to those of Experiment 1, with two key modifications. First, we eliminated the consideration of the local community identity. Second, we added another measure of intention to practice social distancing. After participants saw the health communication, we asked them to indicate the number of times they planned to leave home in the next seven days for various reasons (for work, to shop for groceries and other daily necessities, to pick up medication, to exercise, to get together with friends or family, to get some fresh air, and to exercise their right to freedom) on a scale ranging from 0 = *not going out for this reason* to 8 = *more than once a day.* We reasoned that the more effective the messaging was, the fewer trips participants would plan to make. We excluded work-related trips in these analyses because we considered these to be out of participants' control. In line with this assumption, we did not observe a fit effect on participants' intention to leave home for work (see Tables S39–S40 in the Supplemental Material).

Analyses & Results

Compared with participants who provided data nine days earlier, those in Experiment 2 perceived themselves and the United States as being more vulnerable to COVID-19 ($p < .001$ in both cases). Also, a higher percentage of participants indicated that they were staying at home more due to the pandemic (85% versus 73%, $p < .001$) and were more likely to work remotely (68% versus 62%, $p = .005$), but participants were less likely to engage in virtual socializing (67% versus 62%, $p = .025$).

To our initial surprise, we were not able to replicate Experiment 1's regulatory fit effect on participants' social distancing intentions. We also found no effect of regulatory fit on the measure of social distancing we had added; the total number of times participants planned to leave home for the six non-work-related reasons was not influenced by frame or identity.

Soon, however, we found an explanation for the discrepancy between the experiments. Prior research has shown that the regulatory fit effect is attenuated among people who are actively engaged in activities advocated by a message or who perceive themselves to be at high risk from a threat discussed in a message.[13,14] Given that Experiment 2's participants reported that they felt more vulnerable to COVID-19 and also that they were staying at home more than were the participants in Experiment 1, we decided to examine participants' current staying-at-home practice as a potential moderator of the regulatory fit effect.

We categorized participants as strong or lax stay-at-home adopters on the basis of their saying that they were "for sure" staying home more, as opposed to saying "no" or "trying to." By this measure, 839 participants were strong adopters and 149 were lax adopters.

We first ran regression analyses to examine whether intention to social distance after reading the public health communication could be enhanced by any combination of frame, identity, and adopter type. The results showed a fit effect that approached significance among lax adopters on intention to reduce in-person socializing ($b = 1.36$, 95% CI [–0.25, 2.97], $p = .097$) but not on the other two social distancing measures we had also used in Experiment 1. In other words, pairing "stay healthy" messages with concern for the individual and pairing "keep safe" messages with concern for Americans

increased intentions to reduce in-person socializing among current lax adopters of stay-at-home guidance. (Find detailed results on these three measures in Tables S20–S25 in the Supplemental Material.)

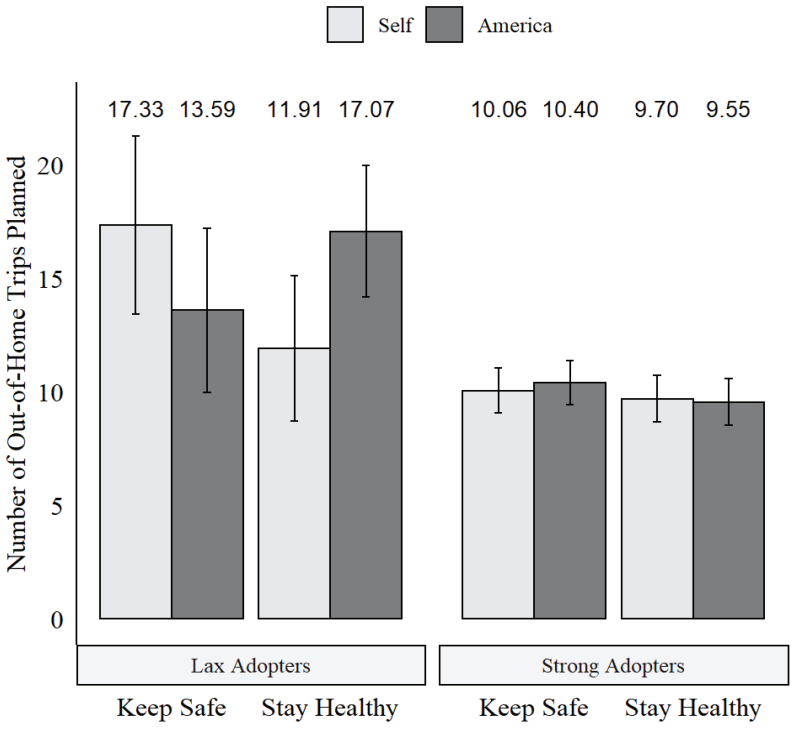
A comparison of the data across the two experiments showed, as noted above, that Experiment 2 included a higher proportion of strong adopters (85% versus 73%, $p < .001$) and that even the lax adopters were more likely to claim they were trying to stay home more (87% versus 78%, $p = .029$). Hence, we speculated that these social distancing items of staying home more and increased socializing by phone or online might no longer be sensitive enough to capture any fit effect that was occurring.

Next, we examined how different combinations of frame, identity, and adopter type might predict social distancing intention as assessed by our added measure: the total number of times participants planned to leave home for reasons unrelated to work in the next week (see Table S26 in the Supplemental Material). We found that, compared with the lax adopters (who planned to make an average of 15.04 trips), strong adopters planned to make fewer trips (9.93 on average). Relative to strong adopters, lax adopters were significantly more influenced to stay home by messaging in which the "stay healthy" or "keep safe" frame fit with the highlighting of individual or American identity, respectively ($b = 9.39$, 95% CI [3.91, 14.86], $p = .001$). Specifically, the predicted fit effect of frame and identity was significant among lax adopters ($b = -8.90$, 95% CI [–13.95, –3.85], $p = .001$) but not among strong adopters ($b = 0.48$, 95% CI [–1.63, 2.60], $p = .654$).

For lax adopters, we found that when their individual identity was made salient, the health-promotion messaging led to fewer planned trips than the prevention-focused messaging did; the mean planned-trips score was 11.91 for those who read the promotion-oriented headline and 17.33 for those who read the prevention-oriented headline ($d = 0.53$, $p = .005$; see Figure 2). In contrast, when their American identity was made salient to the lax adopters, it was the prevention-focused messaging that led to fewer planned trips; the mean planned-trips score was 17.07 for those who read the promotion-oriented headline and 13.59 for those who read the prevention-oriented headline ($d = 0.34$, $p = .044$). Put another way, when the messaging focused on staying healthy, lax adopters whose individual identity was made salient planned to leave home fewer times than did those whose American identity was made salient ($d = 0.55$, $p = .004$), whereas when the messaging focused on staying safe, lax adopters whose American identity was made salient planned to leave home fewer times than did those whose individual identity was made salient ($d = 0.34$, $p = .043$). These results held for each non-work-related reason (see Tables S27–S38 in the Supplemental Material).

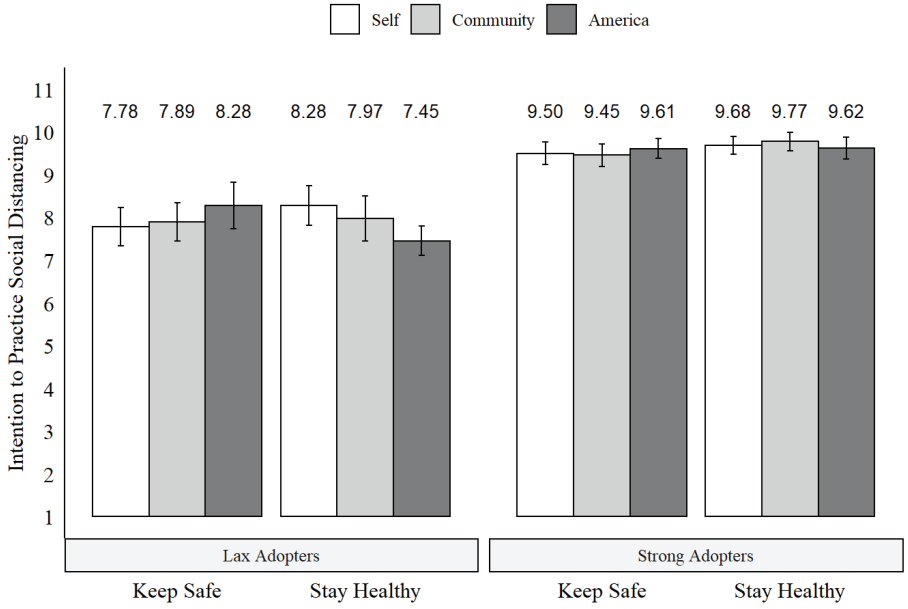
In light of Experiment 2's findings, we reanalyzed the Experiment 1 data to include adopter type. We had 328 lax adopters and 873 strong

Figure 2. Mean number of non-work-related out-of-home trips planned as a function of frame, identity, & adopter type (Experiment 2)



Note. The matching of a "keep safe" messaging frame with an emphasis on recipients' identity as an American and the matching of a "stay healthy" messaging frame with an emphasis on recipients' identity as an individual led recipients who were lax adopters of social distancing measures to plan fewer trips outside the home. Matching frame and identity had no significant effect on strong adopters who were already staying home more. Error bars indicate 95% confidence intervals.

Figure 3. Mean social distancing intention as a function of frame, identity, & adopter type (Experiment 1)



Note. For lax adopters of social distancing guidance, pairing a "keep safe" messaging frame with an emphasis on recipients' identity as Americans ("Here's what you can do to keep America safe") led to greater intention to practice social distancing than did pairing this frame with an emphasis on the individual ("Here's what you can do to keep you safe") or on being a part of a community ("Here's what you can do to keep your community safe"). A "stay healthy" messaging frame was most effective when paired with an emphasis on the self ("Here's what you can do to help you stay healthy") or the community ("Here's what you can do to help your community stay healthy"). These effects were not significant for strong adopters, who were already staying home more. Error bars indicate 95% confidence intervals.

adopters. In line with the findings of Experiment 2, the analysis revealed a significant regulatory fit effect of frame and identity on social distancing for lax adopters (b = 1.33, 95% CI [0.50, 2.15], p = .002) but not for strong adopters (b = 0.17, 95% CI [−0.33, 0.67], p = .504; see Figure 3 and the Supplemental Material for fuller details).

In the data collected for Experiment 2, political party affiliation no longer predicted perceived vulnerability to COVID-19 (see Table S18 in the Supplemental Material), although more Democrats (90.0%) than Republicans or others (79.5% and 82.6%, respectively) still reported that they were "for sure" staying home more than they did before the pandemic (p < .001; see Table S19 in the Supplemental Material). As in Experiment 1, political party affiliation did not moderate the fit effect among lax adopters (p > .26).

Conclusions

In two survey-based experiments, we examined the regulatory fit effect on people's intention to adopt social distancing recommendations for limiting the spread of COVID-19. Consistent with regulatory fit theory, we found that people were persuaded to practice social distancing more when an appeal that focused on health promotion also highlighted the recipient's identity as an individual (that is, when the appeal was framed as a way to "help you stay healthy") or when an appeal that focused on disease prevention also highlighted the recipient's group identity (that is, when the appeal was framed as a way to "keep America safe from the coronavirus").

However, the regulatory fit effect was moderated by the extent to which participants reported being in compliance with distancing guidance: the influence of regulatory fit was found only among lax adopters. Experiment 1's survey was conducted on March 18, 2020, when none of the statewide stay-at-home or shelter-in-place orders were in effect and fewer participants than in Experiment 2 reported that they were actively social distancing. In Experiment 1, we assessed social distancing intention by measuring intentions to practice three social distancing actions and found a regulatory fit

effect on intentions to engage in all three social distancing actions. We later categorized participants in Experiment 1 according to whether they were lax or strong adopters of social distancing and found that messaging that incorporated regulatory fit increased intentions to practice social distancing only among the lax adopters. The strong adopters were already vigilantly practicing social distancing and did not need more persuasion.

Experiment 2 was conducted on March 27, 2020, when 21 states were under stay-at-home orders and a greater percentage of participants reported being adherent to them. When we used the same outcome measures as we applied in Experiment 1, we did not replicate the regulatory fit findings, potentially because the measures were not sensitive enough to capture the fit effect when many participants were already practicing social distancing. But we did observe a significant regulatory fit effect on an additional measure of social distancing intentions: the number of out-of-home trips participants planned to make in the next seven days for each of six reasons unrelated to work. The fit effect was observed among the lax adopters but not among the strong adopters. Strong adopters, who already planned to make fewer trips than the lax adopters did, probably did not have much room to improve.

Our findings have an important implication for policymakers: messages that highlight a match between recipients' identity as an individual and a health-promotion goal or a match between recipients' group identity (for example, as Americans) and a disease-prevention goal can be effective at encouraging the adoption of COVID-19-related social distancing practices. Policymakers should leverage the regulatory fit effect in framing policies and persuasive communications designed to promote social distancing; more specifically, they should pair "stay healthy" messages with an emphasis on benefits to the recipients themselves but pair "keep safe" messages with an emphasis on protecting the broader public. We anticipate that the fit effect could also apply to other precautionary behaviors that we did not examine, such as wearing face masks or getting vaccinated.

end notes

A. Survey materials, data, and code are available at OSF (https://osf.io/h38nm/). We preregistered our primary plan of examining people's perceptions of the pandemic and the effect of regulatory fit on adoption of precautionary measures for Experiment 1 at https://osf.io/kanj8/ and Experiment 2 at https://aspredicted.org/blind.php?x=zy2mw7.

B. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. *F* tests and *t* tests are *parametric*: they make some assumptions about the characteristics of a population, such as that the compared groups have an equal variance on a compared factor. In cases where these assumptions are violated, researchers make some adjustments in their calculations to take into account dissimilar variances across groups. A *b* value indicates how much a change in one variable accounts for a change in another variable. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis. In addition to the chance question, researchers consider the size of the observed effects, using such measures as Cohen's *d* or Cohen's *h*. Cohen's *d* or *h* values of 0.2, 0.5, and 0.8 typically indicate small, medium, and large effect sizes, respectively. Standard deviation is a measure of the amount of variation in a set of values. Approximately two-thirds of the observations fall between one standard deviation below the mean and one standard deviation above the mean. Standard error uses standard deviation to determine how precisely one has estimated a true population value from a sample. For instance, if one took enough samples from a population, the sample mean ± 1 standard error would contain the true population mean around two-thirds of the time. A 95% confidence interval for a given metric indicates that in 95% of random samples from a given population, the measured value will fall within the stated interval.

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supplemental material

- https://behavioralpolicy.org/publications/
- Methods & Analysis

references

1. Office of the Governor Doug Ducey. (2020, March 30). *"Stay home, stay healthy, stay connected"* [Press release]. https://azgovernor.gov/governor/news/2020/03/new-executive-order-stay-home-stay-healthy-stay-connected
2. Office of the Governor. (2020, March 26). *Gov. Beshear urges Kentuckians to stay healthy at home* [Press release]. https://kentucky.gov/Pages/Activity-stream.aspx?n=GovernorBeshear&prId=105
3. Office of Governor Pete Ricketts. (2020, April 6). *Gov. Ricketts urges Nebraskans to stay home, stay healthy, and stay connected* [Press release]. https://governor.nebraska.gov/press/gov-ricketts-urges-nebraskans-stay-home-stay-healthy-and-stay-connected
4. Inslee, J. (2020, March 24). *"Stay home, stay healthy"* [Transcript]. https://www.governor.wa.gov/news-media/stay-home-stay-healthy-address-transcript
5. Office of Governor Ned Lamont. (2020, March 20). *Governor Lamont signs executive order asking Connecticut businesses and residents: 'Stay safe, stay home'* [Press release]. https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/03-2020/Governor-Lamont-Signs-Executive-Order-Asking-Connecticut-Businesses-and-Residents-Stay-Safe
6. Michigan.gov. (2020, March 23). *Governor Whitmer signs "stay home, stay safe" executive order* [Press release]. https://www.michigan.gov/coronavirus/0,9753,7-406-98159-522625--,00.html
7. Herbert, G. (2020, March 27). *Full text: Governor's "stay home, stay safe" directive*. https://coronavirus.utah.gov/full-text-governors-stay-home-stay-safe-directive/
8. Office of Governor Phil Scott. (2020, March 24). *Governor Phil Scott issues a "stay home, stay safe" order, directs additional closures* [Press release]. https://governor.vermont.gov/press-release/governor-phil-scott-issues-%E2%80%9Cstay-home-stay-safe%E2%80%9D-order-directs-additional-closures
9. Higgins, E. T., Idson, L. C., Freitas, A. L., Spiegel, S., & Molden, D. C. (2003). Transfer of value from fit. *Journal of Personality and Social Psychology, 84,* 1140–1153. https://doi.org/10.1037/0022-3514.84.6.1140
10. Lee, A. Y., & Aaker, J. L. (2004). Bringing the frame into focus: The influence of regulatory fit on processing fluency and persuasion. *Journal of Personality and Social Psychology, 86,* 205–218. https://doi.org/10.1037/0022-3514.86.2.205
11. Lee, A. Y., Aaker, J. L., & Gardner, W. L. (2000). The pleasures and pains of distinct self-construals: The role of interdependence in regulatory focus. *Journal of Personality and Social Psychology, 78,* 1122–1134. https://doi.org/10.1037/0022-3514.78.6.1122
12. Aaker, J. L., & Lee, A. Y. (2001). "I" seek pleasures and "we" avoid pains: The role of self-regulatory goals in information processing and persuasion. *Journal of Consumer Research, 28,* 33–49. https://doi.org/10.1086/321946
13. Hong, J., & Lee, A. Y. (2008). Be fit and be strong: Mastering self-regulation through regulatory fit. *Journal of Consumer Research, 34,* 682–695. https://doi.org/10.1086/521902
14. Wang, J., & Lee, A. Y. (2006). The role of regulatory focus in preference construction. *Journal of Marketing Research, 43,* 28–38. https://doi.org/10.1509/jmkr.43.1.28
15. Litman, L., Robinson, J., & Abberbock, T. (2017). TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behavior Research Methods, 49,* 433–442. https://doi.org/10.3758/s13428-016-0727-z
16. Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases, 20,* 533–534. https://doi.org/10.1016/S1473-3099(20)30120-1
17. Centers for Disease Control and Prevention. (2020, November 17). *Social distancing.* https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html

finding

Low voice pitch in orally delivered recommendations can increase compliance with hand sanitizer use among young adults

Eugene Chan

abstract

Oral communications delivered in a low voice pitch are more persuasive and perceived as more pleasant and truthful than are communications delivered in a high pitch. The research reported in this article explored whether young adults' compliance with an orally delivered recommendation to use hand sanitizer, an action thought to limit the spread of COVID-19 and other infectious diseases, would increase when the message was delivered in a low versus a high voice pitch. In an experiment involving 478 university students in Australia, a public health announcement delivered in a low voice pitch, compared with one delivered in a high voice pitch, increased participants' sense of power, which increased their perceived behavioral control over their physical health and, in turn, increased their likelihood of using hand sanitizer. Because voice pitch is an aspect of health communications that can be modified easily at a low cost, the findings suggest a simple approach that public health and policy officials can adopt to improve hand hygiene in a population of people who spend a lot of time in close proximity and who should therefore practice hand hygiene routinely to protect themselves and others from infection.

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Handwashing with soap and water is an excellent way to prevent the spread of infection via hand contact, but people often neglect it or find themselves without the needed materials (such as soap, water, or a sink).[1,2] Hand sanitizers such as alcohol gels offer an easy and effective alternative to handwashing. Young adults, particularly those on college campuses, are less likely than adults to follow handwashing and hand sanitizer recommendations, and this low compliance contributes to the spread of upper respiratory illnesses, strep throat, and other infectious diseases.[3–6] Finding ways to improve hand hygiene among young adults is therefore an important public health objective. Increased hand hygiene is also one of the main ways to fight the SARS-CoV-2 virus during the COVID-19 pandemic.

Through the research I describe in this article, I explored the possibility that opting for low rather than high voice pitch in orally delivered recommendations could enhance the ability of such communications to induce young adults to use hand sanitizer. Pitch is one dimension of voice that can differ among speakers, along with speed, intonation, and volume.[7–12] Voice pitch is the frequency of the sound wave produced by the opening and closing of the vocal cords and is measured in hertz (Hz), or cycles per second. Although a speaker can adjust pitch to some degree, whether pitch is high or low depends to a great extent on characteristics of the vocal cords—with thicker cords, less tension, and a lower frequency of opening and closing resulting in lower pitch.[13] Some individuals naturally have a lower or higher voice pitch.

Low voice pitch has been associated with greater pleasantness, persuasiveness, and truthfulness than high pitch,[14,15] which explains why low pitch can be quite persuasive and is popular in spoken messages delivered by male or female voices.[16] Yet whether low pitch will be more effective than high pitch for orally delivered public health recommendations remains unclear, in part because people sometimes act in opposition to health authorities[17,18]—a response that could conceivably counteract any benefit conferred by low voice pitch.

In the experiment described in this article, I tested the hypothesis that using a low voice pitch in oral recommendations to use hand sanitizer could increase the use of hand sanitizer among young adults, and I proposed that the increase would occur as a result of their strengthened perception of having behavioral control over their health. Some social scientists might initially be dubious of this proposed mechanism because past work on voice pitch suggests that people associate low voice pitch with power in the speaker,[7,8,10,12] a phenomenon that social comparison theories might suggest would lead people who hear a low-pitched message to feel less powerful relative to the apparently powerful speaker and thus feel less in control. However, social comparisons primarily arise when people have a lot on their minds (that is, when they are experiencing cognitive load).[19] When mental resources are not taxed, people correct for mistaken impressions prompted by comparative effects.[20] Thus, in the absence of cognitive load, listening to a person speak in a low-pitched voice could potentially elicit feelings of power in the listener, which, in turn, would facilitate the listener's perception of behavioral control over his or her own health. This last sequence is predicted by the finding that people who feel powerful perceive that they have control even when they do not (that is, when their sense of control is illusory) and tend to perceive that their abilities are greater than they actually are.[21–23]

In the case of the hand sanitizer experiment, I predicted that greater perceived behavioral control over one's health would increase a person's compliance with public health recommendations, because perceived behavioral control over health has been shown to strongly predict health-related behaviors. When people do not follow public health guidelines, one common cause of this disregard is that they do not perceive their physical well-being to be under their control and do not view the recommended actions to be of demonstrable use.[24,25] In contrast, people who see luck as having little influence on their health are more likely to exercise, reduce red meat intake, and perform self-examinations for cancer.[26–29] These individuals see their health, good or bad, as a result of

their own actions and so are more likely to act in their best interest.

Method

I designed the study to test the hypothesis that low voice pitch would be more effective than high voice pitch in increasing young adults' compliance with orally delivered recommendations to use hand sanitizer. I conducted it in early 2019 and used an experimental methodology to determine causality. I analyzed actual behavior (use of hand sanitizer) instead of self-reported intentions to increase external validity (that is, applicability to life outside the lab).

Participants were 478 undergraduates at a university in Australia. Their average age was 23.82 years; 178 were men and 300 were women. The students participated in groups of 10 to 15 in the university's behavioral laboratory and received course credit at the end.

Participants were randomly assigned to listen to either a low-pitch or a high-pitch version of an orally delivered two-minute public health message encouraging the use of hand sanitizer; to avoid biased responses, my research assistant told the participants they were taking part in market research for the headphones they were using to hear the message. All participants heard the same message, just at different pitches: 236 heard the low-pitch version, and 242 heard the high-pitch version. (See the Supplemental Material for the script and the recordings.) According to an analysis by Praat software,[30] the pitch of the message was either 37 Hz or 110 Hz, and the average volume was kept within the range of 50 to 70 decibels for both versions—readily audible but not painfully loud. The students sat in individual cubicles, put on their provided headphones, and listened to the audio clip. The same speaker, a woman, had been enlisted to record the message in both the low and the high pitches, and she kept the length of the audio the same. (A woman was chosen because prior research had indicated that female voices are used more often than male voices in orally delivered health communications).[31]

Immediately after listening to the audio, in accordance with the study's cover story, participants answered three questions about the headphones: "How comfortable was the headset?" "How clear was the audio?" and "How likely would you [*sic*] recommend the headset to a friend?" Responses were given on a scale of 1 = *Not at All* to 9 = *Very Much*.

The participants then completed a battery of personality questionnaires that were mostly irrelevant but had embedded in them two items designed to measure the students' perceived behavioral control over their physical health: "I am personally responsible for my physical health" and "I have control over my physical well-being." These items were answered on a scale of 1 = *Strongly Disagree* to 9 = *Strongly Agree*. These questions were adapted from past research by Mauri A. Ziff and her colleagues.[25] The question set also included one item meant to assess how powerful the participants felt, "I feel powerful," which was answered on a scale of 1 = *Strongly Disagree* to 9 = *Strongly Agree*.

The battery further included a question to measure the perceived authority of the speaker in the audio, "I felt that the speaker was authoritative," which was answered on a scale of 1 = *Strongly Disagree* to 9 = *Strongly Agree*. I included this question to rule out the possibility that listening to the low-pitched voice facilitated compliance with the hand sanitizer recommendation by making the participant feel more obligated to obey someone in authority than listening to a high-pitched voice did.

Participants then ostensibly completed the study by answering demographic questions, including ones asking about their gender, age, and English proficiency. (I assessed proficiency because about 30% of the sample were international students; those with poor proficiency might have not understood the audio message and would need to be eliminated from consideration.) At this point, the participants proceeded to the experimenter's table, where they signed a form to receive course credit. On this table was a bottle of hand sanitizer. My research assistant noted whether the participant used the hand sanitizer before leaving the laboratory.

This action was the key outcome measure (the dependent variable) and was indicated with a binary *yes* or *no*.

Results

Behavioral Compliance

More participants who listened to the low-pitch version of the public health advisory than the high-pitch version used the hand sanitizer on the table (83.1% versus 71.9%)—a difference that was statistically significant (p = .004). (See note A for a discussion of the statistical notation used in this article, and see the Supplemental Material for more statistics relating to the results reported in this section.)

Perceived Behavioral Control

Those who listened to the low-pitch version of the public health advisory scored higher than did those who listened to the high-pitch version on perceived behavioral control over their physical health—an average of 5.59 (*SD* = 1.87) versus 4.99 (*SD* = 1.91). Low pitch was highly correlated with perceived control (r = .89, p = .001).

Felt Power

Those who listened to the low-pitch version of the public health advisory scored significantly higher on felt power than did those who listened to the high-pitch one, with an average score of 5.74 (*SD* = 1.92) versus 5.23 (*SD* = 2.00, p = .005).

Mediation Effects

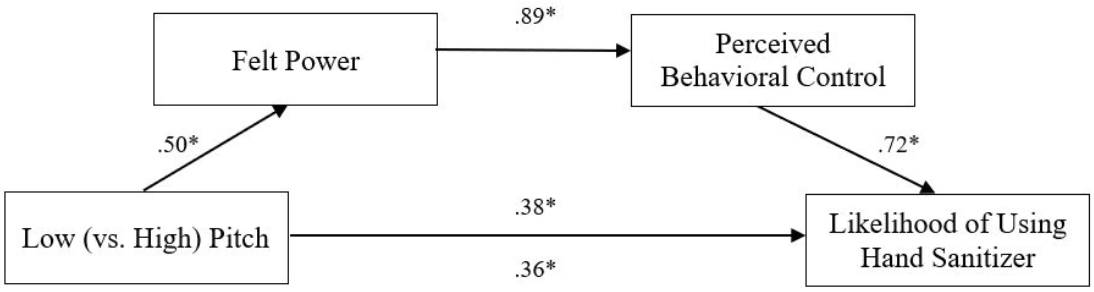
A mediation analysis that used procedures outlined by Kristopher J. Preacher and Andrew F. Hayes (Model 6 of their bootstrapping protocol)[32] found that felt power and perceived behavioral control mediated the influence of pitch on the likelihood of using hand sanitizer, with felt power leading to the perception of control, which led to increased compliance. See Figure 1 for the individual pathways and statistics. I also examined other pathways of influence, but none were significant.

Perceived Authority

Those who listened to the low-pitch and high-pitch versions of the public health advisory rated the perceived authority of the speaker in the audio clip similarly—an average of 5.22 (*SD* = 2.06) versus 5.00 (*SD* = 2.08), respectively, which was not a statistically significant difference. In other words, the difference in pitch did not cause a meaningful difference in the tendency to obey the health message (p = .24).

Find additional analyses in the Supplemental Materials.

Figure 1. The effect of vocal pitch on the behavioral response to an oral health message



Note. Mediation analysis confirmed that an oral message encouraging young adults to use hand sanitizer was more effective in increasing compliance when delivered in a low pitch than in a high pitch because it increased the listener's felt power, which then increased the listener's perceived behavioral control over his or her health. The numbers shown are *B* values, which indicate how much a change in one variable accounts for a change in another variable. *B* =.38 is a measure of the direct effect of pitch on use of hand sanitizer when the mediating factors are not taken into account. *B* = .36 is the indirect effect as mediated by felt power and perceived behavioral control. The standard error is .11, and the 95% confidence interval is [.16, .62].

*p < .05.

Discussion

This experiment demonstrated that using a low voice pitch to deliver a public health message urging greater use of hand sanitizer increased young adults' compliance with the recommendation more than using a high voice pitch did. The mediation analysis confirmed that greater compliance occurred because the low pitch more effectively led the participants to feel powerful, which in turn increased their perceived behavioral control over their health; this greater perceived control facilitated compliance with the recommendation to use hand sanitizer.

The results add to the wider body of research on the possible benefits of lower rather than higher voice pitch in audiovisual messages. This study is the first to suggest that low voice pitch, in addition to enhancing a message's persuasiveness and signaling pleasantness and truthfulness, might promote perceived control over the listener's own physical health and thus encourage the listener to perform the beneficial health behavior highlighted in the message. Unlike some research relating to the influence of low voice pitch on persuasiveness,[17,18] this experiment did not demonstrate any negative reactivity to the low-pitch voice. The reason may be that a negative reaction requires the listener to perceive that the speaker is more authoritative or has higher status than the listener; in this study, the participants who heard the low-pitch message did not differ from the participants who heard the high-pitch message in their perception of the speaker's authority. I did not measure pleasantness or truthfulness; either of these factors could conceivably explain my findings. My study measured only felt power in the listeners and found that it played a role in the demonstrated effects.

The findings have practical implications. Many public health campaigns are delivered orally—whether on the radio, on television, or through social media.[33,34] The new results suggest that the people who are encouraging the public to follow recommended guidelines should speak in a relatively low pitch. This is an approach that can be accomplished at no added cost. Although the experiment delivered its public health communication in a laboratory setting, the outcomes suggest that oral public health campaigns broadcast via social media, podcasts, and other channels that are popular with young adults might be effective at increasing this population's uptake of healthy behaviors. And although this study focused on hand sanitizer use, the results could well apply to efforts to promote other healthy behaviors.

That said, the study had limitations. Further attempts to replicate this experiment with other speakers and with male speakers is warranted. Although Australian culture is largely similar to the cultures of other Western countries such as the United States and United Kingdom, cultural differences could influence the effectiveness of different public health campaign strategies.[35] Relatedly, the message was delivered in American English even though the participants were Australian because the American accent is popular in Oceania. But American English is sometimes respected more than the local accent is,[36] which may have influenced the perceived power of the speaker. The study also measured participants' perceived behavioral control over their physical health with two items and their felt power with just one, because prior research has shown that single questions relating to those perceptions are as valid as multiple-item measures in health contexts.[37,38] Further work is warranted to replicate and strengthen the results of this study.

Also, although I measured hand sanitizer use, I did not assess whether participants used the sanitizer properly. Using hand sanitizer correctly is important for deriving its maximum benefit.

Finally, I examined the possible benefit of low voice pitch for health communications within the confines of a laboratory. This choice offered benefits for determining causality. In practice, however, decisionmakers who hear a spoken message might not attend to the message in full or at all or might be multitasking as they listen; all of these circumstances can affect the impact of voice pitch on felt power, perceived behavioral control over physical health, and

compliance.[20] Therefore, the results must be considered preliminary. Nevertheless, voice pitch is an integral aspect of oral communication that has been studied in various contexts, and my findings offer insights into the likely role of voice pitch in the effectiveness of public health messaging.

end note

A. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. An *r* value represents the correlation between two variables; values can range from –1 to 1, with 0 indicating no correlation, 1 indicating a perfect positive relationship, and –1 indicating a perfect inverse relationship. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis. Standard deviation is a measure of the amount of variation in a set of values. Approximately two-thirds of the observations fall between one standard deviation below the mean and one standard deviation above the mean. Standard error uses standard deviation to determine how precisely one has estimated a true population value from a sample. For instance, if one were to take enough samples from a population, the sample mean $\pm$1 standard error would contain the true population mean around two-thirds of the time. A 95% confidence interval for a given metric indicates that in 95% of random samples from a given population, the measured value will fall within the stated interval.

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supplemental material

- http://behavioralpolicy.org/journal
- Supplemental Text
- Multimedia

references

1. Day, R. A., St. Arnaud, S., & Monsma, M. (1993). Effectiveness of a handwashing program. *Clinical Nursing Research, 2,* 24–40.
2. Monsma, M., Day, R., & St. Arnaud, S. (1992). Handwashing makes a difference. *Journal of School Health, 62,* 109–111.
3. Bliss, S. J., Manning, S. D., Tallman, P., Baker, C. J., Pearlman, M. D., Marrs, C. F., & Foxman, B. (2002). Group B streptococcus colonization in male and nonpregnant female university students: A cross-sectional prevalence study. *Clinical Infectious Diseases, 34,* 184–190.
4. Glass, R. I., Noel, J., Ando, T., Fankhauser, R., Belliot, G., Mounts, A., Parashar, U. D., Bresee, J. S., & . . . Monroe, S. S. (2000). The epidemiology of enteric caliciviruses from humans: A reassessment using new diagnostics. *Journal of Infectious Diseases, 181*(Suppl. 2), S254–S261.
5. Moe, C. L., Christmas, W. A., Echols, L. J., & Miller, S. E. (2001). Outbreaks of acute gastroenteritis associated with Norwalk-like viruses in campus settings. *Journal of American College Health, 50,* 57–66.
6. White, C., Kolble, R., Carlson, R., & Lipson, N. (2005). The impact of a health campaign on hand hygiene and upper respiratory illness among college students living in residence halls. *Journal of American College Health, 53,* 175–181.
7. Aung, T., & Puts, D. (2020). Voice pitch: A window into the communication of social power. *Current Opinion in Psychology, 33,* 154–161.
8. Carney, D. R., Hall, J. A., & LeBeau, L. S. (2005). Beliefs about the nonverbal expression of social power. *Journal of Nonverbal Behavior, 29,* 105–123.
9. DeGroot, T., & Motowidlo, S. J. (1999). Why visual and vocal interview cues can affect interviewers' judgments and predict job performance. *Journal of Applied Psychology, 84,* 986–993.
10. Puts, D. A., Gaulin, S. J., & Verdolini, K. (2006). Dominance and the evolution of sexual dimorphism in human voice pitch. *Evolution and Human Behavior, 27,* 283–296.
11. Scherer, K. R., Banse, R., Wallbott, H. G., & Goldbeck, T. (1991). Vocal cues in emotion encoding and decoding. *Motivation and Emotion, 15,* 123–148.
12. Stel, M., Dijk, E. V., Smith, P. K., Dijk, W. W. V., & Djalal, F. M. (2012). Lowering the pitch of your voice makes you feel more powerful and think more abstractly. *Social Psychological and Personality Science, 3,* 497–502.
13. Ashby, M., & Maidment, J. (2005). *Introducing phonetic science*. Cambridge University Press.
14. Chattopadhyay, A., Dahl, D. W., Ritchie, R. J., & Shahin, K. N. (2003). Hearing voices: The impact of announcer speech characteristics on consumer response to broadcast advertising. *Journal of Consumer Psychology, 13,* 198–204.
15. Cohler, D. K. (1985). *Broadcast journalism: A guide for the presentation of radio and television news*. Prentice-Hall.
16. Martín-Santana, J. D., Reinares-Lara, E., & Reinares-Lara, P. (2017). Influence of radio spokesperson gender and vocal pitch on advertising effectiveness: The role of listener gender. *Spanish Journal of Marketing, 21,* 63–71.
17. Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication Monographs, 72,* 144–168.
18. Rains, S. A., & Turner, M. M. (2007). Psychological reactance and persuasive health communication: A test and extension of the intertwined model. *Human Communication Research, 33,* 241–269.
19. Bocage-Barthélémy, Y., Chatard, A., Jaafari, N., Tello, N., Billieux, J., Daveau, E., & Selimbegović, L. (2018). Automatic social comparison: Cognitive load facilitates an increase in negative thought accessibility after thin ideal exposure among women. *PLOS ONE, 13*(3), Article e0193200. https://doi.org/10.1371/journal.pone.0193200
20. Gilbert, D. T., Giesler, R. B., & Morris, K. A. (1995). When comparisons arise. *Journal of Personality and Social Psychology, 69,* 227–236.
21. Fast, N. J., Gruenfeld, D. H., Sivanathan, N., & Galinsky, A. D. (2009). Illusory control: A generative force behind power's far-reaching effects. *Psychological Science, 20,* 502–508.
22. Fast, N. J., Sivanathan, N., Mayer, N. D., & Galinsky, A. D. (2012). Power and overconfident decision-making. *Organizational Behavior and Human Decision Processes, 117,* 249–260.
23. Magee, J. C., & Galinsky, A. D. (2008). Social hierarchy: The self-reinforcing nature of power and status. *Academy of Management Annals, 2,* 351–398.
24. Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology, 32,* 665–683.
25. Ziff, M. A., Conrad, P., & Lachman, M. E. (1995). The relative effects of perceived personal control and responsibility on health and health-related behaviors in young and middle-aged adults. *Health Education Quarterly, 22,* 127–142.
26. Dishman, R. K., Ickes, W., & Morgan, W. P. (1980). Self-motivation and adherence to habitual physical activity. *Journal of Applied Social Psychology, 10,* 115–132.
27. Moorman, C., & Matulich, E. (1993). A model of consumers' preventive health behaviors: The role of health motivation and health ability. *Journal of Consumer Research, 20,* 208–228.
28. Rakowski, W. (1986). Personal health practices, health status, and expected control over future health. *Journal of Community Health, 11,* 189–203.
29. Wallston, K. A., Maides, S., & Wallston, B. S. (1976). Health-related information seeking as a function of health-related locus of control and health value. *Journal of Research in Personality, 10,* 215–222.
30. Boersma, P., & Weenink, D. (2009). Praat: Doing Phonetics by Computer (Version 5.1.04) [Computer software]. http://fonsg3.hum.uva.nl/praat
31. Strach, P., Zuber, K., Fowler, E. F., Ridout, T. N., & Searles, K. (2015). In a different voice? Explaining the use of men and women as voice-over announcers in political advertising. *Political Communication, 32,* 183–205.
32. Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40,* 879–891.
33. Keating, J., Meekers, D., & Adewuyi, A. (2006). Assessing effects of a media campaign on HIV/AIDS awareness and prevention in Nigeria: Results from the VISION Project. *BMC Public Health, 6,* Article 123. https://doi.org/10.1186/1471-2458-6-123
34. Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behavior. *The Lancet, 376,* 1261–1271.
35. Sanders Thompson, V. L., Cavazos-Rehg, P. A., Jupka, K., Caito, N., Gratzke, J., Tate, K. Y., Deshpande, A., & . . . Kreuter, M. W. (2008). Evidential preferences: Cultural appropriateness

strategies in health communications. *Health Education Research, 23,* 549–559.

36. Bayard, D., Weatherall, A., Gallois, C., & Pittam, J. (2001). Pax Americana? Accent attitudinal evaluations in New Zealand, Australia and America. *Journal of Sociolinguistics, 5,* 22–49.
37. Cunny, K. A., & Perri, M., III. (1991). Single-item vs multiple-item measures of health-related quality of life. *Psychological Reports, 69,* 127–130.
38. Littman, A. J., White, E., Satia, J. A., Bowen, D. J., & Kristal, A. R. (2006). Reliability and validity of 2 single-item measures of psychosocial stress. *Epidemiology, 17,* 398–403.

report

Psychological predictors of prevention behaviors during the COVID-19 pandemic

Stephen B. Broomell, Gretchen B. Chapman, & Julie S. Downs

abstract

Widespread public adoption of behaviors that can prevent the spread of COVID-19 is key to controlling the infection rate. In a nationally representative survey administered April 24 to May 11, 2020, we identified psychological predictors of three preventive behaviors: social distancing, practicing respiratory hygiene (such as hand washing and coughing into a tissue), and mask wearing. All three behaviors were strongly predicted by their perceived effectiveness and were moderately predicted by anxiety about COVID-19 and by perceived behavioral norms. The perceived effectiveness of social distancing also predicted the self-reported number of exposures to people outside the household, and this relationship was mediated by social distancing behavior. In other words, greater perceived effectiveness of social distancing predicted greater compliance with distancing recommendations, which in turn was linked to lower exposure. On the basis of our findings, we suggest some actions that might promote long-term adherence to preventive behaviors even if rapidly shifting beliefs about the risks posed by the virus diminish the public's susceptibility to intervention.

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Slowing the spread of COVID-19 depends critically on the widespread and sustained public adoption of preventive measures recommended by health experts,[1] on a scale not seen in past disease outbreaks. Yet people vary considerably in the degree to which they engage in behaviors meant to limit the transmission of infectious diseases, as is evident during normal cold and flu seasons.[2] With the devastating COVID-19 pandemic continuing, an understanding of how to increase preventive behaviors is arguably more critical now than ever. Psychological theory and research can help provide that understanding and suggest ways to motivate the public to adopt and maintain preventive measures against COVID-19.

Past research indicates that the perceived effectiveness of preventive behaviors, anxiety about a threat (such as fear of catching or spreading an infectious disease), perceptions of social norms for preventive behaviors, and personal experiences with a threat are primary drivers for taking action and changing behavior in response to public health threats.[3–8] However, investigators do not know which of these psychological constructs are most predictive of behavior change in response to the COVID-19 pandemic, nor do they know which constructs correlate most closely with key recommendations of the Centers for Disease Control and Prevention (CDC): namely, engaging in social distancing (such as staying home whenever possible and keeping at least six feet distant from other people), practicing respiratory hygiene (washing hands frequently; avoiding touching the eyes, nose, and mouth; and coughing or sneezing into a tissue), and wearing face masks. Given that psychological theory suggests that some people may reduce their preventive behaviors as time goes by, leading to waves of new infections in the following months,[9] finding effective ways of reinforcing these preventive behaviors is of utmost importance. In this article, we present the results of a survey that we administered during the pandemic to provide insight into which psychological factors best predict compliance with the CDC's recommendations. Understanding these connections can help to inform the development of effective interventions for promoting and sustaining behavior change.

We conducted a nationally representative survey over 18 days in late April and early May 2020 that examined (a) potential psychological predictors of self-reported adherence to the CDC-recommended behaviors of social distancing, practicing respiratory hygiene, and mask wearing; (b) self-reported effort to perform these recommended behaviors; and (c) the number of people (other than household members) with whom respondents had contact in recent days (representing violations of social distancing and thus potential exposure to infection). Our results indicate that each of the three behaviors is strongly predicted by its perceived effectiveness, is modestly predicted by anxiety about COVID-19 and by the social norm related to the behavior, and is weakly predicted by perceptions of the local environment (such as the belief that the number of people sick with the virus has recently increased in the respondent's local area).

Implications of Current Results for Policymakers

- Preventive behavior is predicted by the perceived effectiveness of the behaviors, anxiety about COVID-19, and perceived social norms relating to the behaviors (*descriptive norms*).
- Policy messages can harness the powerful influence of descriptive norms by publicizing widespread adoption of preventive behaviors.
- Public health and political leaders can solidify the social norms of social distancing, practicing respiratory hygiene, and mask wearing by consistently messaging that those actions are necessary and effective for controlling the spread of COVID-19.
- Although anxiety about COVID-19 predicts behavioral adherence, policymakers should be cautious about using fear messages because previous research indicates that such messages backfire if they do not also suggest actions to limit the likelihood of contracting the disease and infecting others.

Because logic suggests that social distancing behavior should reduce exposure rates, we conducted a separate analysis of how the psychological factor most predictive of this behavior—perceived effectiveness—related not only to compliance with distancing recommendations but also to reported exposures. We found that the perceived effectiveness of social distancing correlated with fewer self-reported exposures and that the link between the perception of efficacy and exposure is mediated to a great extent by practicing social distancing. The analyses we report in this article reveal correlations, not causation. But the mediation finding lends support to the intuition that belief in the preventive power of social distancing leads to reduced exposure as a result of prompting people to practice social distancing.

Our findings have important policy implications, suggesting that policymakers might increase people's compliance with recommendations to engage in social distancing, respiratory hygiene, and mask wearing by taking actions that emphasize the effectiveness of these behaviors and that establish and solidify social norms for performing them without reducing the fear of contracting and spreading COVID-19. Because successful social distancing leads to lower levels of infection in a community and may thus decrease anxiety about COVID-19, the public may be tempted to stop performing these recommended behaviors over time. Therefore, in places where infection rates decrease to low levels, policymakers may be wise to step up information campaigns that reinforce the effectiveness of the CDC's recommended behaviors and that strengthen the norms for adherence.

Methods

Participants

We recruited participants through the survey company Dynata, which hosts a nationally representative online panel. Participation was limited to U.S. citizens 18 years of age or older and fluent in English. Data collection began on April 24, 2020, with a preset target sample of 3,500 participants, and continued through May 11, 2020. A total of 41,274 individuals were invited to participate; 4,453 consented and completed the survey. Of these, 497 were excluded according to preset criteria (such as showing specific signs of inattentiveness), which left 3,956 in the final sample, a 9.6% response rate. The mean age was 48 years, 53% of participants were female, and 48% were employed. Table S1 in the Supplemental Material provides additional statistics describing the sample.

Procedure

Participants responded to 122 questions about the COVID-19 pandemic. In this article, we report on a subset of the questions that focused on three preventive behaviors recommended by the CDC: social distancing, practicing respiratory hygiene, and wearing a mask in public. For each of the questions assessing these behaviors (five questions for social distancing, three for respiratory hygiene, and one for mask wearing), participants reported their degree of behavioral compliance on a scale of 1 = *not at all* to 5 = *a great deal*. See Table S2 in the Supplemental Material for the exact questions and means.

Questions assessing the psychological processes hypothesized to influence compliance included items that measured perceptions of the efficacy of the recommended protective behaviors (such as "How effective do you think each of these behaviors is in preventing the spread of COVID-19?" [with each behavior listed separately]), anxiety about COVID-19 (such as "How worried are you about getting infected with COVID-19?"), the belief that each of the recommended behaviors have become social norms (such as "How much do you think your friends and neighbors are engaging in each of these behaviors?" [with each behavior listed separately]), personal experiences of knowing someone diagnosed with or suspected of having COVID-19, and the perception that the number of people sick with the virus had recently risen locally. Except for the personal experience questions, respondents answered all questions on a scale of 1 = *none* to 5 = either *a great deal* or *extremely*, depending on the wording of the item. The personal experience question was answered yes or no. Table S3 in the Supplemental Material lists the specific questions and the results.

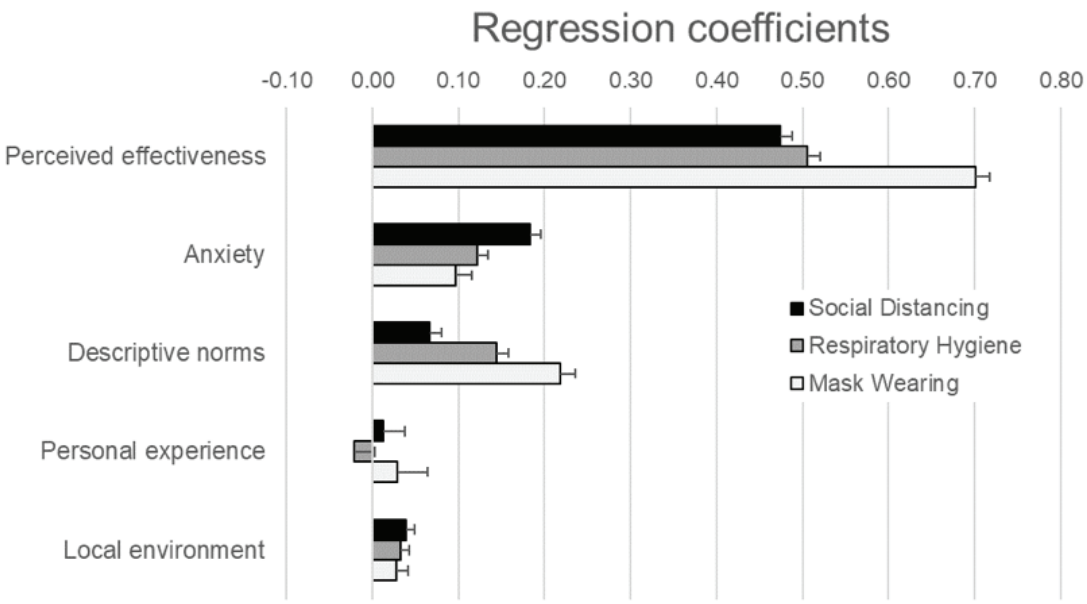
The outcomes of social distancing behavior were determined on the basis of participants' responses to open-ended questions asking for counts of the number of people (other than household members) with whom they had been in close contact, defined as being less than six feet away, even if only for a second. These numerical responses were summed to form one total of number of contacts over the past seven days. Find full details about the survey items and procedures in the Supplemental Material.

Results

Our analysis focused on self-reported measures of three behaviors: social distancing, practicing respiratory hygiene, and mask wearing. We examined five potential predictors of these preventive behaviors: perceived effectiveness, anxiety about COVID-19, perceptions of social norms, personal experience with COVID-19, and perceived prevalence of COVID-19 in the local environment.

We analyzed how strongly each of the psychological variables uniquely correlated with each preventive behavior by conducting what is known as an ordinary least squares regression analysis for each preventive behavior. Table S4 in the Supplemental Material displays the full set of findings. Each regression analysis included the five potential predictors, entered simultaneously. Figure 1 shows the relationship between each potential psychological predictor (assuming the others are fixed) and each behavior, as indicated by the regression coefficient. (For nonscientists: the larger the coefficient, the stronger the association.) Our measure of perceived effectiveness generated the largest coefficients for all three behaviors, with the strongest association seen

Figure 1. Regression coefficients indicating how strongly each of five psychological variables predicts the self-reported practicing of three behaviors meant to limit the spread of COVID-19



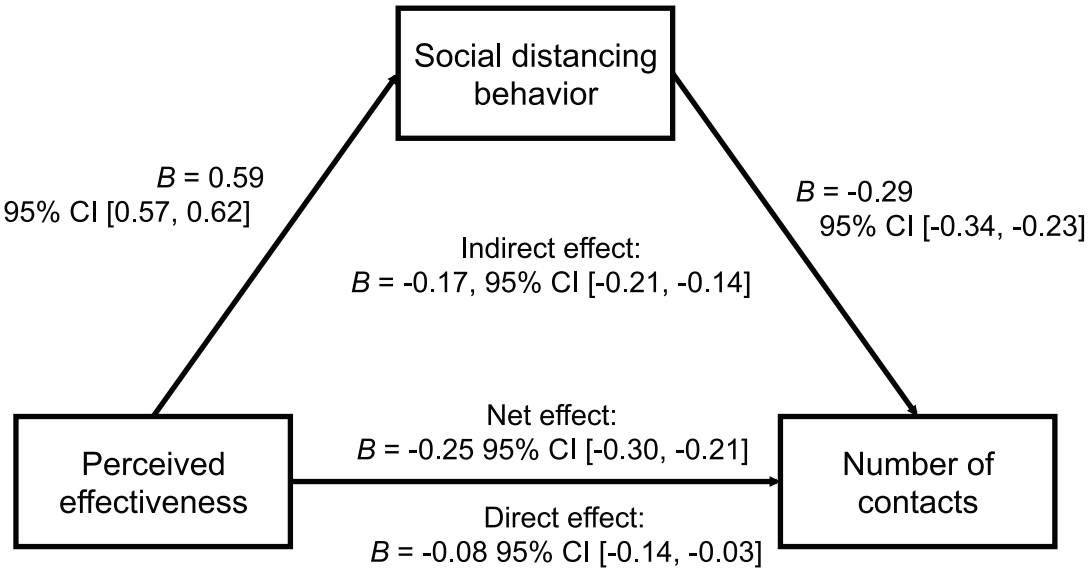
Note. For nonscientists: The regression coefficients indicate the strength and direction of the relationship between potential psychological predictors of preventive behaviors (holding all other predictors fixed) and the average self-reported practice of those behaviors. Perceived effectiveness = perceived effectiveness of the behavior; anxiety = fear of spreading or catching the disease; descriptive norms = belief that the behaviors are common practice in the general population; personal experience = having had COVID-19 or knowing someone who has been diagnosed or had major symptoms; local environment = belief that the number of people sick with COVID-19 has recently increased locally; social distancing = staying home as much as possible in the last seven days and trying to stay at least 6 feet away from other people; respiratory hygiene = engaging in behaviors such as washing hands frequently; avoiding touching the eyes, nose, and mouth; and covering a cough or sneeze with a tissue. Error bars show standard errors around the coefficients.

with mask wearing. The measures of anxiety about COVID-19 and perceptions of social norms generated the next largest coefficients. The remaining two psychological variables we examined—personal experience with COVID-19 and perceived local prevalence—generated small coefficients, with personal experience displaying no predictive power.

Because logic dictates that social distancing minimizes exposure, we decided in advance of the survey to include an analysis of the relation between exposures and the psychological factor that turned out to be most predictive of social distancing. Therefore, we next examined the relationship between the perceived effectiveness of social distancing and the number of self-reported exposures to people not in the household. We hypothesized that this relationship would be mediated by social distancing—that is, that the perceived effectiveness of social distancing would predict social distancing behavior and that the resulting social distancing would, in turn, be inversely related to the number of exposures (that is, more social distancing would be associated with less exposure).

To analyze the extent to which social distancing accounted for the influence of perceived effectiveness on exposure, we performed a mediation analysis. Finding a direct effect would imply that the perceived effectiveness of social distancing by itself predicted low exposure after the influence of engaging in social distancing was separated out. Finding an indirect effect would imply that the perceived effectiveness of social distancing predicts low exposure because perceived effectiveness also predicts social distancing behaviors. We found the latter to be the case. In the language of the field, we ran our mediation analysis[10] with 5,000 bootstrapped samples and found an indirect effect. See Figure 2.

Figure 2. Mediation analysis relating perceived effectiveness of social distancing to social distancing behavior & the number of close contacts made



Note. The plot shows that the perceived effectiveness of social distancing correlates with the number of contacts closer than six feet and that this association is mediated by social distancing behavior.

B values indicate how much a change in one variable will account for a change in the other variable and the direction of the effect; a minus sign reflects an inverse relationship. All *B* values shown are statistically significant.

CI = confidence interval. A 95% CI indicates that in 95% of random samples from a population of interest, the value that was measured will fall within the stated interval.

The importance of social distancing behavior as a mediator between perceived effectiveness of social distancing and the number of contacts is indicated by the size of the *B* value for the indirect effect and by its being larger than the B value for the direct effect (which does not take social distancing behavior into account).

We also examined whether any demographic features predicted preventive behaviors after we controlled for the contributions of the psychological predictors. Women reported higher adherence to all three behaviors than did men. Married people reported more social distancing and better respiratory hygiene than unmarried people did. White people reported worse respiratory hygiene and less mask wearing than people of color did. College-educated respondents reported more social distancing and worse respiratory hygiene than people with lower education levels did. Employed people reported less social distancing but better respiratory hygiene than unemployed individuals did. Respondents with chronic health conditions reported more social distancing and mask wearing than those without such conditions did. Higher income was associated with more social distancing and mask wearing. The more strongly respondents supported President Trump's policies and actions, the less likely they were to report social distancing and mask wearing. These results suggest that interventions to encourage preventive behavior might be especially important among some demographic groups. See Table S4 in the Supplemental Material for details.

Discussion

Our correlational analyses show that (a) the perceived effectiveness of social distancing, respiratory hygiene, or mask wearing predicts the respective behavior strongly; (b) anxiety about COVID-19 and perceptions of descriptive social norms (that is, the belief that others are routinely engaging in the preventive behaviors) predict all three of these behaviors modestly; and (c) perceptions of increases in local cases predict these behaviors only weakly.

In addition, the perceived effectiveness of social distancing predicts the level of self-reported exposure, mediated by social distancing behaviors. The results suggest the possibility that perceived effectiveness of social distancing could lead to adherence to social distancing recommendations, which in turn could lower exposure and thereby reduce the spread of disease. However, because our study was correlational and did not examine the same group of people over time, it cannot establish causation. Experimental research that manipulates the perception of efficacy is required to confirm a causal pathway to behavior.

Implications for Policy

Our survey results indicate that the perceived effectiveness of a behavior that is meant to limit the spread of COVID-19 is strongly correlated with the performance of that behavior—which might indicate that policymakers should develop better strategies for conveying these behaviors' effectiveness. Policymakers may doubt that emphasizing efficacy will help greatly, because past research relating to influenza vaccines indicates that interventions aimed at educating people about vaccine effectiveness are not among the most successful.[11] And it is conceivable that our correlational result could be explained if people who are already engaging in preventive behavior feel obliged to rate those behaviors as effective. However, the past results relating to influenza vaccines may not be directly applicable to the current situation. In particular, people have not had time to develop entrenched beliefs about which preventive approaches to COVID-19 are most effective and to thoroughly weave these attitudes into their identities. This difference from past experience may mean that preventive behaviors targeted to COVID-19 can be influenced by informational interventions in ways that behaviors related to seasonal flu shots and other vaccines are not.

How policymakers can make use of our finding of a modest tie between anxiety about catching or spreading COVID-19 and compliance behavior may also be unclear, because previous research indicates that appeals based on fear can backfire when there are no clearly effective behavioral responses.[7,12] In the absence of an available response, increased fear triggers a defensive response or avoidance of the information. Relying on the power of social norms—emphasizing that social distancing, respiratory hygiene, and mask wearing have become common practice—might be a more promising strategy. Previous literature has demonstrated that social norm manipulations can indeed promote desired behaviors.[13]

Thus, although descriptive social norms were not the strongest predictor in our study, they may be one of the more fruitful areas for intervention in the current coronavirus pandemic. Our finding of a stronger role for norms in mask wearing than in social distancing may relate to mask wearing being publicly observable, whereas staying at home is not as noticeable to others.

Although no vaccine is yet available for COVID-19, research on the psychology of vaccination sheds light on interventions that have in the past been effective at inducing people to adopt behaviors meant to protect against infectious disease.[14] Some of the most successful interventions have harnessed social norms and promoted behaviors directly without trying to change beliefs (such as by giving reminders or spelling out requirements).[15] Our results parallel that literature in pointing to the role of social norms in influencing behavior. In line with this recommendation, a finalist for a public service announcement contest in New York State emphasizes how out of place a non-mask-wearer seems when in a large group of mask-wearers.[16]

Implications for Communication Strategies

Providing the public with accurate, understandable scientific information is essential in the face of a new health risk,[17,18] such as COVID-19. Beyond providing clear facts, messaging by public figures strongly influences how people perceive the effectiveness of preventative behaviors and the strength of social norms relating to those behaviors, as well as how much anxiety people experience about catching or spreading the disease. Public figures have such a powerful influence on public perceptions because individuals often cannot themselves judge the effectiveness of preventive measures; because people differ in their firsthand experiences with COVID-19; and because views on the effectiveness of social distancing, on social norms, and on the threat posed by the disease can differ greatly across neighborhoods, cities, and countries.[19] Given that perceptions of the effectiveness of preventive behaviors can be undermined easily by incorrect or conflicting information from official sources, it is crucial that political leaders and health authorities from the national level down to the community convey accurate, consistent messages. Thus, at a time when information is changing daily and the threat is unprecedented in most people's experience, it is critical for official messages to be aligned, to clearly reflect the effectiveness of preventive behaviors in reducing the virus's spread, and to reinforce the norms for adhering to these behaviors. For example, if all public health and political leaders deliver the message that wearing masks is necessary, that consistency will reinforce the social norm of mask wearing.

Conclusion

The perceived effectiveness of behaviors meant to limit the spread of COVID-19, anxiety about the pandemic, and perceived social norms are key correlates of self-reported adherence to the preventive behaviors of social distancing, practicing respiratory hygiene, and mask wearing. Health policy interventions that provide consistent, accurate information about the level of threat and the effectiveness of recommended behaviors and that highlight high levels of adherence as the norm may be essential to maintaining the preventive behaviors over the long term and to controlling waves of new infections.

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supplemental material

- http://behavioralpolicy.org/journal
- Methods & Analysis

references

1. Barry, J. M. (2020, March 17). The single most important lesson from the 1918 influenza. *The New York Times*. https://www.nytimes.com/2020/03/17/opinion/coronavirus-1918-spanish-flu.html
2. Srivastav, A., Santibanez, T. A., Lu, P. J., Stringer, M. C., Dever, J. A., Bostwick, M., Kurtz, M. S., Qualls, N. L., & . . . Williams, W. W. (2018). Preventive behaviors adults report using to avoid catching or spreading influenza, United States, 2015–16 influenza season. *PLOS ONE, 13*(3), Article e0195085. https://doi.org/10.1371/journal.pone.0195085
3. Ajzen, I. (2012). The theory of planned behavior. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 438–459). https://doi.org/10.4135/9781446249215.n22
4. Broomell, S. B., Budescu, D. V., & Por, H.-H. (2015). Personal experience with climate change predicts intentions to act. *Global Environmental Change, 32,* 67–73. https://doi.org/10.1016/j.gloenvcha.2015.03.001
5. Chapman, G. B., & Coups, E. J. (2006). Emotions and preventive health behavior: Worry, regret, and influenza vaccination. *Health Psychology, 25,* 82–90. https://doi.org/10.1037/0278-6133.25.1.82
6. Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, L. J., & Midgley, C. (1983). Expectancies, values and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75–146). Freeman.
7. Kok, G., Peters, G.-J. Y., Kessels, L. T. E., ten Hoor, G. A., & Ruiter, R. A. C. (2018). Ignoring theory and misinterpreting evidence: The false belief in fear appeals. *Health Psychology Review, 12,* 111–125. https://doi.org/10.1080/17437199.2017.1415767
8. Steinmetz, H., Knappstein, M., Ajzen, I., Schmidt, P., & Kabst, R. (2016). How effective are behavior change interventions based on the theory of planned behavior? A three-level meta-analysis. *Zeitschrift für Psychologie, 224,* 216–233. https://doi.org/10.1027/2151-2604/a000255
9. Carey, B. (2020, March 19). Complacency, not panic, is the real danger. *The New York Times*. https://www.nytimes.com/2020/03/19/health/coronavirus-panic-anxiety.html
10. Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.
11. Kaufman, J., Synnot, A., Ryan, R., Hill, S., Horey, D., Willis, N., Lin, V., & . . . Robinson, P. (2013). Face to face interventions for informing or educating parents about early childhood vaccination. *Cochrane Database of Systematic Reviews, 2013*(5). https://doi.org/10.1002/14651858.CD010038.pub2
12. Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27,* 591–615. https://doi.org/10.1177/109019810002700506
13. Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research, 35,* 472–482. https://doi.org/10.1086/586910
14. Brewer, N. T., Chapman, G. B., Rothman, A. J., Leask, J., & Kempe, A. (2017). Increasing vaccination: Putting psychological science into action. *Psychological Science in the Public Interest, 18*(3), 149–207. https://doi.org/10.1177/1529100618760521
15. Chapman, G. B. (2019). A decision-science approach to health-behavior change. *Current Directions in Psychological Science, 28,* 469–474. https://doi.org/10.1177/0963721419854102
16. Plastic Tree Productions. (2020, May 20). "That guy" [Public service announcement]. In NBC News, *Cuomo reveals finalists for public service announcement contest on mask wearing NBC News now* [Video file] (2:24–2:54). https://www.youtube.com/watch?v=Hi6W-hZyiNc
17. Downs, J. S. (2014). Prescriptive scientific narratives for communicating usable science. *Proceedings of the National Academy of Sciences, USA, 111,* 13627–13633. https://doi.org/10.1073/pnas.1317502111
18. Fischhoff, B., & Scheufele, D. A. (2013). The science of science communication. *Proceedings of the National Academy of Sciences, USA, 110*(Suppl. 3), 14031–14032. https://doi.org/10.1073/pnas.1902256116
19. Broomell, S. B. (2020). Global–local incompatibility: The misperception of reliability in judgment regarding global variables. *Cognitive Science, 44*(4), e12831. https://doi.org/10.1111/cogs.12831

finding

Nudges emphasizing social norms increased hospital visitors' hand sanitizer use

Hilde Mobekk & Laila Stokke

abstract

Hand hygiene has taken on new importance as a key behavior for limiting the spread of COVID-19. In the study reported here, we tested ways to increase hand sanitizer use by hospital visitors. We placed dispensers at entrances to hospital units and compared the effect of simply having the dispenser readily accessible (the control condition) with the effects of two nudges: combining the dispenser with an eye-catching sign emphasizing that hand sanitizer use is the norm ("Here we use HAND DISINFECTANT") or with the same sign except for the addition of an altruistic motive for the norm-emphasizing message ("Here we use HAND DISINFECTANT . . . to protect your relatives"). Both signs greatly improved compliance, although including the altruistic element did not significantly add to the impact of stating the norm. The results indicate that to improve hand hygiene, hospitals should go beyond locating hand sanitizer dispensers conveniently: they should make the dispensers more visible and stress that using hand sanitizer is the norm.

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In the mid-1800s, Ignaz Semmelweis issued simple advice for saving lives to physicians: wash your hands.[1] His admonition was reviled at the time, considered a personal insult by senior doctors who likely resented the implication that they were the cause of their patients' deaths.[1] Today, though, it is clear that hand hygiene is critical not only for health care workers but for anyone who wants to limit the spread of infectious diseases.

And yet compliance with hand-cleaning recommendations has long remained surprisingly low among health professionals and the public, as is demonstrated in part by the high numbers of health care–associated infections (HCAIs)—infections picked up in health care settings. HCAIs affect hundreds of millions of patients worldwide; in the United States alone, almost 100,000 people die of HCAIs every year.[2] Of course, HCAIs can be caused by many different factors related to systems and processes in health care and human behavior,[3] but most cases could be prevented if health care workers and others who entered hospitals followed standard hand hygiene recommendations.

The importance of hand hygiene—whether that involves hand washing or using a hand sanitizer—extends far beyond HCAIs and hospitals. As multidrug-resistant organisms and diseases with no known cure (such as COVID-19) become more common, the need for prevention, and particularly hand hygiene, becomes ever more urgent in all kinds of settings. In light of the urgency of controlling infections in hospitals, we focus in this article on hospitals and report on an experiment that compared the effectiveness of nudges meant to increase visitors' use of hand sanitizer.

Most studies on infection control and hand hygiene compliance in hospitals have, sensibly, concentrated on medical professionals because of the critical need for them to avoid spreading infections.[4,5] However—at least before hospitals began curtailing visitation in response to the COVID-19 pandemic—thousands of people entered hospitals to visit their ailing friends and relatives each day. Along with flowers, chocolates, and other gifts, they brought the potential for transmitting pathogenic microorganisms. One observational study involving multiple hospitals reported in 2019 that visitors and patients accounted for 15.4% of all entries and exits from patient rooms in the acute care setting.[6] Few studies, though, have examined hand hygiene in hospital visitors.[7]

Before undertaking our study, we understood that people can have plenty of reasons, both physical and mental, for not cleaning their hands. Among the barriers may be a lack of knowledge about the benefits of clean hands, overconfidence in the ability of one's immune system to fight off disease, inertia that overcomes good intentions (that is, the intention–behavior gap), or simply a lack of convenient access to soap and water or hand sanitizer. Indeed, a 2015 analysis of a large hospital in the United States showed that inconveniently located sinks and hand sanitizer dispensers contribute to low hand hygiene compliance in many hospitals and other health care institutions.[4] Often these items are placed behind doors or otherwise out of immediate sight.

Unfortunately, interventions to increase hand hygiene compliance (such as education campaigns and reminders) often show modest results that do not last,[8–10] so new methods are needed. In the behavioral sciences, behavior is framed as the interaction between individuals and their environments, which means that behavior can often be altered by making changes in the environment in which decision-making takes place.[11,12] Changing the context of decisions with a simple nudge may sway people toward making more advantageous choices.[13] With that knowledge in mind, we compared the effects of two nudges on visitors' use of hand sanitizer.

Methods

Specifically, we examined whether colored signs that emphasized hand sanitizer use as a social norm[14,15] could improve hospital visitors' hand hygiene. The study was conducted in Oslo University Hospital, Scandinavia's largest

hospital. Patients come from all over Norway to receive treatment there and then stay for the first critical days after surgery before being sent home or to their local hospital for further recovery. Our study is a systematic replication of an informally published hand hygiene field study conducted at Gentofte Hospital in Denmark.[16]

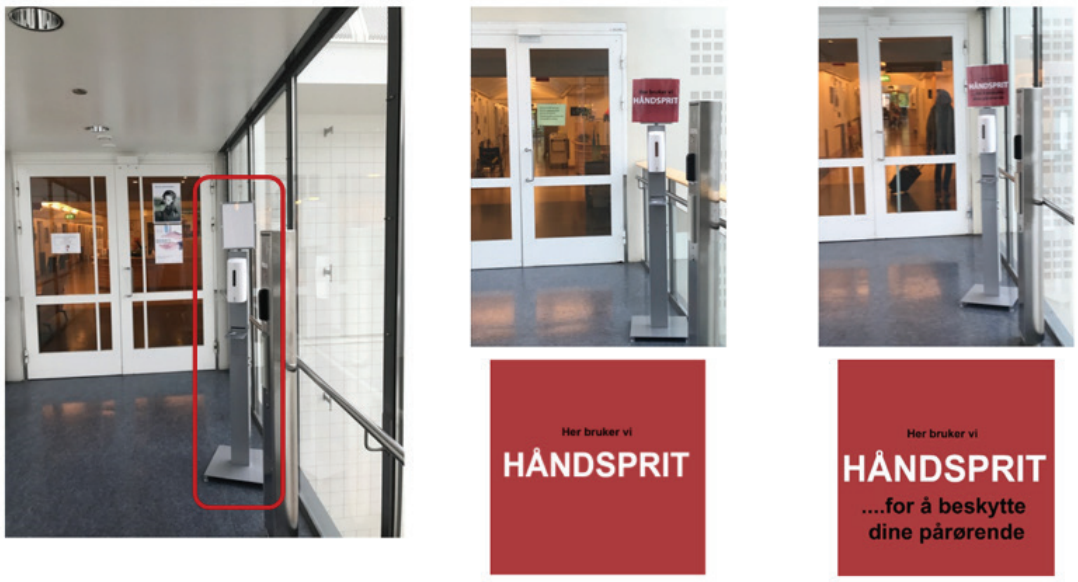
In the Gentofte Hospital study, the investigators used the status quo (often inaccessible dispensers) as the control condition and compared visitors' hand sanitizer use in that condition to (a) use when the dispensing device was placed at the entrance to a medical unit and (b) use when the new placement was combined with a red sign bearing a social-norm-emphasizing message that translates from Danish as "Here we use HAND DISINFECTANT . . . in order to protect your relative." The researchers recorded use or nonuse of the sanitizer in 90 encounters with the dispenser (30 observations in each condition). Three percent of visitors used hand sanitizer in the baseline condition, but 20% used it when the dispenser was placed more conveniently and 67% used it when the sign was displayed with the dispenser.[16]

As is shown in Figure 1, our design included

- a control condition, which involved accessible placement of a hand sanitizer dispenser at each hospital unit entrance;
- nudge 1, which involved adding a red sign with the message "Her bruker vi HÅNDSPRIT" (Here we use HAND DISINFECTANT) to a well-placed dispenser indicating that use of hand sanitizer is the norm at the hospital; and
- nudge 2, which was the same as nudge 1 but, as in the Danish study, the sign also offered an altruistic motive for using hand sanitizer: "Her bruker vi HÅNDSPRIT . . . for å beskytte dine pårørende" (Here we use HAND DISINFECTANT . . . to protect your relatives).

We chose to test the effect of adding signs to hand sanitizer dispensers because messages and social norms can both promote selected behaviors. We chose those particular messages—which we displayed on prominent signs measuring 29 × 29 centimeters—in part

Figure 1. The control condition & two nudges



Note. In the control condition (left), the hand sanitizer dispenser was placed in a convenient location. Nudge 1 (center) and nudge 2 (right) included that same convenient placement plus a red sign with Norwegian text that translates, respectively, as "Here we use HAND DISINFECTANT" and "Here we use HAND DISINFECTANT . . . to protect your relatives."

because the language "Here we use HAND DISINFECTANT" is forceful, simple, and in keeping with the egalitarian Scandinavian culture. We suspected that nudge 2 might be more effective than nudge 1 because it performed well in the Gentofte Hospital study and because some past evidence suggested that health and safety messages that highlight the consequences for others may be more effective than messages focusing only on the benefits for the recipient.[14]

Our study had a quasi-experimental design—"quasi" in that we could not randomly allocate participants to the conditions without letting them know the purpose of the study and thus potentially biasing their actions. We examined 300 episodes in which people made the choice to use or not use the disinfectant (100 choice episodes per condition). We included as participants every hospital visitor who entered a unit. We did not need informed consent or approval from a regional ethics committee because participants were observed in a public setting and no sensitive or publicly identifiable data were recorded. Trained observers unobtrusively recorded the number of visitors who used or did not use hand sanitizer. People wearing hospital uniforms were not included in the study; neither were patients. To avoid measuring the same visitors multiple times, we rotated the nudges used and the medical units observed over three weeks.

Before the study, Oslo University Hospital provided two freestanding automatic hand sanitizer dispensers that discharged a set amount of disinfectant when a hand was placed underneath them. Because the optimal placement of the devices would be as close to patients as possible (to reduce the risk of transmission of microorganisms), we determined that they should be located in front of the entrance to the care units. We tested different locations for the dispensers and ultimately decided to put them approximately two meters in front of the automatic doors that provide entrance to each treatment area, next to a pole that contained the mechanism for controlling the opening of the doors. The dispenser locations we chose also allowed the observers to stay out of sight of the hospital visitors being monitored yet afforded a clear view of the hand sanitizer dispensers. The observers wore hospital attire to enable them to blend into the background and avoid attracting attention from people in the corridors. (A second observer was present for 25% of the observations; the interrater reliability score was 96%.)

Before the study, we also considered different colors for the sign. Because strong colors tend to grab attention and would stand out in an otherwise neutral environment, we tested green, blue, and red. No color led to more sanitizer use than another, so we opted for red—the color the Danish researchers used successfully. Also, the color red is often used to indicate danger or to raise awareness, as with stop signs.

Results

The study involved a binary outcome: whether hand sanitizer was or was not used. In the control condition, 7% of the visitors used hand sanitizer. Nudge 1 (reminding people that hand sanitizer use is the norm) resulted in 46% of the visitors using hand sanitizer, compared with 40% for nudge 2 (which stated the norm and also said, "to protect your relatives"). See Figure 2.

We found that presenting one of the nudges resulted in a significant increase in hand sanitizer use over merely making the dispensers more accessible ($p < .05$). We further found that nudge 2 was no more effective than nudge 1 ($p > .05$). (See note A for more detailed data and note B for an explanation of the statistics used in this article.)

Discussion & Policy Implications

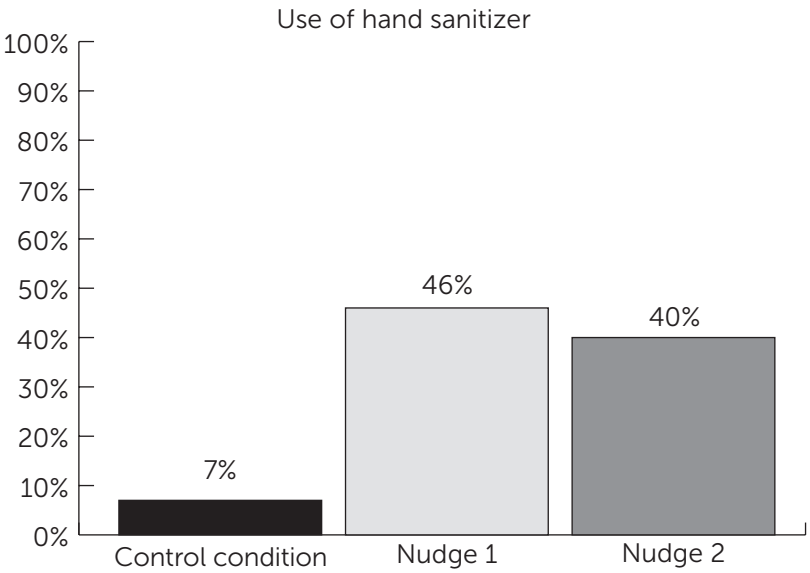
The COVID-19 pandemic has intensified the need for people to keep their hands clean. Practicing hand hygiene is one of the most straightforward, effective, and cost-effective behaviors for limiting the transmission of harmful germs and preventing illnesses.[17] Therefore, it is more important than ever to transform intention into action.

In this study, we tested two nudges—eye-catching signs that said hand sanitizing was the norm—to increase the use of hand sanitizer by hospital visitors. Our results suggest that using cost-effective and simple nudges is an effective way to increase hospital visitors' use of hand sanitizer. The interventions resulted in a quantitatively meaningful and statistically significant increase in hand hygiene compliance. No statistically significant difference existed between the intervention that simply stated the norm and the intervention that stated the norm and also offered an altruistic rationale for compliance. In an intriguing finding that did not reach statistical significance, more women than men used the hand sanitizer in response to the altruistic nudge; it would be interesting to explore this pattern further.

One limitation of the study is that, at times, visitors arrived in small groups; we cannot rule out the possibility that there was some contagion effect in these instances. More important, we did not test the effect of attaching a simple red sign to the dispenser as a control condition (such as a sign that merely labeled the dispenser "Hand Sanitizer" rather than stating a norm); this limitation should be addressed in future replications. Replication studies are also essential, of course, to increase confidence in the findings as well as in their reliability and validity. It is also possible that the wording of the signs might need to differ in different cultures; in some places, for instance, it might be more effective to indicate that some specific authority recommends hand sanitizer use.

Some differences between our results and those of the Gentofte Hospital study warrant discussion. Recall that our control condition is similar to the Gentofte Hospital placement nudge and that our nudge 2 is similar to the Gentofte Hospital placement + sign nudge (which included the message that hand sanitization protects the visitors' relatives). In both the Danish and the Norwegian hospitals, as in many other hospitals around the world, the hand sanitizers were typically located inside patient rooms and out of immediate reach. In our control condition (convenient placement), 7% of the visitors used hand disinfectant, whereas 20% of the visitors used it in response to convenient placement in the Gentofte Hospital study. Further, in the Gentofte Hospital study, the placement + sign condition had a compliance rate of 67% compared with 46% for our nudge 1 (which had no mention of relatives) and 40% for our nudge 2.

Figure 2. The percentage of visitors who used hand sanitizer in the control condition & in response to different nudges



The differences in the magnitude of the results between the two studies could be due to several factors, such as differences in competing stimuli in the surroundings, the number of observations, or cultural attitudes toward following rules. But the consistent bottom line of both studies is that it is possible to increase hand hygiene compliance among hospital visitors through thoughtful placement of dispensers and the use of readily visible signs. Indeed, the finding suggest that if hospitals want to increase hand sanitizer use, they should not only position dispensers conveniently but also increase the dispensers' visibility (such as with brightly colored signs) and stress that the use of the hand sanitizer is the norm.

The best health policies are based on scientific evidence, and policymakers can facilitate improved hand hygiene by promoting the instantiation of proven practices by architects,

contractors, and others who are involved in building hospitals and other institutions in which hand hygiene is of high importance. Our results are also particularly meaningful because they point to proposed interventions that are simple, low cost, and suitable for almost any physical location. What Semmelweis discovered more than 150 years ago still holds: simple interventions can be powerful, and the consequences of not using them can be dire.

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author note

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end notes

A. The data were analyzed using chi-square tests. When hand sanitizer use was compared for all three conditions, the results were $\chi^2(2, N = 300) = 41.23$, $p < .05$. Comparison of the effects of nudge 1 and nudge 2 yielded $\chi^2(1, N = 200) = 0.74$, $p > .05$.

B. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis.

references

1. Markel, H. (2015, May 15). *In 1850, Ignaz Semmelweis saved lives with three words: Wash your hands.* PBS. https://www.pbs.org/newshour/health/ignaz-semmelweis-doctor-prescribed-hand-washing
2. Klevens, R. M., Edwards, J. R., Richards, C. L., Jr., Horan, T. C., Gaynes, R. P., Pollock, D. A., & Cardo, D. M. (2007). Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Reports, 122,* 160–166. https://doi.org/10.1177/003335490712200205
3. Allegranzi, B., Nejad, S. B., Combescure, C., Graafmans, W., Attar, H., Donaldson, L., & Pittet, D. (2011). Burden of endemic health-care-associated infection in developing countries: Systematic review and meta-analysis. *The Lancet, 377,* 228–241. https://doi.org/10.1016/S0140-6736(10)61458-4
4. Cure, L., & Van Enk, R. (2015). Effect of hand sanitizer location on hand hygiene compliance. *American Journal of Infection Control, 43,* 917–921. https://doi.org/10.1016/j.ajic.2015.05.013
5. King, D., Vlaev, I., Everett-Thomas, R., Fitzpatrick, M., Darzi, A., & Birnbach, D. J. (2016). "Priming" hand hygiene compliance in clinical environments. *Health Psychology, 35,* 96–101. https://doi.org/10.1037/hea0000239
6. Arbogast, J. W., Moore, L., Clark, T., Wagner, P., Young, E., & Parker, A. E. (2019). Who goes in and out of patient rooms? An observational study of room entries and exits in the acute care setting. *American Journal of Infection Control, 47,* 585–587. https://doi.org/10.1016/j.ajic.2018.10.013
7. Birnbach, D. J., Nevo, I., Barnes, S., Everett-Thomas, R., Sanko, J. S., & Arheart, K. L. (2012). Do hospital visitors wash their hands? Assessing the use of alcohol-based hand sanitizer in a hospital lobby. *American Journal of Infection Control, 40,* 340–343. https://doi.org/10.1016/j.ajic.2011.05.006
8. Gould, D. J., Moralejo, D., Drey, N., Chudleigh, J. H., & Taljaard, M. (2017). Interventions to improve hand hygiene compliance in patient care. *Cochrane Database of Systematic Reviews, 2017*(9), 1–94. https://doi.org/10.1002/14651858.CD005186.pub4
9. Biran, A., Schmidt, W.-P., Wright, R., Jones, T., Seshadri, M., Isaac, P., Nathan, N. A., Hall, P., McKenna, J., Granger, S., Bidinger, P., & . . . Curtis, V. (2009). The effect of a soap promotion and hygiene education campaign on handwashing behaviour in rural India: A cluster randomised trial. *Tropical Medicine & International Health, 14,* 1303–1314. https://doi.org/10.1111/j.1365-3156.2009.02373.x
10. Nevo, I., Fitzpatrick, M., Everett-Thomas, R., Gluck, P. A., Lenchus, J. D., Arheart, K. L., & Birnbach, D. J. (2010). The efficacy of visual cues to improve hand hygiene compliance. *Simulation in Healthcare, 5,* 325–331. https://doi.org/10.1097/SIH.0b013e3181f69482
11. Hansen, P. G., & Jespersen, A. M. (2013). Nudge and the manipulation of choice: A framework for the responsible use of the nudge approach to behaviour change in public policy. *European Journal of Risk Regulation, 1,* 3–28. https://doi.org/10.1017/S1867299X00002762
12. Rachlin, H. (2015). Choice architecture: A review of *Why nudge: The politics of libertarian paternalism*. *Journal of the Experimental Analysis of Behavior, 104,* 198–203. https://doi.org/10.1002/jeab.163
13. Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness.* New York, NY: Penguin Books.
14. Grant, A. M., & Hofmann, D. A. (2011). It's not all about me: Motivating hand hygiene among health care professionals by focusing on patients. *Psychological Science, 22,* 1494–1499. https://doi.org/10.1177/0956797611419172
15. Judah, G., Aunger, R., Schmidt, W.-P., Michie, S., Granger, S., & Curtis, V. (2009). Experimental pretesting of hand-washing interventions in a natural setting. *American Journal of Public Health, 99*(Suppl. 2), S405–S411. https://doi.org/10.2105/AJPH.2009.164160
16. Aarestrup, S. C., Moesgaared, F., & Schuldt-Jensen, J. (2016). *Nudging hospital visitors' hand hygiene compliance.* iNudgeyou. https://inudgeyou.com/en/nudging-hospital-visitors-hand-hygiene-compliance/
17. World Health Organization. (2009). *Hand hygiene: Why, how & when?* https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf

review

Preserving employee trust during crisis

Nicole Gillespie, Rosalind Searle, Stefanie Gustafsson, & Veronica Hope Hailey

abstract

Employees' trust in their organization is vital during crises and disruption. It powerfully facilitates employees' ability to respond constructively to crises and change, and it underpins organizational agility and resilience. Yet it is during such episodes that trust is most threatened. During the COVID-19 pandemic, this conundrum has organizational leaders asking, How can we preserve employee trust in the face of the financial and other challenges posed by the outbreak? In this article, we synthesize and extrapolate from related research on trust to delineate the key practical actions that leaders can take to preserve trust. The research shows that during crises, employee trust can not only be preserved, it can even be enhanced.

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Employee trust is an important resource for organizations. Research shows that trust facilitates cooperation and effective coordination, strengthens employee commitment and effort, increases the quality of problem solving and knowledge sharing, and enhances innovation and performance.[1–4] Although trust is always important in organizations, it becomes particularly vital during crises and disruption. In times of change, trust powerfully facilitates the ability of employees at all levels of an organization to navigate through and respond constructively to disruptions, and it underpins the organization's ability to be agile and resilient.[5–8]

Yet it is during crises and disruption—when trust is most required—that it is also more likely to be lost. The COVID-19 pandemic is posing just such a threat. It is requiring organizational leaders and policymakers to make rapid, large-scale changes to both sustain organizational viability and maintain the flexibility and ability to later scale up and rapidly return to their core business once the pandemic passes. To ensure organizational survival, they are having to make tough and unpopular decisions, such as to cut pay and work hours and lay off workers temporarily or permanently. The uncertainty and unpredictability of the pandemic has jolted employees out of their familiar ways, including their habitual trust of their employers, and has heightened their sense of vulnerability.[9] In such a context, employees need and seek reassurance from their employer that their continued trust is deserved.

This response raises the very practical question that many leaders and policymakers are currently grappling with: How can employee trust be preserved during this time of crisis and disruption? We answer this question by drawing on decades of our own research on building, preserving, and repairing organizational trust in contexts of crises, disruption, and change,[10–16] as well as on the broader body of behavioral science research in this domain. With respect to our own work, we particularly extract lessons from recent research identifying the practices that during the global financial crisis of 2009 differentiated organizations that successfully preserved employee trust from those that lost trust.[9] From this rich and extensive evidence base, we extrapolate the key practical actions that leaders and managers can take to preserve employee trust during the COVID-19 crisis. These practices are summarized in the box *Practices for Preserving Employee Trust During Crises*.

How Do the Practices Preserve Trust?

Collectively, the practices we recommend shore up trust through two primary mechanisms. First, they reassure employees that the organization will continue to be trustworthy and behave predictably in how it responds to the crisis and treats its employees. Trustworthiness is a multifaceted concept comprising three key components: benevolence, integrity, and ability.[17,18] The practices we recommend address all three components to varying extents. Benevolence is demonstrated by putting people first and treating them with care and humanity throughout the crisis and in the course of any organizational changes it necessitates. Integrity is demonstrated by openly and honestly sharing information and living the organization's shared values. Ability is demonstrated by devising and implementing strategies for navigating the crisis effectively. When employees have confidence in the organization's benevolence, integrity, and ability, trust follows;[13] of the three components, benevolence is the most critical.[19]

Second, the practices reduce employees' perception of vulnerability by decreasing the uncertainty felt as a result of the crisis. This is accomplished by involving employees in decisions and changes that affect them, giving them a sense of control, and emphasizing the values and purpose of the organization and other familiar foundations of trust that already exist in the organization.[9] Involvement in decision-making and the transparency that accompanies it reassure employees that their organizations will not blindside them.

In the text that follows and in the box *Practices for Preserving Employee Trust During Crises*, we group practice recommendations into three

Practices for Preserving Employee Trust During Crises

Practice 1: Build a mental bridge to the future, founded on core values and purpose

- *Develop a shared understanding of how the organization will navigate the crisis.*
  - Communicate the organization's current situation and challenges.
  - Communicate the changes required to effectively navigate these challenges.
  - Explain why the changes are necessary and how they will lead to a positive future.
  - Explain how the changes will protect the organization's core values and purpose.
  - Clarify the collective priorities and how these will help navigate the crisis.
- *Communicate changes in a timely, open, honest, and respectful manner throughout the crisis.*
  - Be up-front and authentic about required changes and the likely effects on employees.
  - Create ample two-way communication opportunities for employee questions and concerns to be openly raised and discussed (such as by holding town halls and Q and A sessions).
  - Be transparent and share relevant information across all levels of the organization.
  - Plan communication messaging, timing, and channels to ensure consistency and minimize rumors.
  - Ensure senior leaders are accessible, visible, and active in delivering communications.
  - Create reliable and consistent communication structures (for instance, by giving frequent briefings about developments and changes).
- *Draw on and reinforce established foundations of trust throughout the crisis (for example, values and purpose).*
  - Identify and reinforce the organizational values, purpose, relationships, practices, structures, and processes that built and sustained employee trust before the crisis.
  - Serve as a role model of behavior that demonstrates organizational values.
  - Use symbols, stories, and language to reinforce and amplify values and purpose.
  - Draw on shared identities to build unity and solidarity during the crisis.

Overall result: Shift employee mindset from "the future is uncertain and unpredictable" to "I understand what is going on, how we are navigating this crisis, and how the changes will help protect our organization in the future."

Practice 2: Care for and support employees emotionally and practically

- *Demonstrate care and concern for employees.*
  - Acknowledge the difficulties and challenges that employees face (such as fear about future and anxiety about their job situation).
  - Prioritize the health and safety of employees and their families.
  - Listen to and address employee concerns and needs.
  - Promote and support collective efforts to help employees support one another.
- *Help employees to emotionally cope with the crisis.*
  - Create safe, supportive spaces, structures, and mechanisms that enable employees to work through difficult emotions (for instance, by taking the time for personal conversations).
  - Provide a variety of support mechanisms to help employees develop their coping capabilities, well-being, and mental health (such as employee assistance programs, well-being initiatives, and one-on-one or small group conversations).
- *Support line and middle managers in efforts to care for their direct reports.*
  - Ensure all employees—including managers—have a clear point of contact and support through the crisis.
  - Equip line and middle managers with the knowledge and tools to support their people.
  - Encourage line and middle managers to proactively and regularly connect with and support their direct reports, either virtually or face to face.
- *Protect jobs as much as possible.*
  - Develop and implement proactive strategies to protect jobs (such as collective cost cutting, partial pay cuts, and reduced work hours).
  - Redeploy employees as required to preserve jobs.
  - Create opportunities for skill development to support redeployment.

Overall result: Shift employee mindset from "I am feeling overwhelmed and worry I will lose my job" to "My employer cares and is supporting me though this difficult time and is doing everything it can to protect my job."

(continued)

Practices for Preserving Employee Trust During Crises *(continued)*

Practice 3: Empower employees and treat them fairly

- *Involve employees in changes and decisions that affect them.*
  - Consult employees on changes and decisions affecting them throughout the process.
  - Communicate the ways that employee concerns and contributions have been considered.
  - Give employees choices regarding changes that affect them, when possible.
- *Ensure changes and decisions are implemented fairly.*
  - Ensure that fair, transparent procedures and processes are used consistently when changes are implemented and decisions are made (such as when redeployment and job losses become necessary).
  - Communicate decisions that affect employees promptly and openly.
  - Fully explain how and why decisions were made.
  - When cuts and loss of benefits are required, show how these are fairly distributed across the organization, including across management levels.
  - Treat employees with respect and dignity at all times.
- *Clarify and recognize employee efforts and contributions to navigating the crisis.*
  - Clarify the work each group of employees needs to prioritize through the crisis.
  - Regularly acknowledge collective and individual efforts and contributions.
  - Recognize the challenges employees have worked through to meet goals.
  - Acknowledge and thank employees when milestones and achievements are met.

Overall result: Shift employee mindset from "I have no control over or input into what happens and worry about how I will be treated" to "I am treated fairly through the changes, have a say in decisions that affect me, and am playing a role in helping the organization navigate this crisis."

sets. Each set is meant to shift employees' mindsets from a sense of uncertainty and vulnerability to a greater sense of predictability and confidence in their employers' trustworthiness (in other words, it supports employees' belief in their employers' benevolence, integrity, and ability). We also illustrate our points with examples of practices that were used successfully in the financial crisis and with quotes from our case study research.[9]

Practice Set 1: Build a Mental Bridge to the Future, Founded on Core Values & Purpose

"There was a massive fear of the unknown."

"We didn't know how it was going to affect the individual, the team, and the branch itself. It was unknown territory."

"I felt quite vulnerable . . . I didn't know what was in the future."

"It was like dropping off a cliff."

The first set of practices figuratively builds a mental bridge for employees to walk over. The practices explain why the status quo of the past is no longer sustainable and present a path from the current crisis situation to a more secure future. Overall, they reduce vulnerability and uncertainty and demonstrate the organization's ability and integrity through developing a shared understanding of how the organization will navigate the crisis and through making it clear that the pathway will reinforce (rather than break from) the organization's core values and purpose. Building the mental bridge involves communicating openly and honestly with employees about how the present crisis is affecting the organization and the challenges it creates, about the changes and priorities that are required to overcome these challenges and to maintain the organization's viability, and about how these changes will reinforce and protect the organization's established values and purpose and lead to a more positive future.[9,13]

Achieving this shared understanding requires regular, meaningful, open, and authentic

two-way communication.[20] Communication channels and timing need to be actively planned and coordinated across the various parts of the organization to ensure their consistency and minimize inaccurate retellings and unhelpful rumors. Our research highlights the importance of treating all employees as adults and being up-front and honest about the likely impacts of the crisis and the associated changes rather than offering false reassurances or sugarcoating the situation. As one executive put it, "It's about being scrupulously honest with everything." When employees are well-informed and their expectations of their employer are managed through the provision of timely, transparent, and accurate information, they are more likely to trust their employer and accept and engage with organizational changes.[21–23] In contrast, poorly communicated changes can be perceived as a violation of trust and can lead to anger that exposes the organization to further risk, including sabotage or theft.[24–26]

Senior leaders' visibility and accessibility when communicating about the crisis and changes are also important.[11,13,14] Several of the organizations we studied in response to the 2009 financial crisis used town halls delivered by senior executives alongside leaders of local sites as vehicles for communicating the organization's response to the crisis and creating meaningful two-way communication. A senior manager of a large U.K. retailer that preserved trust during the global financial crisis described the communication strategy his organization used:

> We went on roadshows around the country. The managing director of every shop stood alongside a Board member and shared the vision and the interpretation of that vision for their shop of the business. It was a stark realization that if sales were going to be flat and costs continued to rise—he called it his pincer movement—that only one thing was going to happen to our profit. It really garnered the troops around the fact that we were going to have to face tough decisions, but there was an incredibly rational reason why.

This honest, personalized communication facilitated trust ("We trust the management because they are showing us hard, cold facts") and created a shared acceptance of the changes ("Everyone realized what needed to be done"). Although the COVID-19 pandemic has constrained face-to-face gatherings, these practices can be adapted to a virtual format, such as through video-conferencing tools and chat functions.

Central to reducing uncertainty is drawing on and reinforcing the familiar, established foundations of trust that already exist in the organization. These trust foundations are unique to each organization and include the values, purpose, relationships, practices, organizational structures, and processes that built and sustained employee trust before the crisis.[9] For example, in one government agency we studied, trust was founded strongly on principles of fairness, integrity, and professional respect. In a manufacturing business, employee trust was based on a unionized culture and the strong relationships between line managers, workers, and trade unions at the local plant level. These trust foundations highlight what the organization needs to protect and continue to do to preserve employees' trust.

Our research shows it is important for leaders to take the time to identify the unique foundations of trust in their organization and then make it clear that these foundations persist, reinforcing that message in their communications while planning for change, behaviors, and interactions during the crisis.[9] These actions help to bring familiar and trust-inducing concepts into the present uncertain context. For example, in the manufacturing business referred to in the previous paragraph, leaders recognized that good union relations were critical for employee trust and, hence, drew heavily on their established communication and consultation practices with the unions as they planned and implemented the changes. Values and shared purpose become important symbols that can galvanize and unify employees and provide hope and motivation during difficult times, thereby facilitating trust.[13] Having

top leaders serve as role models by acting according to these core values is particularly necessary during crises, setting the tone for how the wider organization should respond (for instance, in terms of how employees are cared for and respected).[9,13] Our research shows that leaders who saw themselves as protectors and stewards of the organization's core values and purpose during the crisis were most successful at preserving organizational trust.

In sum, these practices shift employees from feeling "the future is uncertain and unpredictable" to "I understand what is going on and how we will navigate the crisis in a way that helps protect our organization and what we stand for." The practices also powerfully demonstrate the organization's ability and integrity.

Practice 2: Care for & Support Employees Emotionally & Practically

"There was a great deal of nervousness and anxiety."

"*I was worrying for my job."*

"I felt quite vulnerable."

The second set of practices focuses on reducing vulnerability and demonstrating benevolence by caring for and supporting employees and helping them cope emotionally with the uncertainty and ambiguity of the crisis. This coping support includes assisting employees in working through emotions commonly triggered by crises, such as fear, anxiety, and vulnerability.[27] Such emotions can overwhelm and disrupt thinking[28] and threaten ongoing relationships.[29] Creating safe social environments and support mechanisms that make employees feel cared for and like their emotional needs take priority can help them to recognize and work through their fears and other feelings and develop their coping strategies and capabilities.[30,31]

Promoting managerial, peer, and collective efforts that demonstrate care and concern for one another is important for workplace resilience.[32] Grand gestures are not necessary. Instead, simple but authentic actions, such as acknowledging people's difficulties and challenges, being accessible to staff, and taking the time to regularly check in and ask how things are going are all important trust-inducing ways to provide support.[33] As one manager recounted, her "diary was just cleared" as affected employees became her priority over "every other appointment" during the crisis. Managers should be aware that individuals will vary widely in their experience of the crisis. For some employees, it will have a minimal, perhaps even a positive impact. For others, it will be hugely disruptive and transformative, changing their perceptions of and confidence in themselves, their relationships, and possibly their philosophy of life. For this latter group, it is important to recognize that longer term specialized support and assistance may be required.[28]

During a crisis, demonstrating that people and their health and well-being come first must be a priority. Line managers and middle managers are essential to supporting and caring for employees and are often tasked with the day-to-day implementation of changes relating to their people. They are the face of the organization for most employees, and their importance in preserving trust is likely to be magnified by the virtual work arrangements and limited social contact imposed by the COVID-19 pandemic. Conversely, line and middle managers who fail to support employees can undermine two-way communication and efforts to preserve trust.[34] More specifically, having trusted managers can enhance employees' sense of security, acceptance of change, and continuance of positive work behaviors.[2,35,36] That being the case, organizations must support and coach line and middle managers and encourage them to connect proactively and regularly with their direct reports. Aid to these leaders should include equipping them with the tools and knowledge they need to support their people effectively and also supporting the leaders in managing their own emotions and well-being during the crisis.[37]

Job security and employment conditions will rank high among employees' concerns. One of the strongest demonstrations of care and

support in a crisis, then, is protecting their jobs.[14] Work arrangements are often amended in response to crises, particularly work hours, rewards, and benefits. Organizational strategies and actions that prioritize the protection of jobs are of central importance to the preservation of trust.[9] Our research reveals that the organizations that best preserved trust implemented a range of strategies designed to minimize job losses, including across-the-board cost cutting, reductions in pay, reduced work hours, leave without pay, sabbaticals, and redeployment plans.

Investing in retraining employees and expanding skills during downturns is also a strong demonstration of support and offers the added benefit of strengthening the organization's postcrisis capabilities. One organization we studied preserved trust during the global financial crisis by introducing a retraining and redeployment program called Switch. "Switch," said one manager, "stands for 'staff, working, in, transition in change.' It's a strengths-based framework, assessing [employees'] strengths and moving them from a job that they are currently doing to a role that we need them to do in the future." This program was perceived by employees as "evidence that they do actually care" and "are doing the best they can for employees."

In sum, as a group, these practices can help employees shift from feeling overwhelmed, insecure, and alone in coping with the crisis to feeling reassured that their employer cares about and is supporting them and is doing everything possible to protect jobs. The practices particularly demonstrate the organization's benevolence.

Practice 3: Empower Employees & Treat Them Fairly

"We have a really consistent approach which means that everyone is treated fairly. . . that's really important in terms of trust."

The third set of practices aims to further reinforce employees' faith in the organization's integrity and benevolence and reduce feelings of vulnerability by consulting employees, involving them in decisions and changes that affect them, and treating them fairly. Empowerment and participation in decisionmaking powerfully support trust in times of disruption.[9,38,39] Such involvement can reduce vulnerability by giving employees a sense of control, and it enhances their engagement, well-being, and acceptance of changes.[7,40] Fostering two-way communication and gaining employees' input can also help in identifying and rectifying problems, oversights, and omissions in the planning and implementation of any changes. Recognizing each employee's unique needs and situation and giving them choices in decisions that affect their work arrangements and benefits help preserve trust.[9] For example, to avoid outright layoffs in response to the financial crisis, a U.K. law firm developed an innovative voluntary program called Flex that empowered employees to choose from a menu of work contract change options (such as reduced hours or taking a sabbatical). Over 95% of employees opted in and changed their contracts, with the organization subsequently receiving multiple prominent awards for this program.[14]

One of the most consistent findings in behavioral science research is the importance of fairness for building and preserving trust.[41,42] Organizations often face insidious choices in crises (such as layoffs versus pay reductions), and diligently ensuring that fair and transparent processes and procedures are consistently followed when making and implementing such decisions is critical to ongoing trust.[43] So is openly and transparently explaining how these decisions were made and how the pain of these decisions is collectively and fairly distributed across the organization. This openness further builds solidarity in the face of adversity by signaling "we are all in this together."[9] In contrast, perceived favoritism and self-serving decisions undermine the trust of layoff survivors and the ability of laid-off workers to trust subsequent employers,[44] fueling cynicism and disengagement.[45]

Authentically acknowledging the collective and individual efforts and contributions of employees throughout a crisis is important for trust, morale, and ongoing engagement.[9,14,46]

For example, the CEO of one of the United Kingdom's largest independent pharmacy chains personally handwrote notes thanking employees for their work. Such recognition leads employees to feel trusted and reinforces for them that their individual contributions are important to helping the organization navigate the crisis.

In sum, this third set of practices helps shift employees from a vulnerable to an empowered mindset and gives them confidence that they have a say in key decisions that affect them and that are being treated fairly. Meanwhile, the practices demonstrate organizational benevolence and integrity.

Conclusion

In contexts of crises and disruption, the preservation of employee trust in their organizations is vitally important to weathering the upheaval. Our research shows that employee trust can be not only preserved but even enhanced during times of crisis. However, preserving trust depends on organizational leaders and managers proactively and consistently engaging over time in the practices we have outlined in this article. Collectively, the practices offer a way for leaders to preserve trust by reducing employees' sense of uncertainty and vulnerability (that is, their perceived risk) and demonstrating the organization's trustworthiness in the response to the crisis.

The process of preserving trust is fraught with challenges, and leaders often make mistakes along the journey. However, by acting with authenticity, integrity, and humanity, leaders who diligently expend the effort to retain trust and stay true to organizational values and purpose through difficult times are likely to garner support and have errors forgiven. The silver lining to the hard work spent on preserving trust through a crisis is enhanced organizational agility and the resilience to navigate and bounce back from the crisis, as well as employees' trust in the organization's ability to respond to future crises.

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references

1. Dirks, K. T., & Ferrin, D. L. (2001). The role of trust in organizational settings. *Organization Science, 12,* 450–467.
2. Dirks, K. T., & Ferrin, D. L. (2002). Trust in leadership: Meta-analytic findings and implications for research and practice. *Journal of Applied Psychology, 87,* 611–628.
3. Fulmer, C. A., & Gelfand, M. J. (2012). At what level (and in whom) we trust: Trust across multiple organizational levels. *Journal of Management, 38,* 1167–1230.
4. De Jong, B. A., Dirks, K. T., & Gillespie, N. (2016). Trust and team performance: A meta-analysis of main effects, moderators, and covariates. *Journal of Applied Psychology, 101,* 1134–1150.
5. Balogun, J., Hope Hailey, V., & Gustafsson, S. (2015). *Exploring strategic change* (4th ed.). Pearson Education.
6. McLain, D. L., & Hackman, K. (1999). Trust, risk, and decision-making in organizational change. *Public Administration Quarterly, 23,* 152–176.
7. Mishra, A. K., & Spreitzer, G. M. (1998). Explaining how survivors respond to downsizing: The roles of trust, empowerment, justice and work redesign. *Academy of Management Review, 23,* 567–588.
8. Oreg, S., Bartunek, J. M., Lee, G., & Do, B. (2018). An affect-based model of recipients' responses to organizational change events. *Academy of Management Review, 43,* 65–86.
9. Gustafsson, S., Gillespie, N. A., Searle, R., Hope Hailey, V., & Dietz, G. (2020). Preserving organizational trust during disruption. *Organization Studies.* Advance online publication. https://doi.org/10.1177/0170840620912705
10. Gillespie, N., Dietz, G., & Lockey, S. (2014). Organizational reintegration and trust repair after an integrity violation: A case study. *Business Ethics Quarterly, 24,* 371–410.
11. Dietz, G., & Gillespie, N. (2011). *Building and repairing organizational trust*. Institute of Business Ethics.
12. Dietz, G., & Gillespie, N. (2012). *The recovery of trust: Case studies of organizational failures and successful trust repair.* Institute of Business Ethics.
13. Gillespie, N., & Dietz, G. (2009). Trust repair after an organization-level failure. *Academy of Management Review, 34,* 127–145.
14. Hope-Hailey, V., Searle, R., & Dietz, G. (with Abbotson, S., Robinson, V., McCartney, C., & Wright, B.). (2012). *Where has all the trust gone? Stewardship, leadership and governance.* Chartered Institute of Personnel and Development.
15. Weibel, A., Den Hartog, D., Gillespie, N., Searle, R., Six, F., & Skinner, D. (2016). How do controls impact employee trust in the employer? *Human Resource Management, 55,* 437–462.
16. Searle, R., Den Hartog, D., Weibel, A., Gillespie, N., Six, F., Hatzakis, T., & Skinner, D. (2011). Trust in the employer: The role of high involvement work practices and procedural justice in European organisations. *International Journal of Human Resource Management, 22,* 1068–1091.
17. Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review, 20,* 709–734.
18. Colquitt, J. A., Scott, B. A., & LePine, J. A. (2007). Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology, 92,* 909–927.
19. Snow, S. (2020, April 27). The common approach to earning trust completely backfires on leaders. *Forbes.* https://www.forbes.com/sites/shanesnow/2020/04/27/this-common-approach-to-earning-trust-completely-backfires-on-leaders/#47f8735f2fcb
20. Vosse, B. J. F., & Aliyu, O. A. (2018). Determinants of employee trust during organisational change in higher institutions. *Journal of Organizational Change Management, 31,* 1105–1118. https://doi.org/10.1108/JOCM-05-2017-0203
21. van den Heuvel, S., Schalk, R., Freese, C., & Timmerman, V. (2016). What's in it for me? A managerial perspective on the influence of the psychological contract on attitude towards change. *Journal of Organizational Change Management, 29,* 263–292. https://doi.org/10.1108/JOCM-06-2015-0100
22. van den Heuvel, S., Schalk, R., & van Assen, M. A. L. M. (2015). Does a well-informed employee have a more positive attitude toward change? The mediating role of psychological contract fulfillment, trust, and perceived need for change. *The Journal of Applied Behavioral Science, 51,* 401–422. https://doi.org/10.1177/0021886315569507
23. Yue, C. A., Men, L. R., & Ferguson, M. A. (2019). Bridging transformational leadership, transparent communication, and employee openness to change: The mediating role of trust. *Public Relations Review, 45,* Article 101779. https://doi.org/10.1016/j.pubrev.2019.04.012
24. Griep, Y., & Vantilborgh, T. (2018). Let's get cynical about this! Recursive relationships between psychological contract breach and counterproductive work behaviour. *Journal of Occupational and Organizational Psychology, 91,* 421–429. https://doi.org/10.1111/joop.12201
25. Griep, Y., & Vantilborgh, T. (2018). Reciprocal effects of psychological contract breach on counterproductive and organizational citizenship behaviors: The role of time. *Journal of Vocational Behavior, 104,* 141–153. https://doi.org/10.1016/j.jvb.2017.10.013
26. Searle, R. H., & Rice, C. (2018). *Assessing and mitigating the impact of organisational change on counterproductive work behaviour: An operational (dis)trust based framework.* Centre for Research and Evidence on Security Threats. https://crestresearch.ac.uk/projects/counterproductive-work-behaviour
27. Barclay, L. J., & Kiefer, T. (2017). In the aftermath of unfair events: Understanding the differential effects of anxiety and anger. *Journal of Management, 45,* 1802–1829. https://doi.org/10.1177/0149206317739107
28. Maitlis, S. (2020). Posttraumatic growth at work. *Annual Review of Organizational Psychology and Organizational Behavior, 7,* 395–419. https://doi.org/10.1146/annurev-orgpsych-012119-044932
29. Barclay, L. J., & Kiefer, T. (2014). Approach or avoid? Exploring overall justice and the differential effects of positive and negative emotions. *Journal of Management, 40,* 1857–1898. https://doi.org/10.1177/0149206312441833
30. Sloan, P., & Oliver, D. (2013). Building trust in multi-stakeholder partnerships: Critical emotional incidents and practices of engagement. *Organization Studies, 34,* 1835–1868.
31. Williams, M. (2007). Building genuine trust through interpersonal emotion management: A threat regulation model of trust and collaboration across boundaries. *Academy of Management Review, 32,* 595–621.
32. Olekalns, M., Caza, B. B., & Vogus, T. J. (2020). Gradual drifts, abrupt shocks: From relationship fractures to relational resilience. *Academy of Management Annals, 14,* 1–28. https://doi.org/10.5465/annals.2017.0111

33. Agote, L., Aramburu, N., & Lines, R. (2015). Authentic leadership perception, trust in the leader, and followers' emotions in organizational change processes. *The Journal of Applied Behavioral Science, 52,* 35–63. https://doi.org/10.1177/0021886315617531

34. Farndale, E., Van Ruiten, J., Kelliher, C., & Hope-Hailey, V. (2011). The influence of perceived employee voice on organizational commitment: An exchange perspective. *Human Resource Management, 50,* 113–129. https://doi.org/10.1002/hrm.20404

35. Neves, P., & Caetano, A. (2009). Commitment to change: Contributions to trust in the supervisor and work outcomes. *Group & Organization Management, 34,* 623–644. https://doi.org/10.1177/1059601109350980

36. Nohe, C., & Michaelis, B. (2016). Team OCB, leader charisma, and organizational change: A multilevel study. *The Leadership Quarterly, 27,* 883–895. https://doi.org/10.1016/j.leaqua.2016.05.006

37. Thakur, R. R., & Srivastava, S. (2018). From resistance to readiness: The role of mediating variables. *Journal of Organizational Change Management, 31,* 230–247. https://doi.org/10.1108/JOCM-06-2017-0237

38. Gillespie, N., & Mann, L. (2004). Transformational leadership and shared values: The building blocks of trust. *Journal of Managerial Psychology, 19,* 588–607.

39. Holland, P., Cooper, B., Pyman, A., & Teicher, J. (2012). Trust in management: The role of employee voice arrangements and perceived managerial opposition to unions. *Human Resource Management Journal, 22,* 377–391.

40. Kiefer, T., Hartley, J., Conway, N., & Briner, R. B. (2015). Feeling the squeeze: Public employees' experiences of cutback- and innovation-related organizational changes following a national announcement of budget reductions. *Journal of Public Administration Research and Theory, 25,* 1279–1305. https://doi.org/10.1093/jopart/muu042

41. Colquitt, J. A., LePine, J. A., Piccolo, R. F., Zaphata, C. P., & Rich, B. L. (2012). Explaining the justice–performance relationship: Trust as exchange deepener or trust as uncertainty reducer? *Journal of Applied Psychology, 97,* 1–15.

42. Aryee, S., Budhwar, P. S., & Chen, Z. X. (2002). Trust as a mediator of the relationship between organizational justice and work outcomes: Test of a social exchange model. *Journal of Organizational Behavior, 23,* 267–285.

43. Spreitzer, G. M., & Mishra, A. K. (2002). To stay or to go: Voluntary survivor turnover following an organizational downsizing. *Journal of Organizational Behavior, 23,* 707–729. https://doi.org/10.1002/job.166

44. Pugh, S. D., Skarlicki, D. P., & Passell, B. S. (2003). After the fall: Layoff victims' trust and cynicism in re-employment. *Journal of Occupational and Organizational Psychology, 76,* 201–212.

45. Searle, R. H., & Ball, K. S. (2004). The development of trust and distrust in a merger. *Journal of Managerial Psychology, 19,* 708–721.

46. van der Werff, L., Legood, A., Buckley, F., Weibel, A., & de Cremer, D. (2019). Trust motivation: The self-regulatory processes underlying trust decisions. *Organizational Psychology Review, 9,* 99–123. https://doi.org/10.1177/2041386619873616

proposal

Softening the blow: Incorporating employee perceptions of justice into best practices for layoffs during the COVID-19 pandemic

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abstract

COVID-19 has led to staggering numbers of people being laid off or furloughed. The way these decisions are communicated to employees can critically affect how workers receive and process the news. Specifically, if employees perceive layoff decisions as unfair, both those who are let go and those who remain may suffer untoward mental and physical effects from the layoffs, and these effects, in turn, can have negative consequences for the organization (such as reputational damage). In this article, we draw on prior research into perceptions of justice—including distributive justice (focused on how resources and burdens are allocated), procedural justice (focused on how decisions are made and implemented), and interactional justice (focused on how decisions are communicated)—to offer behaviorally based policy recommendations that organizational leaders and managers can apply to buffer some of the negative effects that layoff decisions can have on both employees and organizations.

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Since the COVID-19 crisis took hold in the United States, more than 40 million workers have filed for unemployment, the largest escalation in jobless claims since the Department of Labor began tracking the data in 1967.[1] Many behemoth organizations, including Disney, Macy's, Marriott International, and Boeing, have furloughed or laid off unprecedented numbers of employees.[2] How they broke the news to employees has varied dramatically. For example, Bird, the electric scooter company, laid off 406 workers (30% of its employees) in a two-minute Zoom webinar via a reportedly "robotic-sounding, disembodied voice"[3,4]—leading popular press outlets to highlight its insensitivity. In contrast, when Airbnb laid off nearly 25% of its workforce, the CEO not only wrote a candid letter to employees about the layoff decision process, he also created an alumni talent directory, which contained laid-off employees' job application materials (such as resumes and exemplar work) and tasked Airbnb recruiters with helping laid-off employees pursue new employment.[5]

The ways that organizations convey job-loss decisions can strongly affect how employees receive and process the decisions. Research suggests that when employees perceive that they have been treated justly, they fare better in coping with job losses; the perception of fairness can also help to maintain the morale of the employees who remain behind and buttress the functioning and reputation of the organization as a whole. At a time when downsizing might be unavoidable, it is critical that organizations adopt just and evidence-based practices for laying off and furloughing employees. In this article, we offer justice-oriented, behaviorally based policy recommendations for the organizational representatives who have to make and communicate downsizing decisions during the COVID-19 pandemic.

The Psychological Science of Layoffs

When an economic downturn forces organizational authorities to lay off employees, the event will inevitably be seriously stressful, even traumatic, for the affected employees (the layoff *victims*). After all, jobs are central to people's financial well-being and psychological identities.[6] Dismissed employees often suffer declines in their mental and physical health[7,8] and, on reemployment, report greater job insecurity, distrust of the employer, cynicism, and intentions to leave.[9,10]

The layoff victims are certainly the worst off in these scenarios, but others—including the layoff *agents* (the individuals who plan for or carry out the downsizing), the layoff *survivors* (the workers who do not lose their jobs), and those on temporary furlough—may also experience negative outcomes related to the layoff decisions. The layoff agents often feel distress and sorrow and may cope by emotionally, physically, and cognitively distancing themselves from the layoff task itself and from the layoff victims.[11–13] For instance, they may avoid empathizing with the layoff victims, limit the time spent in the layoff discussions, and reframe the layoffs in their own minds as a normal part of the work world rather than as a tragedy for the individuals being let go. Layoff survivors, for their part, contend with heightened *job insecurity*—worry over whether their job will persist in the future—which can make them vulnerable to declines in mental and physical health, as well as to decreased job satisfaction, performance, and commitment to the organization.[14] Furloughs ideally prevent mass layoffs, yet the possibility of returning to work eventually does not prevent furloughed employees from feeling insecure about their job and income prospects, nor does it protect them from feeling heightened stress, distrust, and anger over a violation of the *psychological contract*—the assumption that in exchange for diligent work, an employer will continue one's employment.[15] These feelings can cause lasting negative ramifications for life satisfaction, burnout, and the ability to cope with work demands that interfere with home life (and vice versa).[16]

Organizations themselves can also experience negative outcomes related to layoff decisions—among them, diminished financial performance,[17,18] impaired corporate reputation,[19] and decreased customer satisfaction.[20] Announcements of mass layoffs can elicit

strong negative reactions from investors and harm downstream perceptions of firms' trustworthiness and integrity.[21]

Although employees are not the only ones who experience negative consequences from layoffs and furloughs, their mental and physical well-being should certainly be a priority for layoff agents when downsizing appears unavoidable. In the next section, we expand on why attending to employees' perceptions of justice is an important part of that effort and spell out what those perceptions entail. We speak primarily of layoffs, but most of the recommendations also relate to the just handling of furloughs.

Why Justice Perceptions Are Important During Layoffs

People's perception of whether they have been treated justly is subjective—it depends on whether they consider the processes and outcomes surrounding a decision to be fair.[22] These fairness perceptions result from conscious or unconscious considerations of three different kinds of justice: distributive, procedural, and interactional. In the context of layoffs, distributive justice relates to how resources and burdens are allocated; people want the outcomes they experience to be commensurate with the amount of time, effort, and other resources they have invested in something, and they want their outcome-to-input ratio to be similar to others' ratios.[23] Procedural justice is concerned with how decisions are made or implemented; often, employees perceive a decision as procedurally unfair if they do not feel that they that have had a voice in the process (such as if they have not had the opportunity to provide feedback) or if they are not provided with an adequate explanation for why a decision was made. Interactional justice is concerned with how employees feel that they are treated during the decision process and after the decision has been made.

Research has demonstrated the importance of each of these types of justice in how people respond to layoff decisions. If organizations are intentional about providing support and resources to their laid-off employees (distributive justice), delivering layoff decisions in a transparent and logical manner (procedural justice), and demonstrating concern for the employees' dignity and well-being (interactional justice), they can significantly buffer the negative effects of layoffs on the emotional responses and organizational commitment of both employees who are let go and those who remain.[24–31]

Managerial & Organizational Takeaways

Drawing on the principles of justice, we offer managers and organizations the following recommendations.

Before the Layoffs

- Organizational leadership should consider all other options before turning to layoffs and make sure that employees know that they are doing so. Such options can include having CEOs and other organizational leaders forgo or significantly reduce their salaries during the pandemic[2] and using other strategies to distribute the financial burdens—for example, reduced hours, job sharing, bonus freezes, unpaid leave, paused retirement fund contributions, and reduced vacation days.[32]

- If possible, ask employees for their ideas on how to cut costs; this action may be most practical for small business owners. Organizational leaders may feel wary of this approach, worrying that contemplating all the proposals will be overwhelming; however, crowdsourcing approaches can allow employees to feel as if they have a voice in the process and may spark innovative solutions. When asking employees for ideas, be clear about how leadership plans to choose among the suggestions, such as by favoring lower risk approaches that have been proven to cut costs or suggestions that offer the best chances for saving jobs.[32] The final options can even be presented to the employees so that they can indicate their preferences.

- If layoffs become inevitable, leadership should be as transparent as possible, informing employees of roughly when the

layoffs will begin and giving them a reasonable span of time to absorb the information. Although organizational leaders may not know whether they will have to resort to layoffs, providing honest and regular updates will help workers feel more prepared for the bad news if it comes.

- Before layoff conversations begin, decide who will deliver the news to employees and when these conversations will occur. Although the conversations are difficult, it is best for direct supervisors to hold them, rather than external consultants. These conversations should be private, one-on-one discussions, not held in a group. Although leaders may find it easier to conduct a group video call, employees will appreciate being treated with respect and having the opportunity to ask questions.

- Those who will deliver the layoff decision to employees should be clear on what information will be communicated and how much detail will be shared, so that different employees do not receive disparate messages. The layoff agents should also know the answers to common questions, such as the timing of the employees' last paycheck, what benefits to expect, how much severance will be paid,[33] and what resources and support will be offered (for example, whether there will be outplacement services and well-being resources). Organizational leadership should host a meeting or training session for those delivering these decisions, to ensure that everyone is on the same page.

- Before any layoff conversations are held, leadership should send an organization-wide message to bring all employees up to speed on the situation. Organizations can follow the lead of the CEOs of Airbnb and Yelp, who sent out messages to their employees discussing how their organizations came to the decision to lay off employees, their reduction process, the benefits and resources that would be available to laid-off employees, and exactly when and how layoff conversations would occur.[34,35]

During the Layoff Conversation

- Those who deliver layoff decisions should ensure that they are in a space that allows them to give these conversations their full attention. For instance, if these layoff agents are working from home, they should warn family members to not bother them at the times when the conversations will be held. It is not always feasible to create a distraction-free environment; however, out of respect for the employees being laid off, it is important to minimize as many distractions as possible.

- Be clear and concise, so employees are not left confused by unnecessary ambiguity. Explain the decision process surrounding the employee's layoff and communicate clear next steps (for instance, when their last day is, whether they can expect to be hired back at a later date, when and how they should return any company property or retrieve their belongings from the office, how the company will support them moving forward, and to whom they can reach out if they have questions or concerns). During the COVID-19 pandemic, organizations may be uncertain about many details, such as whether they will be able to rehire laid-off employees. Even then, those delivering layoff decisions should be as transparent as possible, such as by specifying how they will keep laid-off employees updated if future job opportunities arise. In addition, having a script and practicing beforehand can help ensure that employees are given all of the information they need to know.

- Acknowledge the difficulty of being laid off during this time and of potentially not being able to say goodbye to colleagues in person. Those delivering layoff decisions should convey that they and the organization are very grateful for the employee's work and contributions and still care for them. Give employees an opportunity to respond and ask questions.

- At the organizational level, company leaders should ensure that laid-off employees are provided with support and resources, such as severance pay and outplacement services. As an example, Airbnb provided laid-off employees with at least 14 weeks of base pay, one year of health insurance, four months of mental health support, an alumni talent directory and placement team, career services through RiseSmart, and company laptops.[35] Many other companies—among them Under Armour, Caesars Entertainment, Marriott, and Macy's—have provided, for varying lengths of time, health benefits for furloughed or laid-off employees.[36] If organizations do not have the economic ability to provide continued benefits and supports, they can give laid-off employees a list of external resources. Managers can also offer to write letters of recommendation or reach out to others in their personal networks to see if they are hiring.

After the Layoffs

- Check in with the layoff survivors. They will likely be feeling a strong mix of emotions (such as sadness, gratitude, and guilt for still having their jobs),[14] as well as continuing uncertainty about the future.

- Managers can conduct one-on-one check-ins, and organizational leaders should continue to send regular updates and messages to demonstrate care for the layoff survivors. Leadership can also hold an open forum to discuss any remaining employee concerns; such forums demonstrate a continued interest in the employees' well-being and effort to provide transparency.

Conclusion

The COVID-19 pandemic has caused dramatic lifestyle, economic, psychological, and behavioral changes globally. Unfortunately, the changes include a widespread economic recession that has resulted in organizations having to furlough and lay off employees in unprecedented numbers. We suggest that managers and organizations leverage principles of distributive, procedural, and interactional justice—treating employees equitably and communicating layoff decisions clearly and compassionately. By enacting these policy suggestions, managers will improve the ability of the layoff and furlough victims, the remaining employees, and the broader organization to function and recover in the wake of this devastating pandemic.

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references

1. U.S. Department of Labor. (2020, May 28). *Unemployment insurance weekly claims report.* Retrieved May 2020, from https://www.dol.gov/ui/data.pdf
2. Borden, T., & Akhtar, A. (2020, May 28). The coronavirus outbreak has triggered unprecedented mass layoffs and furloughs. Here are the major companies that have announced they are downsizing their workforces. *Business Insider.* Retrieved June 14, 2020, from https://www.businessinsider.com/coronavirus-layoffs-furloughs-hospitality-service-travel-unemployment-2020
3. Sapra, B. (2020, April 2). Bird employees say they were locked out of their email and Slack accounts as they were told their jobs were gone. *Business Insider.* https://www.businessinsider.com/bird-employees-locked-out-of-emails-layoffs-2020-4
4. Bergman, B. (2020, April 6). "It felt like a Black Mirror episode": The inside account of how Bird laid off 406 people in two minutes via a Zoom webinar. *dot.LA.* https://dot.la/bird-layoffs-meeting-story-2645612465.html
5. Tiku, N. (2020, May 15). Airbnb creates a new listing: Its laid-off workers. *Washington Post.* https://www.washingtonpost.com/technology/2020/05/15/airbnb-layoffs-tech/
6. Richter, M., König, C. J., Geiger, M., Schieren, S., Lothschütz, J., & Zobel, Y. (2018). "Just a little respect": Effects of a layoff agent's actions on employees' reactions to a dismissal notification meeting. *Journal of Business Ethics, 153,* 741–761. https://doi.org/10.1007/s10551-016-3372-7
7. McKee-Ryan, F., Song, Z., Wanberg, C. R., & Kinicki, A. J. (2005). Psychological and physical well-being during unemployment: A meta-analytic study. *Journal of Applied Psychology, 90,* 53–76.
8. Paul, K. I., & Moser, K. (2009). Unemployment impairs mental health: Meta-analyses. *Journal of Vocational Behavior, 74,* 264–282.
9. Moore, S., Grunberg, L., & Greenberg, E. (2004). Repeated downsizing contact: The effects of similar and dissimilar layoff experiences on work and well-being outcomes. *Journal of Occupational Health Psychology, 9,* 247–257.
10. Pugh, S. D., Skarlicki, D. P., & Passell, B. S. (2003). After the fall: Layoff victims' trust and cynicism in re-employment. *Journal of Occupational and Organizational Psychology, 76,* 201–212.
11. Clair, J. A., & Dufresne, R. L. (2004). Playing the grim reaper: How employees experience carrying out a downsizing. *Human Relations, 57,* 1597–1625.
12. DeWitt, R., Trevino, L., & Mollica, K. (2003). Stuck in the middle: A control-based model of managers' reactions to their subordinates' layoffs. *Journal of Managerial Issues, 15,* 32–49.
13. Folger, R., & Skarlicki, D. P. (1998). When tough times make tough bosses: Managerial distancing as a function of layoff blame. *Academy of Management Journal, 41,* 79–87.
14. Sverke, M., Hellgren, J., & Näswall, K. (2002). No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology, 7,* 242–264. https://doi.org/10.1037/1076-8998.7.3.242
15. Bellairs, T., Halbesleben, J. R., & Leon, M. R. (2014). A multilevel model of strategic human resource implications of employee furloughs. *Research in Personnel and Human Resources Management, 32,* 99–146.
16. Baranik, L. E., Cheung, J. H., Sinclair, R. R., & Lance, C. E. (2019). What happens when employees are furloughed? A resource loss perspective. *Journal of Career Development, 46,* 381–394. https://doi.org/10.1177/0894845318763880
17. De Meuse, K. P., Bergmann, T. J., Vanderheide, P. A., & Roraff, C. E. (2004). New evidence regarding organizational downsizing and a firm's financial performance: A long-term analysis. *Journal of Managerial Issues, 16,* 155–177.
18. Guthrie, J. P., & Datta, D. K. (2008). Dumb and dumber: The impact of downsizing on firm performance as moderated by industry conditions. *Organization Science, 19,* 108–123.
19. Love, E. G., & Kraatz, M. (2009). Character, conformity, or the bottom line? How and why downsizing affected corporate reputation. *Academy of Management Journal, 52,* 314–335.
20. Habel, J., & Klarmann, M. (2014). Mass layoffs: When and how do they affect customer satisfaction? In A. Geyer-Schulz & L. Meyer-Waarden (Eds.), *Customer & service systems* (pp. 55–58). KIT Scientific.
21. Worrell, D. L., Davidson, W. N., & Sharma, V. M. (1991). Layoff announcements and stockholder wealth. *Academy of Management Journal, 34*(3), 662–678. https://doi.org/10.5465/256410
22. Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology, 86,* 425–445. https://doi.org/10.1037/0021-9010.86.3.425
23. Adams, J. S. (1965). Inequity in social exchange. In B. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp. 267–299). Academic Press.
24. Blau, G., Petrucci, T., & McClendon, J. (2012). Effects of layoff victims' justice reactions and emotional responses on attitudes toward their previous employer. *Career Development International, 17,* 500–517. https://doi.org/10.1108/13620431211280105
25. van Dierendonck, D., & Jacobs, G. (2012). Survivors and victims, a meta-analytical review of fairness and organizational commitment after downsizing. *British Journal of Management, 23,* 96–109. https://doi.org/10.1111/j.1467-8551.2010.00724.x
26. Levanthal, G. S. (1980). What should be done with equity theory? In K. J. Gergen, M. S. Greenberg, & R. G. Willis (Eds.), *Social exchange: Advances in theory and research* (pp. 27–55). Plenum Press.
27. Barclay, L. J., Skarlicki, D. P., & Pugh, S. D. (2005). Exploring the role of emotions in injustice perceptions and retaliation. *Journal of Applied Psychology, 90,* 629–643. https://doi.org/10.1037/0021-9010.90.4.629
28. Brockner, J., DeWitt, R. L., Grover, S., & Reed, T. (1990). When it is especially important to explain why: Factors affecting the relationship between managers' explanations of a layoff and survivors' reactions to the layoff. *Journal of Experimental Social Psychology, 26,* 389–407. https://doi.org/10.1016/0022-1031(90)90065-T
29. Konovsky, M. A., & Folger, R. (1991). The effects of procedures, social accounts, and benefits level on victims' layoff reactions. *Journal of Applied Social Psychology, 21,* 630–650. https://doi.org/10.1111/j.1559-1816.1991.tb00540.x

30. Skarlicki, D. P., Ellard, J. H., & Kelln, B. R. C. (1998). Third-party perceptions of a layoff: Procedural, derogation, and retributive aspects of justice. *Journal of Applied Psychology, 83,* 119–127. https://doi.org/10.1037/0021-9010.83.1.119

31. Naumann, S. E., Bennett, N., Bies, R. J., & Martin, C. (1998). Laid off, but still loyal: The influence of perceived justice and organizational support. *International Journal of Conflict Management, 9,* 356–368. https://doi.org/10.1108/eb022815

32. Tarki, A., Levy, P., & Weiss, J. (2020, March 20). The coronavirus crisis doesn't have to lead to layoffs. *Harvard Business Review.* https://hbr.org/2020/03/the-coronavirus-crisis-doesnt-have-to-lead-to-layoffs

33. Peppercorn, S. (2020, March 31). 7 questions to raise immediately after you're laid off. *Harvard Business Review.* https://hbr.org/2020/03/7-questions-to-raise-immediately-after-youre-laid-off

34. Stoppelman, J. (2020, April 9). Planning for Yelp's future [Blog post]. *Yelp Official Blog.* https://blog.yelp.com/2020/04/planning-for-yelps-future

35. Chesky, B. (2020, May 5). A message from co-founder and CEO Brian Chesky. *Airbnb.* https://news.airbnb.com/a-message-from-co-founder-and-ceo-brian-chesky/

36. 24/7 Wall St. Staff. (2020, April 25). These 21 prominent US businesses are among those temporarily laying off the most people. *USA Today.* https://www.usatoday.com/story/money/2020/04/25/21-american-businesses-temporarily-laying-off-the-most-people/111592432/

proposal

The coronavirus & work–life inequality: Three evidence-based initiatives to update U.S. work–life employment policies

Ellen Ernst Kossek & Kyung-Hee Lee

abstract

The coronavirus crisis has illuminated how poorly the United States compares with other major industrialized nations in providing workers across all industries equal access to paid sick and family leave, employee-requested flexible scheduling, and reasonable work hours. Many essential workers in frontline jobs (such as those in health care, food services, and public safety) have been unable to access benefits that support work–life balance and that play a critical role in helping employees manage job stress and protect their health. At the same time, many nonessential workers (disproportionately women) who can telecommute to prevent exposure have been left juggling a demanding job while also caring for children, elders, or others at home. We propose three evidence-based national initiatives that would improve U.S. work–life policy: ensure employees have access to and the ability to use paid sick leave and family leave, mandate that employers create emergency backup staffing infrastructures, and give employees the right to request flexible and reasonable work hours. These work–life policies are based on principles of balanced flexibility that benefit employers, employees, and society as a whole.

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The COVID-19 pandemic[1] has led to many policy debates centered on mitigating economic loss and containing the public health contagion. However, national policy on the work–life balance of U.S. workers, which has been hugely affected by the pandemic, remains underexamined. In this article, we highlight work–life inequalities that the pandemic has exposed across job types in the United States and between the United States and economically similar nations, and we share research on three evidence-based work–life policies that support both organizational productivity and employee well-being.

COVID-19 Work–Life Impacts on Essential & Nonessential Workers

In spring 2020, the rapid spread of the novel coronavirus and the severity and lethality of the disease it causes prompted most U.S. states to institute a period of mandatory stay-at-home orders.[2] Employees whose jobs permitted telecommuting worked from home. It is estimated that before the pandemic, about 29% of the U.S. population could do some or all of their work remotely—including one in two employees in technology jobs and one in 20 service-sector employees.[3] Since the pandemic began, this figure has expanded to a majority of the workforce (62%),[4] and some major companies (such as Facebook and Google) have announced that remote work will continue through 2020 or beyond.[5] The pandemic has closed day care operations and schools, so employees with children have had the added burden of managing childcare and overseeing schoolwork during normal work hours. Employees who had relied on elder care in-home services or adult day care centers to help with aged family members or dependents have had to provide care themselves. The burdens of childcare and elder care have fallen disproportionately on female telecommuters.[6]

Some 49 million to 62 million employees work in occupations labeled "essential" by the U.S. Department of Homeland Security,[7] often in customer-facing jobs[8] in industries such as public safety, health care, and food retail and manufacturing.[9] These frontline workers frequently have a harder time than other workers when juggling work and home responsibilities, for several reasons. They usually do not have the option to work from home even if they need to tend to children and adults whose schools or care centers are closed. National labor statistics show[10] that many essential workers have heavy family demands in addition to their stressful occupations,[11] yet they often hold low-paid hourly jobs and have few supports for work–life balance.[12] Specifically, these essential jobs may not offer paid sick leave, flexible scheduling, or ways to limit excessive work hours.[13] What is more, research suggests that many essential workers risk backlash from their employers for requesting individualized work–life accommodations, particularly those who are in equal employment opportunity–protected groups.[14] The number of people in that category is large, as women and minorities are overrepresented in occupations that are classified as essential: 75% of hospital workers are women, and 50% of people who work in food manufacturing and 40% who work in grocery stores are Black, Asian, or Hispanic.[15]

Pandemic Highlights Opportunities to Close U.S. Work–Life Policy Gaps

Although the COVID-19 pandemic has not created the work–life imbalance problem in the United States, it has made the difficulties highly visible and exacerbated them, particularly for essential workers, and it has highlighted how poorly this country compares with other nations on this issue.[16] The United States currently lags behind nearly all major industrialized countries in adopting national work–life policies that research has shown to improve worker health and the quality of both work life and family life.[17] Instead, the nation relies on a patchwork system of voluntary employer or labor-negotiated policies that govern work–life benefits such as paid sick leave and family leave, backup staffing, and flexible scheduling. Large companies are more likely to offer these benefits than smaller ones, but even large companies exclude many essential or lower level jobs from eligibility for such benefits.[18] (See note A.) Here, we examine

three work–life policies that, if implemented, would enable pandemic readiness and match evidence-based best practices. These policies are national paid sick leave and family leave, a mandate to have an emergency backup staffing infrastructure, and the right of employees to request flexible and reasonable work schedules.

Three Recommended Evidence-Based U.S. Work–Life Public Policy Initiatives

National Paid Sick Leave & Family Leave

National studies show that when employees are sick, those without paid sick leave, as compared with employees with paid sick leave, are less likely to seek medical care, more likely to go to work while ill, and more likely to experience workplace injuries.[19–21] Conversely, employees who have paid sick leave are 40% more likely to be vaccinated against contagious diseases than are those without the benefit.[22] These trends have tremendous implications for the spread of contagious diseases to coworkers, customers, and others. It is estimated that during the 2009–2010 H1N1 flu pandemic, infected employees who went to work infected 7 million people and caused 1,500 deaths.[23]

Paid sick leave actually prevents productivity losses from absenteeism—because employees take care of new or chronic health issues before they become more serious and lead to longer absences—and from presenteeism—that is, being at work but not functioning fully because of health problems.[24] On the basis of 2007–2014 data from the Medical Expenditure Panel Survey, it is estimated that, overall, paid sick leave could have saved employers $63 million to $1.88 billion between 2007 and 2014 by reducing absences that were due to influenza-like illnesses.[25] The American Productivity Audit of 28,902 employees estimates that employers lose an average of 1.32 weekly hours per employee because of chronic health conditions, translating into $225.8 billion in annual losses.[26]

Family leave, which enables workers to take short employment breaks with job security, is another way to give employees the ability to handle child and elder care demands and family illnesses while still remaining connected to the labor force. Beyond helping employees, this policy can benefit the U.S. economy by reducing the number of people who lose their jobs and have to draw on public assistance and the number of people (often female caregivers) who drop out of the labor market because of family demands and thus end up reducing their Social Security contributions. A majority of workers, regardless of whether they are married or have children, will manage care for family members sometime during their careers. Caregiving demands have become particularly challenging during the pandemic, but even before it began, the policies in place gave only about one-fifth of the U.S. workforce access to some amount of paid family leave.[27] In states that offer paid family leave (see note B), studies have found improvements in productivity or profitability for employers, particularly when the duration of the leave is less than one year.[28] Most family leaves provide employees with partial wage replacement (50%–70% of earnings) for up to 12 weeks to care for a new child (biological, adopted, or fostered) or a sick family member (parent, child, spouse, or registered domestic partner). Leave programs are funded through employee contributions, and sometimes employers also contribute, as they do for unemployment or temporary disability insurance.

Data from California were examined to identify pre- and post-leave effects on employers from 2000 to 2014; they showed lower employee turnover rates, an outcome that reduces labor costs for employers.[28] Researchers conducting another California study estimated that seven to 12 months after a child's birth, women's participation in the workforce was 15%–20% higher than it would have been without the program.[29] Similarly, other studies using data from California and New Jersey have found that women who used paid leave for a short duration returned to work sooner than did women who had to take leave with no pay.[30]

Family leave benefits employees in multiple ways. New mothers were less likely to live in poverty in the year after their child's birth once

California's leave program began.[30,31] Paid leave also lengthens the time that mothers breastfeed[32] and aids their ability to arrange for childcare.[33] The United States can learn from countries that have a longer history of paid family leave. When Iceland implemented paid family leave, which includes incentives for men to use it, the country reported improvements in gender pay equality and parity in staying in the labor market.[34] A Norwegian study analyzed historical data and found benefits for children as well—high school dropout rates were 2%–3% lower and earnings at age 30 years were 5%–7% higher after the country's four-week paid maternity leave was introduced.[35]

Emergency Backup Staffing as Flexibility Infrastructure

Many essential industries, such as hospitals, nursing homes, prisons, food manufacturers, and grocery stores, are at risk of and have experienced COVID-19 outbreaks. This increased exposure has serious health consequences for the most vulnerable in society: as of May 2020, 42% of U.S. coronavirus deaths were in nursing homes or assisted-living facilities.[36] When organizations do not have adequate backup staffing options, workers may have their requests to take time off to care for themselves or their families denied; they are thus more likely to work when sick and to expose others to contagious illnesses in their workplaces. To avert worker shortages, employers can institutionalize backup or emergency staffing—for instance, by having a rotating on-call system of trained, certified workers who can fill in when needs arise. Such infrastructure systems help to compensate for an understaffed workforce during disease outbreaks, weather emergencies, or school closures while maintaining productivity and critical work–life supports.[37]

Multiple studies have found that health care understaffing, particularly in nursing, is linked to turnover,[38] job dissatisfaction,[39] fatigue,[40] and burnout in employees, and it correlates with poor patient care, including serious infections[41,42] and missed medical treatments.[42–44] One large study found that reducing burnout in nurses by 30% could lower patient-infection rates and save hospitals up to $68 million a year.[42] A nursing home study found that improving work–life flexibility with sufficient staffing resulted in less burnout (specifically, less emotional exhaustion), which was correlated with lower patient-infection rates (an indicator of the quality of care).[45]

In retail stores, such as grocery stores that employ essential workers, understaffing harms service quality, which is linked to both lower customer satisfaction[46] and lower job satisfaction,[47] and decreases profitability.[48] A study involving 41 retail stores across 17 states estimated that those that were understaffed during peak periods experienced an 8.56% loss in sales, on average.[49]

Legal Right to Request Flexible Reasonable Work Schedules

Research shows that when employees have some flexibility and control over when and where they work, they are less likely to experience burnout and to have childcare or health problems; employee turnover decreases as well.[50] In light of these documented benefits, several countries, including the United Kingdom, Sweden, Denmark, Germany, and Australia, have legally protected workers' rights to request flexible work arrangements.[51,52] Flexible work schedule policies were initiated to address childcare responsibilities and gave employees the right to request changes in when they work (flextime), how many hours they work (flexload), and where they work (flexplace).[53] Employers are obligated to formally respond to these requests, indicating whether the changes can be accommodated and the specific grounds for any refusals, such as cost or customer demands.[54]

Multiple studies involving small, medium, and large employers have shown that such policies enhance employees' desire to work at companies that offer them.[53] When first adopted, the U.K. law focused on workers with children who were under 6 years of age or who were disabled and at home. A 2008 study found that employers would save £22 million annually from reduced turnover and absenteeism and would enjoy increased profitability if the law

were expanded to include employees with children up to age 16 years;[55,56] since then, the law granting the right to request flexible working has been expanded multiple times and now applies to most U.K. employees regardless of whether they have children at home.[57]

The U.K. government also funds a recurring Work–Life Balance Employee Survey. In 2012, reported survey results identified the three most frequently requested types of job flexibility: flextime, telework, and part-time or reduced hours.[55] Nearly half of employees using flexible work options reported no negative consequences, and most reported benefits of more time with family, improved work–life balance, and better childcare arrangements.[55] Another U.K. study using longitudinal household data from 2009 to 2014 found that women who were able to telework after childbirth were more likely to stay with their employer and work full time.[58]

In Australia, the Fair Work Act has set limits on work hours to protect worker health (including on overtime hours, which employers may request but employees are not required to accept).[59] Yet in the United States, up to one-fourth of employees, including many in essential jobs, may be required to work overtime, with no right of refusal,[60] and no federal guideline delineates maximum weekly hours. Working long hours can have adverse effects on employee health, with such outcomes as hypertension,[61] chronic infections,[40] and depression.[62] Working overtime also increases injury risk: a U.S. study of over 10,000 workers found that individuals working overtime were 61% more likely to get injured.[63]

Conclusion

The United States could face serious negative health and economic consequences and a shortage of essential workers if national lawmakers do not establish policies to support work–life balance in the workplace.[13] Work–life benefits are not consistently available across jobs and employee demographic groups, and lack of access to them has become a form of job inequality—one that has been exacerbated by the COVID-19 pandemic. American workers in different industries face unequal access to policies that support work–life balance, leaving too many of them facing the consequences of chronic work–life stress, which can affect health, mental health, and job satisfaction. Because women are overrepresented in essential industries and given that even those who are able to telework are likely to handle more of the family caregiving and household demands while working than men are, the lack of national work–life balance legislation may halt the progress that was made in gender equality before the pandemic.[65]

Research suggests that job inequality can be mitigated through policies based on principles of "balanced flexibility," in which both employers and employees are engaged in decisionmaking and both work and nonwork demands are considered.[66] The societal problem of how to balance company and worker needs for managing work hours and leave is growing into a health problem for the nation's workforce and the U.S. economy. Responding to the work–life needs of U.S workers and their families has generally relied on the largesse of individual employers, and work–life policies have often been culturally viewed as an individual problem and not a U.S. public health and economic issue. Yet on the basis of a large body of research, we argue that national work–life employment policies in the United States should be updated to include paid sick leave and family leave, mandated employer emergency backup staffing plans, and the right of workers to request flexible schedules and reasonable work hours. Such innovations would protect the well-being of workers and their families while also boosting productivity and public health. In addition, these work–life policy initiatives would bring U.S. employment and occupational health policies up to the level of other major industrialized countries. These policies would be a huge help in mitigating the employment stresses of both essential and nonessential workers during the coronavirus pandemic and would better prepare the nation for the next crisis.

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endnotes

A. Although the Families First Coronavirus Response Act provided several weeks of full or partial pay to quarantined workers or workers with children whose schools were closed,[67] most essential workers were unable to access those federal funds and lacked access to other paid sick leave or family leave benefits.[68]

B. At the time of this article's publication, only California, New Jersey, Rhode Island, New York, Oregon, Connecticut, and Washington, DC, require paid family leave, and not all of them protect the jobs from being lost while employees are taking the leave.[69,70]

references

1. World Health Organization. (2020, June 29). *Rolling updates on coronavirus disease (COVID-19).* Retrieved July 6, 2020, from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen
2. Kaiser Family Foundation. (2020, April 17). *State data and policy actions to address coronavirus.* Retrieved April 17, 2020, from https://www.kff.org/health-costs/issue-brief/state-data-and-policy-actions-to-address-coronavirus/#socialdistancing
3. U.S. Bureau of Labor Statistics. (2019, September 24). *Table 1. Workers who could work at home, did work at home, and were paid for work at home, by selected characteristics, averages for the period 2017–2018* [Press release]. https://www.bls.gov/news.release/flex2.t01.htm
4. Brenan, M. (2020, April 3). *U.S. workers discovering affinity for remote work.* Gallup. https://news.gallup.com/poll/306695/workers-discovering-affinity-remote-work.aspx
5. BBC. (2020, May 8). Facebook and Google extend working from home to end of year. Retrieved from https://www.bbc.com/news/business-52570714
6. Bhanoo, S. (2020, March 23). Pandemic forces family members into new role: Caregivers for elderly loved ones. *The Washington Post*. https://www.washingtonpost.com/lifestyle/wellness/family-caregivers-seniors-coronavirus/2020/03/23/f7b3f9f4-6c99-11ea-a3ec-70d7479d83f0_story.html
7. Tomer, A., & Kane, J. W. (2020, March 31). *How to protect essential workers during COVID-19.* Brookings Institution. https://www.brookings.edu/research/how-to-protect-essential-workers-during-covid-19/
8. Gostin, L. O., & Wiley, L. F. (2020, April 2). Government public health powers during the COVID-19 pandemic: Stay-at-home orders, business closures, and travel restrictions. *JAMA, 323,* 2137–2138. https://doi.org/10.1001/jama.2020.5460
9. Cybersecurity & Infrastructure Security Agency. (2020, April 17). *Guidance on the essential critical infrastructure workforce: Ensuring community and national resilience in COVID-19 response* (Version 3.0). https://www.cisa.gov/sites/default/files/publications/Version_3.0_CISA_Guidance_on_Essential_Critical_Infrastructure_Workers_1.pdf
10. O*Net. (n.d.). *O*NET online.* https://www.onetonline.org/
11. Kossek, E. E., & Perrigino, M. B. (2016). Resilience: A review using a grounded integrative occupational approach. *Academy of Management Annals, 10,* 729–797. https://doi.org/10.1080/19416520.2016.1159878
12. Ingraham, C. (2020, April 6). Why many 'essential' workers get paid so little, according to experts. *The Washington Post.* https://www.washingtonpost.com/2020/04/06/why-do-so-many-essential-workers-get-paid-so-little-heres-what-economists-have-say/
13. Kossek, E. E., & Lautsch, B. A. (2018). Work–life flexibility for whom? Occupational status and work–life inequality in upper, middle, and lower level jobs. *Academy of Management Annals, 12,* 5–36. https://doi.org/10.5465/annals.2016.0059
14. Perrigino, M. B., Dunford, B. B., & Wilson, K. S. (2018). Work–family backlash: The "dark side" of work–life balance (WLB) policies. *Academy of Management Annals, 12,* 600–630. https://doi.org/10.5465/annals.2016.0077
15. U.S. Bureau of Labor Statistics. (2020, January 22). *Household data annual averages: 18. Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity* [Table]. https://www.bls.gov/cps/cpsaat18.htm
16. U.S. Bureau of Labor Statistics. (2019). *National Compensation Survey: Employee benefits in the United States, March 2019* (Bulletin 2791). https://www.bls.gov/ncs/ebs/benefits/2019/employee-benefits-in-the-united-states-march-2019.pdf
17. Kossek, E., & Ollier-Malaterre, A. (2013). Work-family policies: Linking national contexts, organizational practice and people for multi-level change. In S. Poelmans, J. Greenhaus, & M. Las Heras (Eds.), *New frontiers in work-family research: A vision for the future in a global world* (pp. 1–53). Palgrave Macmillan.
18. Kossek, E., & Distelberg, B. (2009). Work and family employment policy for a transformed work force: Trends and themes. In N. Crouter & A. Booth (Eds.), *Work–life policies* (pp. 1–51). Urban Institute Press.
19. DeRigne, L., Stoddard-Dare, P., & Quinn, L. (2016). Workers without paid sick leave less likely to take time off for illness or injury compared to those with paid sick leave. *Health Affairs, 35,* 520–527. https://doi.org/10.1377/hlthaff.2015.0965
20. Peipins, L. A., Soman, A., Berkowitz, Z., & White, M. C. (2012). The lack of paid sick leave as a barrier to cancer screening and medical care-seeking: Results from the National Health Interview Survey. *BMC Public Health, 12,* Article 520. https://doi.org/10.1186/1471-2458-12-520
21. Asfaw, A., Pana-Cryan, R., & Rosa, R. (2012). Paid sick leave and nonfatal occupational injuries. *American Journal of Public Health, 102,* e59–e64. https://doi.org/10.2105/AJPH.2011.300482
22. Wilson, F. A., Wang, Y., & Stimpson, J. P. (2014). Universal paid leave increases influenza vaccinations among employees in the U.S. *Vaccine, 32,* 2441–2445. https://doi.org/10.1016/j.vaccine.2014.02.084
23. American Public Health Association. (2013). *Support for paid sick leave and family leave policies* (Policy No. 20136). https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/16/11/05/support-for-paid-sick-leave-and-family-leave-policies
24. Hemp, P. (2004). Presenteeism: At work—but out of it. *Harvard Business Review, 82*(10), 49–58.
25. Asfaw, A., Rosa, R., & Pana-Cryan, R. (2017). Potential economic benefits of paid sick leave in reducing absenteeism related to the spread of influenza-like illness. *Journal of Occupational and Environmental Medicine, 59,* 822–829. https://doi.org/10.1097/JOM.0000000000001076
26. Stewart, W. F., Ricci, J. A., Chee, E., & Morganstein, D. (2003). Lost productive work time costs from health conditions in the United States: Results from the American Productivity Audit. *Journal of Occupational and Environmental Medicine, 45,* 1234–1246. https://doi.org/10.1097/01.jom.0000099999.27348.78
27. U.S. Bureau of Labor Statistics. (2019, February 26). *What data does the BLS publish on family leave?* https://www.bls.gov/ncs/ebs/factsheet/family-leave-benefits-fact-sheet.htm
28. Rossin-Slater, M. (2017). *Maternity and family leave policy* (NBER Working Paper 23069). National Bureau of Economic Research.

29. Baum, C. L., II, & Ruhm, C. J. (2016). The effects of paid family leave in California on labor market outcomes. *Journal of Policy Analysis and Management, 35,* 333–356. https://doi.org/10.1002/pam.21894

30. Byker, T. S. (2016). Paid parental leave laws in the United States: Does short-duration leave affect women's labor-force attachment? *The American Economic Review, 106,* 242–246. https://doi.org/10.1257/aer.p20161118

31. Stanczyk, A. B. (2016). *Paid family leave may reduce poverty following a birth: Evidence from California*. University of Chicago, The Employment Instability, Family Well-Being, and Social Policy Network.

32. Democratic Staff of the Joint Economic Committee. (n.d.). *The economic benefits of paid leave: Fact sheet.* Retrieved from https://www.jec.senate.gov/public/_cache/files/646d2340-dcd4-4614-ada9-be5b1c3f445c/jec-fact-sheet---economic-benefits-of-paid-leave.pdf

33. Appelbaum, E., & Milkman, R. (2011). *Leaves that pay: Employer and worker experiences with paid family leave in California*. Center for Economic and Policy Research.

34. Focus Consultancy. (2008). *The parental leave system in Iceland.* European Commission. https://ec.europa.eu/social/BlobServlet?docId=2265&langId=en

35. Carneiro, P., Løken, K. V., & Salvanes, K. G. (2015). A flying start? Maternity leave benefits and long-run outcomes of children. *Journal of Political Economy, 123,* 365–412. https://doi.org/10.1086/679627

36. Roy, A. (2020, May 26). The most important coronavirus statistic: 42% of deaths are from 0.6% of the population. *Forbes.* https://www.forbes.com/sites/theapothecary/2020/05/26/nursing-homes-assisted-living-facilities-0-6-of-the-u-s-population-43-of-u-s-COVID-19-deaths/#fcba66b74cdb

37. United States Postal Service, Office of the Inspector General. (2015). *Flexibility at work: Human resource strategies to help the postal service* (Report No. RARC-WP-15-004). https://www.uspsoig.gov/sites/default/files/document-library-files/2015/rarc-wp-15-004_flexibility_at_work-_human_resource_strategies_0.pdf

38. Rafferty, A. M., Ball, J., & Aiken, L. H. (2001). Are teamwork and professional autonomy compatible, and do they result in improved hospital care? *Quality in Health Care, 10,* ii32–ii37.

39. MacPhee, M., Dahinten, V. S., & Havaei, F. (2017). The impact of heavy perceived nurse workloads on patient and nurse outcomes. *Administrative Sciences*, *7*(1), Article 7. https://doi.org/10.3390/admsci7010007

40. Mohren, D. C. L., Swaen, G. M. H., Kant, I. J., Borm, P. J. A., & Galama, J. M. D. (2001). Associations between infections and fatigue in a Dutch working population: Results of the Maastricht Cohort Study on Fatigue at Work. *European Journal of Epidemiology, 17,* 1081–1087. https://doi.org/10.1023/A:1021270924291

41. Columbia School of Nursing. (2019, August 5). *Columbia nursing study finds link between health care associated infections and nurse understaffing.* https://www.nursing.columbia.edu/news/columbia-nursing-study-finds-link-between-health-care-associated-infections-and-nurse

42. Cimiotti, J. P., Aiken, L. H., Sloane, D. M., & Wu, E. S. (2012). Nurse staffing, burnout, and health care–associated infection. *American Journal of Infection Control, 40,* 486–490. https://doi.org/10.1016/j.ajic.2012.02.029

43. Metcalf, A. Y., Wang, Y., & Habermann, M. (2018). Hospital unit understaffing and missed treatments: Primary evidence. *Management Decision, 56,* 2273–2286. https://doi.org/10.1108/MD-09-2017-0908

44. Twigg, D. E., Gelder, L., & Myers, H. (2015). The impact of understaffed shifts on nurse-sensitive outcomes. *Journal of Advanced Nursing, 71,* 1564–1572. https://doi.org/10.1111/jan.12616

45. Kossek, E. E., Rosokha, L. M., & Leana, C. (2019). Work schedule patching in health care: Exploring implementation approaches. *Work and Occupations, 47,* 228–261. https://doi.org/10.1177/0730888419841101

46. Oliva, R., & Sterman, J. D. (2001). Cutting corners and working overtime: Quality erosion in the service industry. *Management Science, 47,* 894–914. https://doi.org/10.1287/mnsc.47.7.894.9807

47. Loveman, G. W. (1998). Employee satisfaction, customer loyalty, and financial performance: An empirical examination of the service profit chain in retail banking. *Journal of Service Research, 1,* 18–31. https://doi.org/10.1177/109467059800100103

48. Maxham, J. G., III, Netemeyer, R. G., & Lichtenstein, D. R. (2008). The retail value chain: Linking employee perceptions to employee performance, customer evaluations, and store performance. *Marketing Science, 27,* 147–167. https://doi.org/10.1287/mksc.1070.0282

49. Mani, V., Kesavan, S., & Swaminathan, J. M. (2015). Estimating the impact of understaffing on sales and profitability in retail stores. *Production & Operations Management, 24,* 201–218. https://doi.org/10.1111/poms.12237

50. Society for Human Resource Management Foundation. (2014). *Leveraging workplace flexibility for engagement and productivity.* Retrieved from https://www.shrm.org/hr-today/trends-and-forecasting/special-reports-and-expert-views/Documents/Leveraging-Workplace-Flexibility.pdf

51. Hegewisch, A. (2009). *Flexible working policies: A comparative review* (Research Report 16). Retrieved from Equality and Human Rights Commission website: https://www.equalityhumanrights.com/sites/default/files/research-report-16-flexible-working-policies-comparative-review.pdf

52. Gov.UK. (n.d.). *Flexible working.* https://www.gov.uk/flexible-working/applying-for-flexible-working

53. Atkinson, J. (2016). 'Letters aren't good': The operation of the right to request flexible working post-maternity leave in UK small and medium-sized companies. *Journal of Social Welfare and Family Law, 38,* 380–393. https://doi.org/10.1080/09649069.2016.1239346

54. Croucher, R., & Kelliher, C. (2005). The right to request flexible working in Britain: The law and organizational realities. *European Journal of Comparative Law and Industrial Relations, 21,* 503–529.

55. Tipping, S., Chanfreau, J., Perry, J., & Tait, C. (2012). *The fourth Work-Life Balance Employee Survey* (Employment Relations Research Series 122). Gov.UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32153/12-p151-fourth-work-life-balance-employee-survey.pdf

56. Department for Business Enterprise & Regulatory Reform. (2008, August). *Consultation on implementing the recommendations of Imelda Walsh's independent review: Amending and extending the right to request flexible working to parents of older children.*

https://webarchive.nationalarchives.gov.uk/20091112211400/http://www.berr.gov.uk/consultations/page47553.html

57. Employment Act 2002, c. 22, sec. 47. http://www.legislation.gov.uk/ukpga/2002/22/section/47

58. Chung, H., & van der Horst, M. (2018). Women's employment patterns after childbirth and the perceived access to and use of flextime and teleworking. *Human Relations, 71,* 47–72. https://doi.org/10.1177/0018726717713828

59. Fair Work Ombudsman. (n.d.). *Maximum weekly hours.* https://www.fairwork.gov.au/how-we-will-help/templates-and-guides/fact-sheets/minimum-workplace-entitlements/maximum-weekly-hours

60. Golden, L., & Wiens-Tuers, B. (2005). Mandatory overtime work in the United States: Who, where, and what? *Labor Studies Journal, 30,* 1–25. https://doi.org/10.1177/0160449X0503000102

61. Yang, H., Schnall, P. L., Jauregui, M., Su, T.-C., & Baker, D. (2006). Work hours and self-reported hypertension among working people in California. *Hypertension, 48,* 744–750. https://doi.org/10.1161/01.HYP.0000238327.41911.52

62. Shields, M. (1999). Long working hours and health. *Health Reports, 11*(2), 33–48.

63. Dembe, A. E., Erickson, J. B., Delbos, R. G., & Banks, S. M. (2005). The impact of overtime and long work hours on occupational injuries and illnesses: New evidence from the United States. *Occupational & Environmental Medicine, 62,* 588–597. https://doi.org/10.1136/oem.2004.016667

64. Shen, W., Chang, K., Cheng, K.-T., & Kim, K. Y. (2019). What to do and what works? Exploring how work groups cope with understaffing. *Journal of Occupational Health Psychology, 24,* 346–358. https://doi.org/10.1037/ocp0000129

65. Paul, J. (2020, June 22). *After the pandemic, women who work from home could face career penalties* [Press release]. Purdue University. https://www.purdue.edu/newsroom/releases/2020/Q2/after-the-pandemic,-women-who-work-from-home-could-face-career-penalties.html

66. Kossek, E., Thompson, R., & Lautsch, L. (2015). Balanced flexibility: Avoiding the traps. *California Management Review, 57,* 3–25.

67. U.S. Department of Labor. (2020). Families First Coronavirus Response Act: Employee paid leave rights. https://www.dol.gov/agencies/whd/pandemic/ffcra-employee-paid-leave

68. Fowers, A., & Tan, S. (2020, March 19). The new sick leave law doesn't help the workers that need it most. *The Washington Post.* https://www.washingtonpost.com/graphics/2020/national/sick-leave-workers-coronavirus/

69. Isaacs, J. B., Healy, O., & Peters, H. E. (2017, May). *Paid family leave in the United States: Time for a new national policy.* Urban Institute. https://www.urban.org/sites/default/files/publication/90201/paid_family_leave_0.pdf

70. Blakely-Gray, R. (2019, June 17). What are the states with paid family leave? [Blog post]. *Payroll Blog.* https://www.patriotsoftware.com/blog/payroll/states-with-paid-family-leave/

proposal

Managing remote workers during quarantine: Insights from organizational research on boundary management

Matthew B. Perrigino & Roshni Raveendhran

abstract

Because of the COVID-19 pandemic, millions of employees find themselves working from home for the first time, and organizational leaders and supervisors are coping with the challenge of managing remote workers who are struggling to set and maintain a boundary between work and home life. Using an evidence-based management approach, we offer actionable insights into how managers can assess, create, and support work-from-home practices that address employees' daily boundary control needs and challenges effectively. Our assess–create–support framework provides a blueprint for how managers can establish and optimize psychological and time-related work–home boundaries to enhance remote workers' health, well-being, and performance.

Perrigino, M. B., & Raveendhran, R. (2020). Managing remote workers during quarantine: Insights from organizational research on boundary management. *Behavioral Science & Policy 6*(2), 87–94. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

Although the ability to work from home (WFH) can offer numerous benefits to employees, research suggests that job performance worsens, job satisfaction decreases, and family-related problems occur when employees struggle to manage the boundaries between work and home.[1–6] With the COVID-19 pandemic forcing millions of employees to work from home for the first time, the struggle has become more widespread—as is highlighted by news headlines such as "Work-Life Balance Is a Lie—and Coronavirus Is Exposing It."[7–10]

The pandemic is also adding to the standard challenges of working from home. Physical boundaries no longer separate work from home at all. Employees who formerly worked remotely only part time must now conduct all of their business in their personal spaces. Meanwhile, already remote workers no longer have the luxury of doing so from "third spaces," such as coworking facilities or coffee shops.[11] In addition to the various ways that employees are required to adapt to the forced WFH setup, they also have to deal with the distracting presence of other family members—including children attempting to engage in virtual learning—during typical workday hours.[12,13] Moreover, the work and home demands created by the COVID-19 pandemic are significantly distorting psychological and time-related boundaries between work life and home life. Employees are working up to three hours longer each day, experiencing the sensation of days blurring together, and expressing concern that employment and family obligations require as much time on weekends as they do on typical weekdays.[14–16]

Existing WFH policies were not designed to either address or fully encompass the issues raised by the coronavirus pandemic. In this article, we propose an evidence-based management framework that focuses on how managers can help homebound employees create temporal and psychological boundaries that enable them to better structure their days and handle the social and psychological pressures that stem from being forced to work from home. We call our boundary management approach the *assess–create–support framework*.

Assess–Create–Support Framework

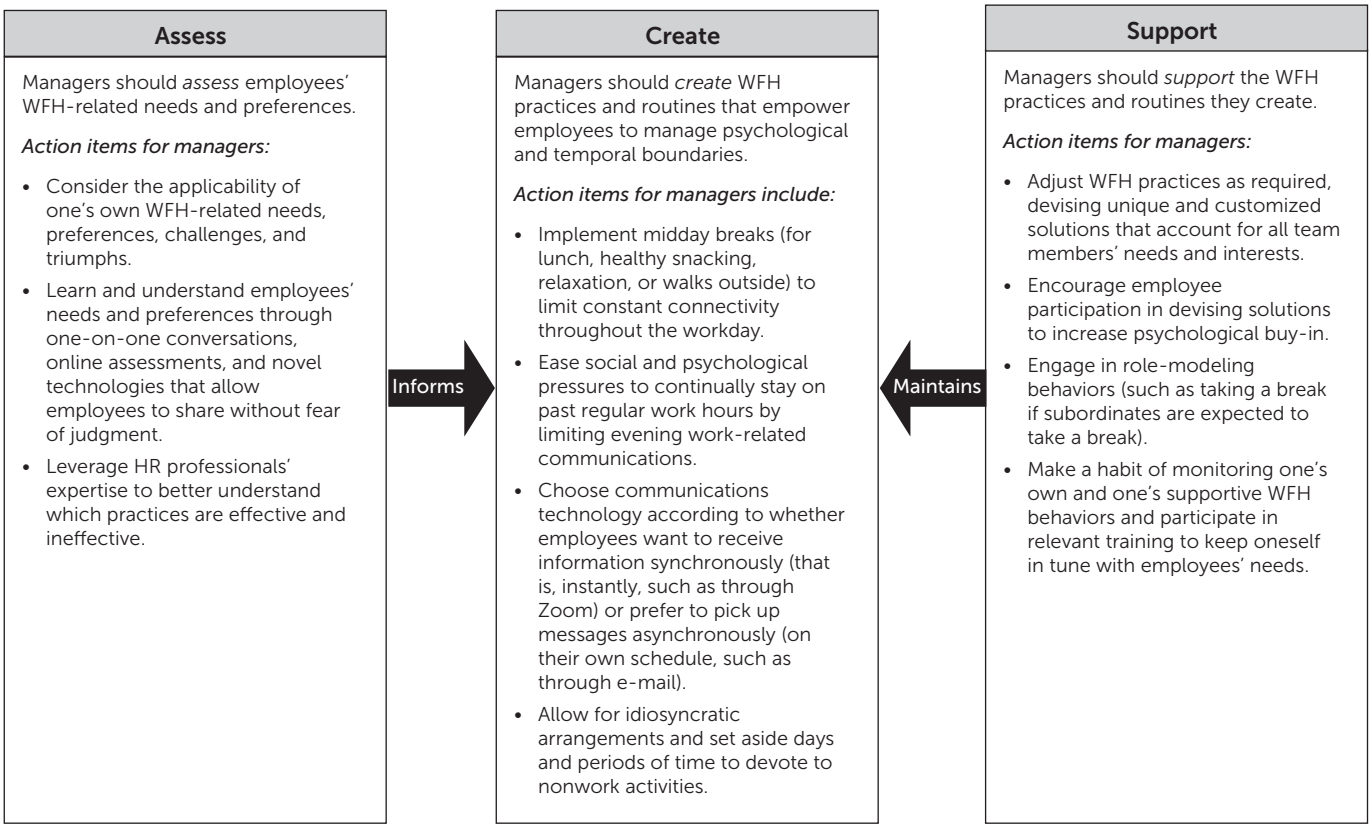
The success of the policies that organizations institute to enhance their employees' well-being depends on two key factors: the degree to which managers—as gatekeepers—implement these policies and the degree to which this implementation meets employees' needs.[5,17–20] Our assess–create–support framework addresses both of these factors and is depicted in Figure 1. First, managers must *assess* employees' needs and preferences so as to tailor WFH practices to address the demands created by the COVID-19 crisis. Second, managers should *create* practices that help delineate temporal and psychological boundaries for their employees. Third, managers must *support* these practices by championing their implementation. Below we describe this advice in detail and offer supporting evidence from recent research on internal organizational practices.

Assess

Research indicates that managers, with their wide-ranging and multiple responsibilities, may possess limited awareness of their employees' needs related to work–life balance.[21] The support that they provide for work–life balance is often informed by their own experiences with the issue: Managers with elder caregiving responsibilities, for instance, are more likely to grant their subordinates' flexible scheduling requests, and organizations whose top management teams have children tend to offer more policies targeted to work–life balance.[22–25] To begin the process of addressing their employees' work–life balance issues, managers should identify the ways that their own WFH-related needs, challenges, and triumphs during this pandemic might offer insights into the experiences of their employees. But they should go further as well.

To avoid operating under the assumption that their experiences apply to everyone, managers should also collect and consider information from their employees about the demands being placed on them and about their ideas and preferences for solutions to the conundrums these demands create. Research suggests that

Figure 1. The assess–create–support framework for boundary management during (& after) the COVID-19 pandemic



Note. WFH = work from home; HR = human resources.

although some individuals are *separators* (who prefer to separate work and nonwork roles), others are *integrators* (who prefer to blend work and nonwork roles).[26] Given the unique challenges that employees might face during this crisis (such as having to manage school-age children and their education at home or provide care for a sick family member), it is especially important that managers become aware of and understand each employee's boundary management preferences and needs. For example, separators might require stringent boundary control to perform their best, whereas integrators might require increased flexibility.

One-on-one conversations certainly are the best means of understanding the unique situation each employee faces, but managers may well be strapped for time and resources, especially when they lead large teams. In such cases, they may be able to leverage technological tools, such as online assessments (for example, the Center for Creative Leadership's WorkLife Indicator[27]), to learn about their employees' specific circumstances. Insights might be gleaned as well through technologies that enable employees to share information about their challenges by communicating with an avatar of their leader—a potential option when employees are reluctant to speak directly with a manager about personal or family issues.[28]

We also suggest that managers consult with their organization's human resources (HR) professionals to better understand existing WFH practices. Research indicates that HR professionals are better versed than most managers in the health and well-being benefits of WFH practices.[29] Moreover, they may be able to point to formal supports that current organizational

work–life balance policies can provide that managers are not aware of.[18] Speaking with HR professionals can give managers a fuller, more holistic understanding of the organization's WFH practices that can then be leveraged to maximize the benefits for their subordinates.

Create

On the basis of the information obtained in the assessment phase, managers can work with employees to tailor psychological and temporal boundaries between work and home that take into account differences in whether and how employees prefer to separate or integrate work and nonwork roles. We further recommend that managers encourage employees to take brief breaks, as convenient, at different points during the workday. Given that the stereotypical nine-to-five workday spills into night during this unprecedented time, manager-authorized breaks can enable employees to take time off from their computers and not feel guilty for doing so. In this way, managers can ease the psychological and social pressures that employees face to routinely stay on the job past regular work hours. Managers can urge employees to take breaks for eating lunch, snacking on healthy foods, doing relaxation exercises, or taking short (face-mask-protected) walks during the workday, given that research shows these activities help increase employees' energy and reduce end-of-workday fatigue.[30–32]

To reduce the psychological pressure to work longer days during the pandemic, managers can consider prohibiting or discouraging engaging in work-related communications after hours (at least for those employees who have not set up work-at-night arrangements with their supervisors).[14] They must be careful to not signal a belief that subordinates' sleep time is unimportant, as can be conveyed by sending work-related e-mails at 3 a.m.[33] Responding to or sending communications late at night can lead to feelings of depletion and can impair engagement the following day.[34] The effects of late-day communication can vary between individuals, though: Whereas integrators may be able to leverage after-hours contact to exercise greater flexibility in a healthy way, separators are likely to struggle with their need to maintain separate work and home times when they feel pressure to work after hours.[35]

Managers can address this challenge by implementing practices that offer compromise among the mixed preferences of their subordinates. For example, research suggests that asynchronous electronic communication (such as e-mail), which can be viewed at a recipient's convenience, might be less invasive at home than synchronous electronic communication (such as face-to-face meetings conducted via Zoom or Slack video conferencing).[36,37] Moreover, managers could consider varying their use of these tools to match the different needs of separators (with their desire for clear boundaries) and integrators (with their desire for flexibility).

We further encourage managers to consider setting aside entire days or chunks of time for employees to devote specifically to nonwork activities. For example, Google announced a company-wide holiday to encourage recovery from "coronavirus work-from-home burnout."[38] When the work that managers supervise is not urgent, managers may be able to prohibit any work-related activities on weekends to better protect the psychological boundaries between employees' weekdays and weekends.[15] During weekdays, managers might also be able to work out idiosyncratic arrangements that provide individual employees with additional flexibility in their work schedules or that help to temporarily reduce their workload.[23,39]

Support

Research suggests that the informal support provided by managers is more important than the formal support provided through organizational policies in influencing how employees achieve and maintain work–life balance.[40] Even after managers create the WFH practices discussed above, they should adjust the practices to optimize solutions on an ongoing basis, devising creative modifications that account for the best interests of all team members.[41] One COVID-19-specific challenge involves managing employees whose school-age children are

attempting to attend school virtually.[12,13] Instead of expecting an employee to take meetings while simultaneously overseeing a child's learning activities or expecting the employee to prioritize work when the child needs the employee's laptop for school, the supervisor can support the employee by adjusting daily schedules so that other team members cover for the individual during weekday morning hours. In exchange, the individual can provide coverage during, say, afternoon hours or on weekends (setting aside no-weekend-work rules if the employee prefers to take weekend hours). Indeed, research indicates that these types of creative solutions—particularly when employees participate in developing them—provide the most effective form of family-related supervisor support in terms of improving employees' physical health and job satisfaction.[42]

Beyond adjusting and optimizing WFH routines, it is essential that managers model the recommended behaviors themselves. Supervisors' boundary management behaviors are witnessed and emulated by their subordinates.[43,44] For the benefit of their subordinates, managers should practice what they preach even when doing so goes against their personal preference. For example, some managers like to skip lunch to enhance their productivity.[45,46] However, if they establish a midday lunch break for their supervisees, then they, too, should take this break. Otherwise, the discrepancies between messaging and behaviors will confuse their supervisees and render WFH practices ineffective, as managers' behaviors are likely to trickle down to the people they supervise.[47,48] This advice is particularly important during the current crisis, given that employees are isolated from other coworkers and might be forced to gauge which behaviors are normative at this time by closely attending to their supervisor's actions.

Finally, we urge managers to incorporate these supportive and constructive WFH behaviors into their daily routines. Research indicates that when managers monitor themselves and assess the degree to which they engage in supportive actions each day, their subordinates experience better outcomes related to work–life balance, such as reduced work–family conflict, more positive work attitudes, and more time spent with children.[49–51] In addition to tracking the ways that they support their employees through WFH practices, managers can also track the amount of time they themselves spend away from work-related communications in the evening and on weekends, so as to be mindful of and ready to adjust these behaviors. Organizational leaders can support these managerial efforts by developing computer-based training programs that incorporate specific organizational WFH policies and practices (including desirable WFH-supportive behaviors) or by providing behavior-tracking technologies that help supervisors monitor their own and their employees' boundary management behaviors—for informational purposes rather than for employee evaluations.[52,53]

Conclusion

No one-size-fits-all solution will enable employees to effectively manage work–life boundaries each day. By applying the assess–create–support framework, however, managers can establish WFH policies and practices that enable them to collaborate with their employees to set customized psychological and time-related boundaries, giving the employees the combination of structure and flexibility they need to function well in both spheres. With the support of their managers, employees will feel empowered to establish their own routines for work–life balance within the new WFH reality. These arrangements will also benefit organizations because remote employees will be healthier (reducing absenteeism costs), happier (reducing turnover costs), and more productive (enhancing top-line growth) as well as more likely to stay with the employer both during the COVID-19 pandemic and after it passes.[18,54,55]

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references

1. Goodstein, J. D. (1994). Institutional pressures and strategic responsiveness: Employer involvement in work-family issues. *Academy of Management Journal, 37,* 350–382. https://doi.org/10.5465/256833
2. Osterman, P. (1995). Work/family programs and the employment relationship. *Administrative Science Quarterly, 40,* 681–700. https://doi.org/10.2307/2393758
3. Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92,* 1524–1541. https://doi.org/10.1037/0021-9010.92.6.1524
4. Wayne, J. H., Butts, M. M., Casper, W. J., & Allen, T. D. (2017). In search of balance: A conceptual and empirical integration of multiple meanings of work–family balance. *Personnel Psychology, 70,* 167–210. https://doi.org/10.1111/peps.12132
5. Perrigino, M. B., Dunford, B. B., & Wilson, K. S. (2018). Work–family backlash: The "dark side" of work–life balance (WLB) policies. *Academy of Management Annals, 12,* 600–630. https://doi.org/10.5465/annals.2016.0077
6. Mazmanian, M., Orlikowski, W. J., & Yates, J. (2013). The autonomy paradox: The implications of mobile email devices for knowledge professionals. *Organization Science, 24,* 1337–1357. https://doi.org/10.1287/orsc.1120.0806
7. Lindemann, D. J. (2020, March 26). Work-life balance is a lie—and coronavirus is exposing it. *Quartz.* https://qz.com/work/1825693/work-life-balance-is-a-lie-and-coronavirus-is-exposing-it/
8. Liang, L.-H. (2020, March 8). How COVID-19 led to a nationwide work-from-home experiment. *BBC News.* https://www.bbc.com/worklife/article/20200309-coronavirus-covid-19-advice-chinas-work-at-home-experiment
9. Brown, E. (2020, April 30). Could COVID-19 usher in a new era of working from home? *Knowable Magazine.* https://www.knowablemagazine.org/article/society/2020/could-covid-19-usher-new-era-working-home
10. Robert Half International. (2020, April 30). COVID-19 and the workplace: Employees weigh in [Blog post]. *The Robert Half Blog.* https://www.roberthalf.com/blog/management-tips/covid-19-and-the-workplace-employees-weigh-in
11. Biron, M., & van Veldhoven, M. (2016). When control becomes a liability rather than an asset: Comparing home and office days among part-time teleworkers. *Journal of Organizational Behavior, 37,* 1317–1337. https://doi.org/10.1002/job.2106
12. Nickerson, R. (2020, May 12). Working moms of Houston share advice on balancing work, family amid COVID-19. *Houston Chronicle.* https://www.chron.com/neighborhood/memorial/news/article/Working-moms-of-Houston-share-advice-on-balancing-15264322.php
13. Watson, B. (2020, May 8). Moms adjust to homeschooling during COVID-19 outbreak. *Press-Republican.* https://www.pressrepublican.com/news/coronavirus/moms-adjust-to-homeschooling-during-covid-19-outbreak/article_991fa9ad-4d86-5efe-8a0e-1f7af6bd588e.html
14. Davis, M., & Bloomberg, J. G. (2020, April 27). Three hours longer, the COVID-19 pandemic workday endangering work-life balance. *Alabama NewsCenter.* https://alabamanewscenter.com/2020/04/27/three-hours-longer-the-covid-19-pandemic-workday-endangering-work-life-balance/
15. Bergeron, T. (2020, May 4). Monday mornings just aren't the same: With COVID-19 restrictions, there is no weekend anymore. And that's not good. *ROI-NJ.* https://www.roi-nj.com/2020/05/04/opinion/monday-mornings-just-arent-the-same-with-covid-19-restrictions-there-is-no-weekend-anymore-and-thats-not-good/
16. Jagannathan, M. (2020, May 22). Are you always exhausted? The burnout is real for U.S. workers. *MarketWatch.* https://www.marketwatch.com/story/all-the-days-are-blurring-together-how-to-battle-burnout-and-find-a-healthy-work-life-balance-during-the-pandemic-2020-05-13
17. Kelly, E. L., & Kalev, A. (2006). Managing flexible work arrangements in US organizations: Formalized discretion or "a right to ask." *Socio-Economic Review, 4,* 379–416. https://doi.org/10.1093/ser/mwl001
18. Beauregard, T. A., & Henry, L. C. (2009). Making the link between work-life balance practices and organizational performance. *Human Resource Management Review, 19,* 9–22. https://doi.org/10.1016/j.hrmr.2008.09.001
19. Kossek, E. E., & Nichol, V. (1992). The effects of on-site child care on employee attitudes and performance. *Personnel Psychology, 45,* 485–509. https://doi.org/10.1111/j.1744-6570.1992.tb00857.x
20. Meyer, C. S., Mukerjee, S., & Sestero, A. (2001). Work-family benefits: Which ones maximize profits? *Journal of Managerial Issues, 13,* 28–44. https://www.jstor.org/stable/40604332
21. Milliken, F. J., Martins, L. L., & Morgan, H. (1998). Explaining organizational responsiveness to work-family issues: The role of human resource executives as issue interpreters. *Academy of Management Journal, 41,* 580–592. https://doi.org/10.5465/256944
22. Cogin, J. A., Sanders, K., & Williamson, I. O. (2018). Work-life support practices and customer satisfaction: The role of TMT composition and country culture. *Human Resource Management, 57,* 279–291. https://doi.org/10.1002/hrm.21833
23. Las Heras, M., Van der Heijden, B. I. J. M., De Jong, J., & Rofcanin, Y. (2017). "Handle with care": The mediating role of schedule i-deals in the relationship between supervisors' own caregiving responsibilities and employee outcomes. *Human Resource Management Journal, 27,* 335–349. https://doi.org/10.1111/1748-8583.12160
24. Gupta, A., Nadkarni, S., & Mariam, M. (2019). Dispositional sources of managerial discretion: CEO ideology, CEO personality, and firm strategies. *Administrative Science Quarterly, 64,* 855–893. https://doi.org/10.1177/0001839218793128
25. Rofcanin, Y., Las Heras, M., Escribano, P. I., & Stanko, T. (2019). FSSBs and elderly care: Exploring the role of organizational context on employees' overall health and work–family balance satisfaction. *Journal of Business and Psychology, 35,* 403–419. https://doi.org/10.1007/s10869-019-09629-8
26. Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior, 81,* 112–128. https://doi.org/10.1016/j.jvb.2012.04.003
27. Center for Creative Leadership. (n.d.). *WorkLife Indicator.* https://www.ccl.org/lead-it-yourself-solutions/self-assessments/worklife-indicator/

28. Raveendhran, R., Fast, N. J., & Carnevale, P. J. (2020). Virtual (freedom from) reality: Evaluation apprehension and leaders' preference for communicating through avatars. *Computers in Human Behavior, 111,* Article 106415. Advance online publication. https://doi.org/10.1016/j.chb.2020.106415

29. Peters, P., & Heusinkveld, S. (2010). Institutional explanations for managers' attitudes towards telehomeworking. *Human Relations, 63,* 107–135. https://doi.org/10.1177/0018726709336025

30. Sonnentag, S., Pundt, A., & Venz, L. (2017). Distal and proximal predictors of snacking at work: A daily-survey study. *Journal of Applied Psychology, 102,* 151–162. https://doi.org/10.1037/apl0000162

31. Trougakos, J. P., Hideg, I., Cheng, B. H., & Beal, D. J. (2014). Lunch breaks unpacked: The role of autonomy as a moderator of recovery during lunch. *Academy of Management Journal, 57,* 405–421. https://doi.org/10.5465/amj.2011.1072

32. Sianoja, M., Syrek, C. J., de Bloom, J., Korpela, K., & Kinnunen, U. (2018). Enhancing daily well-being at work through lunchtime park walks and relaxation exercises: Recovery experiences as mediators. *Journal of Occupational Health Psychology, 23,* 428–442. https://doi.org/10.1037/ocp0000083

33. Barnes, C. M., Awtrey, E., Lucianetti, L., & Spreitzer, G. (2020). Leader sleep devaluation, employee sleep, and unethical behavior. *Sleep Health, 6(3), 411–417.e5*. https://doi.org/10.1016/j.sleh.2019.12.001

34. Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted? Consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes, 124,* 11–23. https://doi.org/10.1016/j.obhdp.2014.01.001

35. Piszczek, M. M. (2017). Boundary control and controlled boundaries: Organizational expectations for technology use at the work–family interface. *Journal of Organizational Behavior, 38,* 592–611. https://doi.org/10.1002/job.2153

36. Barley, S. R., Meyerson, D. E., & Grodal, S. (2011). E-mail as a source and symbol of stress. *Organization Science, 22,* 887–906. https://doi.org/10.1287/orsc.1100.0573

37. Rose, E. (2013). Access denied: Employee control of personal communications at work. *Work, Employment and Society, 27,* 694–710. https://doi.org/10.1177/0950017012460329

38. Barrabi, T. (2020, May 8). Google adds company holiday for coronavirus work-from-home burnout. *Fox Business News.* https://www.foxbusiness.com/markets/google-coronavirus-holiday-work-from-home-burnout

39. Hornung, S., Rousseau, D. M., & Glaser, J. (2008). Creating flexible work arrangements through idiosyncratic deals. *Journal of Applied Psychology, 93,* 655–664. https://doi.org/10.1037/0021-9010.93.3.655

40. Anderson, S. E., Coffey, B. S., & Byerly, R. T. (2002). Formal organizational initiatives and informal workplace practices: Links to work-family conflict and job-related outcomes. *Journal of Management, 28,* 787–810. https://doi.org/10.1177/014920630202800605

41. Hammer, L. B., Kossek, E. E., Yragui, N. L., Bodner, T. E., & Hanson, G. C. (2009). Development and validation of a multidimensional measure of family supportive supervisor behaviors (FSSB). *Journal of Management, 35,* 837–856. https://doi.org/10.1177/0149206308328510

42. Odle-Dusseau, H. N., Hammer, L. B., Crain, T. L., & Bodner, T. E. (2016). The influence of family-supportive supervisor training on employee job performance and attitudes: An organizational work–family intervention. *Journal of Occupational Health Psychology, 21,* 296–308. https://doi.org/10.1037/a0039961

43. Koch, A. R., & Binnewies, C. (2015). Setting a good example: Supervisors as work-life-friendly role models within the context of boundary management. *Journal of Occupational Health Psychology, 20,* 82–92. https://doi.org/10.1037/a0037890

44. Paustian-Underdahl, S. C., & Halbesleben, J. R. B. (2014). Examining the influence of climate, supervisor guidance, and behavioral integrity on work–family conflict: A demands and resources approach. *Journal of Organizational Behavior, 35,* 447–463. https://doi.org/10.1002/job.1883

45. de Haaff, B. (2015, May 19). Why exceptional leaders skip lunch [Blog post]. *Aha! Blog.* https://blog.aha.io/why-exceptional-leaders-skip-lunch/

46. Hamilton, I. A. (2020, January 15). Twitter CEO Jack Dorsey only eats 7 meals per week, which is more than he used to. *Business Insider.* https://www.businessinsider.com/twitter-ceo-jack-dorsey-only-eats-7-meals-per-week-2020-1

47. O'Neill, J. W., Harrison, M. M., Cleveland, J., Almeida, D., Stawski, R., & Crouter, A. C. (2009). Work–family climate, organizational commitment, and turnover: Multilevel contagion effects of leaders. *Journal of Vocational Behavior, 74,* 18–29. https://doi.org/10.1016/j.jvb.2008.10.004

48. ten Brummelhuis, L. L., Haar, J. M., & Roche, M. (2014). Does family life help to be a better leader? A closer look at crossover processes from leaders to followers. *Personnel Psychology, 67,* 917–949. https://doi.org/10.1111/peps.12057

49. Kelly, E. L., Moen, P., Oakes, J. M., Fan, W., Okechukwu, C., Davis, K. D., . . . Casper, L. M. (2014). Changing work and work-family conflict: Evidence from the work, family, and health network. *American Sociological Review, 79,* 485–516. https://doi.org/10.1177/0003122414531435

50. Moen, P., Kelly, E. L., Fan, W., Lee, S. R., Almeida, D., Kossek, E. E., & Buxton, O. M. (2016). Does a flexibility/support organizational initiative improve high-tech employees' well-being? Evidence from the work, family, and health network. *American Sociological Review, 81,* 134–164. https://doi.org/10.1177/0003122415622391

51. Davis, K. D., Lawson, K. M., Almeida, D. M., Kelly, E. L., King, R. B., Hammer, L., Casper, L. M., Okechukwu, C. A., Hanson, G., & . . . McHale, S. M. (2015). Parents' daily time with their children: A workplace intervention. *Pediatrics, 135,* 875–882. https://doi.org/10.1542/peds.2014-2057

52. Hammer, L. B., Kossek, E. E., Anger, W. K., Bodner, T., & Zimmerman, K. L. (2011). Clarifying work–family intervention processes: The roles of work–family conflict and family-supportive supervisor behaviors. *Journal of Applied Psychology, 96,* 134–150. https://doi.org/10.1037/a0020927

53. Raveendhran, R. R., & Fast, N. J. (2020). *Humans judge, algorithms nudge: The psychology of behavior tracking at work*. Working paper.

54. Perry-Smith, J. E., & Blum, T. C. (2000). Work-family human resource bundles and perceived organizational performance. *Academy of Management Journal, 43,* 1107–1117. https://doi.org/10.5465/1556339

55. Kelly, E. L., Kossek, E. E., Hammer, L. B., Durham, M., Bray, J., Chermack, K., Murphy, L. A., & . . . Kaskubar, D. (2008). Getting there from here: Research on the effects of work–family initiatives on work–family conflict and business outcomes. *Academy of Management Annals, 2,* 305–349. https://doi.org/10.5465/19416520802211610

proposal

Adapting the U.S. Air Force's combat rescue management practices could improve organizational responses to challenges posed by the COVID-19 pandemic

Vicki Whiting, Brian Wierman, & Phillip Whiting

abstract

In this article, we argue that U.S. Air Force Special Operations Command (AFSOC) pararescue teams offer a model of best practices that could be adapted by leaders of other organizations during the COVID-19 crisis. AFSOC teams recover and provide medical treatment to personnel in unpredictable and dangerous environments. Our research suggests that the ability of AFSOC teams to operate effectively in situations of uncertainty, complexity, and urgency depends on several critical factors: an operational tempo that includes time for reflection; effective assessment, selection, and training of team members; risk assessment and ongoing revision of the planning process; and fluid leadership with a chief executive who maintains ultimate accountability. These same management practices could be adapted by organizational leaders to help them respond more effectively to the challenges posed by the constantly changing COVID-19 pandemic.

Whiting, V., Wierman, B., & Whiting, P. (2020). Adapting the U.S. Air Force's combat rescue management practices could improve organizational responses to challenges posted by the COVID-19 pandemic. *Behavioral Science & Policy 6*(2), 95–100. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

U.S. Air Force Special Operations Command (AFSOC) pararescue teams, commonly referred to as PJ teams, recover and provide medical treatment to personnel involved in combat, natural disasters, or humanitarian-assistance operations. They respond to crisis situations in any environment, even acting as the 911 force to other special operators.[1] As such, they are extreme action teams that "complete their tasks in unconventional performance environments and have serious consequences associated with failure."[2] Such teams are a refinement of crisis action teams, which have been defined as "highly skilled specialist teams cooperating in brief performance events that require improvisation in unpredictable circumstances."[3]

COVID-19 has put all organizations into unconventional environments in which the consequences associated with flawed performance can be extremely serious, including the loss of lives and livelihoods. Adopting AFSOC management and leadership practices can maximize organizational effectiveness during this crisis.

Operational Tempo

In the U.S. military, PJ teams and other deployable units and assets (such as naval vessels and infantry battalions) operate at a pace that stands apart from that of other units in that they carefully cycle their operational tempo to avoid constant high intensity. At any given time, there are PJ teams training for deployment, on deployment, or coming off deployment and reviewing lessons learned. This deliberate scheduling of time away from intense operations engenders opportunities to reflect on lessons learned from high-tempo operations or crisis responses. These lessons are then integrated into training and put to use in improving effectiveness in the field.

Organizational Takeaway

Mature and well-led organizations generally have risk management protocols in place, but they may lack the time and resources to grow and nurture teams devoted to responding to crises. Resource-constrained organizations often prioritize short-term and immediate needs. However, accepting long-term risk to maximize short-term gains—dubbed *managerial short-termism*—can be avoided.[4]

Even among organizations with well-developed crisis-response plans and teams, the attention to planning and team design will naturally compete with hectic day-to-day operations, in which competition and market demands invoke constant stress. Organizations can thus suffer from a constant "hair-on-fire" reality that degrades both short- and long-term effectiveness.

To be effective in the ongoing and constantly changing COVID-19 environment, organizations should form crisis-response leadership teams. These teams should be organized so that leaders periodically cycle off active crisis duty to reflect on lessons learned and ways to integrate new pandemic developments into the crisis response. It can be tempting for organizational leaders to take an all-hands-on-deck approach in times of crisis, and in the case of a single-event crisis, such as a security breach or a product failure, this response works. The difference with COVID-19, however, is that the crisis continues to evolve, and its length and lasting impact are unknown. In this type of highly complex, rapidly changing environment, adopting AFSOC's approach of creating time for crisis-response leaders to step away from day-to-day crisis response is critical. This break will give leaders time both to reflect on the efficacy of the current organizational response and to consider how to adapt and improve the ongoing response. Although most organizations do not have the structure and resources to field redundant response teams that can relieve one another on the front lines, they can be deliberate in designating a defined weekly time when all members of the crisis-response leadership team can gather together away from interruption to share field lessons, be briefed on recent changes in the pandemic environment, and review and update planned responses.

Team Selection & Training

The selection and training of PJs (that is, individuals on PJ teams) is integral to ensure their

ability to respond to crisis under extreme conditions. AFSOC takes seriously the overall process of onboarding and training these combat rescue troops because organizational success is contingent on individual soldiers' mission-specific competencies, commitment to mission, and acceptance of great personal risk.

AFSOC's 12-week Assessment and Selection course evaluates prospective PJs holistically. Demanding physical training, swim, and run time requirements push candidates to their physical limits. In addition to physical tests, Assessment and Selection also includes peer reviews and psychological tests to identify candidates who are team players, ethical, and in possession of the requisite professional character traits. Training instructors conduct and run a carefully designed training schedule, which has an attrition rate of over 80%, to evaluate whether a candidate possesses the mental and physical capacity to do what is required in the line of duty. The selection process that a prospective recruit undergoes provides the foundation for the candidate's ability to operate effectively during a crisis and gives the person a sense of whether they will be able to rise to the challenge of the mission and culture when operating in hostile conditions. Ultimately, the selection process allows for evaluation of physical aptitude and, more important, attitude and toughness.

After they are selected, prospective PJs enter the Pipeline, an extensive two-year training program to learn the skill sets required to operate as a member of an AFSOC team. Each step of the selection and assessment process involves 360-degree rankings of prospective PJs, where all candidates are ranked in numerical order by training commanders, officers, and fellow candidates according to performance. PJs who consistently rank in the lower quadrant of the 360 ranking can be removed from training. Once PJs successfully complete the Pipeline, they are assigned to operational units and begin to deploy. The universal selection process allows for community morale and cohesion, and the shared skill set ensures that teams maintain skill redundancy. Most important is that the ranking ensures that all team members trust one another and are familiar with each team member's capability and strengths. AFSOC designs PJ training and culture to foster mutual respect and capability among the PJ community, greatly enhancing teams' crisis response in subsequent real-world operations.[5]

Organizational Takeaway

It is not realistic to expect organizations to mirror AFSOC selection and training processes, but some important principles can be gleaned. Leaders must be carefully evaluated and vetted before being selected for an organization's crisis-response leadership team. Selection for this team is best done through a historical review of the individual's organizational contributions as well as a 360-degree feedback evaluation to determine the level of aptitude, attitude, toughness, and commitment to mission and culture the individual will bring to the team. Traditionally, organizations have used 360-degree feedback and similar tools from human resource departments to review performance, and it may be tempting for organizations in the midst of a crisis to skip this step; however, crisis-response leadership team members must be highly regarded as team members and professionals if they are to have the influence necessary to be effective in driving organizational response.

Once a crisis-response leadership team has been selected, training should be provided not only to develop the team's capacity to conduct business but also to build esprit de corps within the team and establish a shared decisionmaking framework. Because the selection process will have identified top-caliber organizational members, the training process need not be extensive, although it should be deliberate so as to get all team members on the same page and give the team an opportunity to adopt a shared team culture. Training should include pandemic information; the organization's vision, mission, and culture; and procedures and approaches for setting goals, planning, and operating. Scenario training and "wargaming" (explained in the next section) can further enhance individual members' capabilities and align team members within the framework of the organization's mission and culture.

Risk Assessment & Operational Analysis

All branches of the military use a planning process to develop and identify courses of action (COAs) to respond to potential crises. The *Joint Planning* process manual (*JP-5*) describes COAs as "a potential way (solution, method) to accomplish the assigned mission."[6] Developing COAs helps mitigate the risk of a given crisis by identifying critical variables that have the potential to significantly affect outcomes; they also help in identifying necessary responses and decisions on a particular aspect of the crisis. Military leaders will often use wargaming—working through various scenarios—as a way to walk through or simulate each COA and consider the risks to the team and the mission. During wargaming, planners document perceived or anticipated risks and develop a variety of plans and heuristics to aid their decisionmaking during a crisis. Wargaming allows the team to identify tasks, necessary equipment, critical events, organizational issues, command and support relationships, the timeline, and potentially harmful consequences of any miscoordination.

Organizational Takeaway

Crisis-response leadership teams should develop COAs as described in the *JP-5* to plan responses for different COVID-19 scenarios. For example, a business that depends on large-scale gatherings of people might develop several different COAs to be ready for multiple scenarios depending on the speed with which a vaccine becomes widely available. COAs should be articulated such that the organization's mission or task can be accomplished by following the COA during an anticipated crisis. The magnitude and variety of organizational impacts resulting from COVID-19 make it critical that COAs are complete, feasible, consistent with organizational doctrine, and in compliance with guidance set out by executive authority.

Wargaming allows team members to evaluate how well each COA would perform in the face of potential risks and other variables. In the case of the COVID pandemic, these variables could include additional waves of infection, the timing and efficacy of a vaccine, the availability and use of testing, financial market volatility, and consumer willingness to reengage in commerce. Weaknesses exposed by wargaming can be addressed and incorporated into revised COAs.

As important as the COAs are, leaders must recognize that planning tools can oversimplify the situation or fail to anticipate future events. As such, crisis-response leadership teams should regularly review and update the COVID-19 COAs as new information becomes available.

Fluid Leadership & Accountability

Because of the effectiveness of team selection and training as well as the process of risk assessment and operational analysis, leadership in a PJ team becomes fluid and dynamic. Daniel Goleman, originator of the concept of emotional intelligence, noted that "the most effective leaders switch flexibly among the leadership styles as needed. . . . Such leaders don't mechanically match their style to fit a checklist of situations—they are far more fluid."[7]

PJs train to understand when and how to move between fluid and traditional leadership structures. For example, during a crisis, the commanding officer often defers to PJs with the appropriate subject-matter expertise to lead relevant parts of the mission. Fluid leadership entails using the best qualified individual to lead based on context. Ultimately, however, the commanding officer is responsible for the overall outcome of a given mission and the overall success of the team. Within this structure of accountability, though, leadership in the field rests with the individual best situated to align the team around mission success.

Organizational Takeaway

In an organization, fluid leadership capability will most likely need to be specifically acknowledged and adopted by members of the crisis-response leadership team, especially if this is not a normal mode of operation for the organization. Members should be prepared to

step up and lead when their core competence is most relevant to operational success. Fluid leadership is not an abdication of accountability for a chief executive, however. The chief executive must rely on the team to communicate clearly and must acknowledge and incorporate those insights in a way that serves the overall team's interests. Although the chief executive can and often should fluidly delegate authority to a member of the crisis-response team, he or she can never relinquish overall accountability and responsibility.

Conclusion

Organizational leaders facing the myriad threats created by COVID-19 can learn from AFSOC's extreme action team planning and design. Appointing and empowering a crisis-response leadership team of capable and committed subject-matter experts to gather, assess the situation, and lead initiatives responding to the pandemic will help those organizations survive and thrive. Leaders should seek to adjust and design the team's operational tempo, allowing time for members to step away from day-to-day crisis management for reflection, learning, and future crisis-response planning. Teams should adopt risk assessment and operational analysis management practices borrowed from AFSOC and the U.S. military, such as those described in the *JP-5*, to identify the best courses of action to manage their response. Team leadership should be allowed to shift fluidly as context dictates, although ultimate responsibility lies on the shoulders of the chief executive. As teams coordinate and lead their organizational response, team members must provide timely and thorough feedback so that the chief executive can clearly, factually, and fully manage communications as is appropriate for different stakeholder groups in the rapidly evolving, extraordinarily complex crisis created by COVID-19.

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Summary Table. Practices from U.S. Air Force extreme action teams that could be adopted by civilian companies, institutions, & organizations facing challenges from the COVID-19 pandemic

Category	U.S. Air Force Special Operations Command (AFSOC) practice	Civilian organization practice
Team purpose	AFSOC extreme action teams plan and carry out missions to recover and provide medical treatment to personnel in unpredictable environments where failure could have serious outcomes.	Crisis-response leadership teams plan and carry out organizational responses to crises affecting organizational operations, including the COVID-19 pandemic.
Operational tempo	Extreme action teams regularly cycle through training, deployment, and reflection (lessons learned).	Team members should cycle on and off "active duty" to allow time for reflection and revision of ongoing response.
Team selection	Prospective candidates undergo physical fitness tests and 360-degree rankings based on evaluations of aptitude, attitude, and toughness.	Selection criteria should include a review of an individual's historical performance and a 360-degree performance evaluation.
Training	Team members train for two years to master skills, build group trust, and align with mission and culture.	Team members should complete shared training to build trust and align with mission and culture.
Risk assessment and operational analysis	Teams develop courses of action (COAs) and use wargaming to help identify and plan for risks.	Teams should develop COAs to respond to different scenarios for how COVID-19 might play out and continually review and improve COAs as conditions evolve.
Fluid leadership and ultimate accountability	Functional hierarchy defers to subject-matter experts on the extreme action team. However, the commanding officer is ultimately responsible for the outcome.	Chief executives should practice and acknowledge fluid leadership. Team members should be prepared to step up when their core competence is most relevant. However, the chief executive is ultimately responsible for the outcome.

references

1. St. Clair, J. (2019, December 26). The savior elite: Inside the special operations force tasked with rescuing Navy SEALS. *Esquire*. https://www.esquire.com/news-politics/a28692306/us-air-force-pararescue-tamar-rescue-mission/
2. Bell, S. T., Fisher, D. M., Brown, S. G., & Mann, K. E. (2018). An approach for conducting actionable research with extreme teams. *Journal of Management, 44,* 2740–2765.
3. Sundstrom, E., De Meuse, K. P., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist, 45,* 120–133. https://doi.org/10.1037/0003-066X.45.2.120
4. Alexander, J. (2017). *Short-termism and corporate myopia: The values assigned by the market to short-term and long-term firms* (CMC Senior Theses 1499). Scholarship @ Claremont. https://scholarship.claremont.edu/cmc_theses/1499
5. Whiting, V., DePillis, E., Wierman, B., & Whiting, P. (2019). *Combat is the equalizer: Hierarchical and fluid leadership in Air Force pararescue*. [Working paper].
6. Joint Chiefs of Staff. (2017). *Joint planning* (Joint Publication 5-0). https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp5_0_20171606.pdf
7. Goleman, D. (2017). *Leadership that gets results*. Harvard Business Press. (Original work published 2000)

proposal

How behavioral science can inform policies to prevent discrimination against the Asian community in the era of COVID-19

Abby Corrington, Mikki Hebl, Linnea C. Ng, Ivy Watson, Isabel Bilotta, Shannon K. Cheng, & Eden King

abstract

The Asian community in the United States has seen an enormous uptick in discriminatory experiences since the start of the COVID-19 pandemic. Asian individuals have reported discrimination within their workplaces, in their communities, and against Asian-owned businesses. Many for-profit organizations have failed to acknowledge this surge. We argue that organizations should adopt policies to protect their Asian employees and clientele. On the basis of behavioral science research and knowledge of best practices for promoting diversity and inclusion, we suggest that organizational leaders create crisis task forces to find ways to reduce discrimination against Asian employees and that the leaders more generally reaffirm organizational commitments to diversity and inclusion, communicate those commitments to stakeholders, visibly enact expected organizational norms related to diversity and inclusion, and establish or reassess accountability systems to ensure that policies and norms are followed.

Corrington, A., Hebl, M., Ng, L. C., Watson, I., Bilotta, I., Cheng, S. K., & King, E. (2020). How behavioral science can inform policies to prevent discrimination against the Asian community in the era of COVID-19. *Behavioral Science & Policy 6*(2), 101–108. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

In early February, the leadership of Tufts University Medical Center sent an e-mail reminding employees of the importance of treating patients and colleagues with respect and civility, regardless of national origin. Tufts's goal was to prevent bias against members of Asian communities, who were facing increasing discrimination and violence in the United States because of COVID-19's origin in China.[1] America's leaders have generally ignored this uptick in discrimination or even exacerbated it, such as by referring to the novel coronavirus as the "Chinese virus." The heads of businesses and other organizations can and should step up by demonstrating and conveying to employees and clients that their organizations value diversity and inclusion and will not tolerate discrimination on the basis of race or ethnicity.

In this article, we highlight instances of COVID-19-related anti-Asian xenophobia in the United States in general and within organizations. Next, we describe various organizational responses, the majority of which have been undertaken by nonprofits rather than for-profit businesses, which have been surprisingly silent on the subject. Finally, having outlined both the problem and the limited scope of responses to date, we offer behavioral science–backed recommendations for how organizational policymakers can intervene to reduce anti-Asian discrimination.

Instances of Xenophobia Toward Asian Individuals During the Pandemic

In April, the FBI noted that there had been an increase in hate crimes targeting Asian individuals as a result of the global coronavirus pandemic.[2] In fact, so many anecdotal accounts surfaced that organizations such as Asian Americans Advancing Justice, the Asian Pacific Policy & Planning Council, and OCA—Asian Pacific American Advocates joined together to launch an online reporting website. Within four weeks of the launch, nearly 1,500 COVID-19-related incidents of discrimination against Asian individuals in the United States were reported.[3] These attacks ranged from verbal harassment (70% of reports) to physical violence (9% of reports); more than 40% took place in private businesses.[3] The incidents targeted Asian individuals of many different backgrounds, including those who are Chinese, Korean, Vietnamese, Japanese, and Filipino.[3] Asian women were harassed 2.3 times as often as Asian men were; 80% of the reported targets were 20–40 years old.[3] As Russell Jeung, a professor of Asian American Studies at San Francisco State University, commented in a press release from the site's organizers, "combining cases of workplace discrimination and being barred from businesses indicates that Asian Americans' civil rights are being violated."[4]

Three forms of anti-Asian bias are spiking: (a) discrimination against Asian employees in the workplace, (b) discrimination against Asian individuals in the general population, and (c) discrimination against Asian-owned businesses. Acts of workplace discrimination include being targeted with derogatory comments, excluded from events and meetings, blamed for the spread of coronavirus, and laughed at by colleagues.[3]

Discrimination against Asian individuals in the general population has taken place in grocery stores, subways, public transit, and taxis.[5] Some businesses have even denied services to Asian clientele because of their race and the belief that they might have COVID-19. Additionally, delivery drivers and customers alike have experienced grocery and fast food orders being canceled or unfulfilled because of their perceived race.[6] Meanwhile, college campuses have reported increases in racist and discriminatory statements against Asian students, faculty, and staff.[7] Even the U.S. president has made jokes at the expense of Asian individuals, referring to the coronavirus multiple times as the "Kung flu."[8]

In terms of discrimination against Asian-owned businesses, in early February and March, Asian business owners reported a significant drop in revenue.[9] Because fewer than 20 cases had been diagnosed in the entire country at the time of these downturns, the hits taken by these Asian businesses do not seem to have been based on evidence that COVID-19 was spreading here. Rather, stereotypes, bias, and xenophobia exacerbated by fear seem to have been the driving forces behind the reduced patronage.

The increase in discrimination against Asian individuals probably does not represent a novel bias that first arose in response to the COVID-19 pandemic. That is, the presence of COVID-19 did not create or lead to anti-Asian xenophobia; rather, the disease seems to have revealed and provided perceived justification for preexisting xenophobia. Indeed, Asian individuals are the racial group that has the second lowest hospitalization rate from COVID-19,[10] a pattern that supports the probability that anti-Asian xenophobia in the United States is based not on logic or evidence but on bias and bigotry.

Organizational Responses to Discrimination

At the time of this writing, most for-profit organizations have not taken a stand against anti-Asian xenophobia during the pandemic. In general, the for-profit and nonprofit organizations that have issued public responses to anti-Asian sentiment have missions that already involve civil rights advocacy, are committed to equitable treatment, or have been directly affected by racial animosity. Examples of organizations making public statements specifically in response to increased incidents of bias against Asian individuals include the following:

- The NAACP and several other leading civil rights groups issued a joint statement asserting that "as our nation grapples with the coronavirus, we are deeply concerned that recent incidents of racism and discrimination against Asian Americans threaten our collective public safety. In recent weeks, Asian Americans have been subjected to violent attacks, discrimination against their businesses and xenophobic portrayal by the media and our elected leaders."[11]

- The Justice and Diversity Center of the Bar Association of San Francisco issued a press release stating that the "stakes are simply too high to allow racism and xenophobia to distract from what is most vital: Focusing our collective energies on getting through this pandemic and lifting up the most vulnerable among us."[12]

- The American College of Surgeons published a condemnation of bias and discrimination, writing that the organization "supports all health care personnel who provide essential services in our communities at this time and maintains that they should be able to continue to do so without the specter of hatred and violence resulting from xenophobia, racism, and bigotry."[13]

- Harvard University issued a statement saying that the signatories (several university centers and institutes) "strongly condemn xenophobic and racist acts arising from the global COVID-19 pandemic," including those directed at people of Asian ancestry.[14]

- In March, about a dozen Asian politicians, academics, and leaders of nonprofits individually spoke out against the racial hostility that had become pervasive since the COVID-19 outbreak.[15]

- After Costco received negative press in response to a boy being turned away from a free-sample station because the representative of the product thought the boy was Chinese and could transmit coronavirus, a Costco representative told a news outlet that a company executive had spoken to the family, adding that "we are very sorry this incident occurred in our location. The comments to the boy were made not by a Costco employee but by an employee of an independent demo company. The demo company is taking appropriate measures with its employees."[16]

In one exception to the paucity of antidiscrimination responses from for-profit companies, 130 Silicon Valley executives released a statement decrying anti-Asian rhetoric and incidents.[17] The overall lack of attention by for-profits is surprising because such organizations have commonly responded publicly during other periods of racial tension in recent history. For example, after the deaths of George Floyd and Breonna Taylor at the hands of police, Amazon, Netflix, and Twitter, among many other for-profit organizations, not only publicly denounced discrimination toward Black individuals but also

made notable changes in organizational policy and donated millions of dollars to combat racial injustice in America.[9] In 2018, organizations such as Apple, IBM, and PepsiCo sent a letter to the U.S. Department of Homeland Security expressing their concerns about unfair changes in immigration policies and their detrimental effects on the companies' workers.[18]

Such public stances on racial issues in support of other stigmatized groups raises the question of why for-profit organizations have generally failed to respond to anti-Asian sentiment and behavior during the COVID-19 pandemic, particularly in light of the large number of reported instances of bias and discrimination. The lack of response may be driven by fear (of getting sick or putting employees at risk), existing implicit biases toward Asian employees (who may be stereotyped as cold and may evoke jealousy for their perceived superior competence), and the tendency to give lower priority to diversity and inclusion efforts during periods of financial strain.[19,20]

Action to reduce bias and discrimination is even rarer than the issuing of statements. Among the few overt actions taken to support Asian people we can point to are social media campaigns such as #WashTheHate[21] and steps taken by a handful of organizations to offer some proactive support to Asian individuals. For instance, the University of Wisconsin–Madison held a town hall to show solidarity and point people to resources,[22] and other organizations have directed staff members to Asian employee resource groups to discuss concerns.[23,24]

Policy Recommendations

Although no simple solution will enable organizations to eliminate all COVID-19-related discrimination against Asian individuals, we have identified several actions that organizational leaders should take. Our recommendations are not exhaustive. We focus on those suggested by a synthesis of existing behavioral science research and by consideration of established diversity and inclusion best practices for promoting equity and combating discrimination.

Create a Crisis Task Force to Address Discrimination Against Asian Employees

Each organization should create a task force that includes representatives of different stakeholders (that is, people who have an interest in ensuring success, such as a human resources specialist, legal counsel, and a media spokesperson). At least one individual (such as the human resources representative) should be responsible for monitoring reports of employee concerns in an effort to enhance employee safety, mental health, and well-being.[25,26] The task force should work to fully understand the fears, threats, and anxieties that Asian employees may be experiencing and ensure that organizational action is taken both proactively and responsively. In other words, the purpose of such task forces is to tune in to and support the organization's most important assets: its people.

Our task force recommendation is extrapolated in part from behavioral science research into actions toward employees that enhance organizational functioning. Behavioral science research has shown that when employees feel supported by their employers, they become motivated to exert greater effort, engage at work, and recommend their organizations as good places to work; they are also less likely to leave their organizations.[27] Also, workers who feel valued, secure, supported, and respected are more productive, miss fewer workdays, make fewer work errors, and have fewer accidents.[28] Simply stated, when employers demonstrate concern for their employees' well-being, the employers build trust and a sense of safety.[28–30] It is under these conditions that employees are able to focus and do their best work.[31–33] A recent Gallup assessment of the COVID-19 responses of more than 200 members of the Chief Human Resources Officer Roundtable indicates that many companies have created task forces that focus not only on the business impact, travel requirements, technology, and training issues related to the pandemic but also on employee well-being, engagement, morale, and communication.[24] It makes sense for companies to also establish a task force to specifically address COVID-19-related discrimination against Asian individuals.

Reaffirm Leadership's Commitment to Diversity & Inclusion

Seventy-nine Fortune 500 companies list diversity and inclusion as part of their core values,[34] yet evidence suggests that economic downturns tend to be accompanied by companies' devoting decreased attention and fewer resources to supporting these values. The business and moral cases for diversity provide a rationale for consistently championing diversity across company ups and downs.[35] Specifically, ample research has shown that organizations that are diverse and inclusive are characterized by greater innovation and resilience[36]—capabilities that organizations will need to recover from the COVID-19 crisis. Indeed, diversity and inclusion enhance both business performance and organizational health and contribute to broader efforts to revitalize economies and protect social cohesion.[34,37] Thus, strategic responses to the COVID-19 crisis should reflect enduring core values, including the fair and respectful treatment of all people.

The critical role of diversity in successful business recovery is evident from a review of organizational responses to the 2008–2009 financial crisis. For example, banks with a greater proportion of women on their boards were more stable throughout the financial crisis than their competitors were.[38] Now, during the COVID-19 pandemic, cities, states, and countries led by women appear to be managing the pandemic better than those led by men.[39,40] Although these specific examples relate to gender and not race, the business case for diversity and the other evidence already discussed suggest that similarly positive outcomes would be expected for organizations with various types of diversity. Likewise, although reaffirming leadership's commitment to diversity and inclusion does not specifically address Asian xenophobia, it should enhance the effectiveness of actions directed specifically at that problem.

Communicate Leadership's Continuing Commitment to Diversity & Inclusion

Organizations should denounce the recent rise in discrimination against Asian individuals by reminding their employees that such discrimination is not only against organizational policies but also illegal. The organization should encourage all employees to speak out against racist jokes, hostile and aggressive behavior, and racism itself.[41] Furthermore, if the company is a service provider, leaders should remind staff that they are not permitted to refuse to serve or in any way decrease the quality of service they provide to the company's clientele. Indeed, research has shown that antidiscrimination policies and legislation can profoundly reduce subtle interpersonal discrimination even when such policies and laws explicitly address only overt and formal types of discrimination.[42,43] Therefore, reminding employees of antidiscrimination policies and laws should go a long way toward ensuring equitable treatment of Asian individuals.

Model Inclusive Behavior for Employees to Emulate

Leaders who display inclusive behavior convey the organization's cultural norms to everyone in the organization. For example, those who explicitly condemn subtle acts of discrimination against Asian employees or customers demonstrate that such behavior is inconsistent with the organization's norms. Visibly supporting Asian employees or clients with positive feedback, attention, and care is another way to model expected organizational norms.

Empirical research has shown that diversity-related initiatives are more successful when leadership support is modeled.[44] For instance, in an experiment assessing attitudes and behaviors regarding lesbian, gay, bisexual, and transgender (LGBT) individuals, subordinates of leaders who set goals related to supporting LGBT individuals (such as speaking up against slurs, stepping up as an ally, or attending an LGBT group meeting) reported more positive attitudes and behaviors than did subordinates of leaders who did not set such goals.[44] These results bolster those of previous studies demonstrating the benefit of having buy-in from those in positions of influence.[45,46] Empirical studies that demonstrate the value of having leaders model norms are also consistent with the tenets of social learning theory,[47] which holds that people learn how to

Table 1. COVID-19-related problems, solutions for organizational leaders, & behavioral principles related to the policy recommendations

Problem	Solution	Behavioral principle
Asian employees may experience threats to their safety, well-being, and productivity.	Create a crisis task force to address the discrimination.	The existence of the task force should increase employee trust in the organization. Trust-building leads to focused and productive work.
Economic downturns can result in decreased attention to and resources for diversity and inclusion.	Reaffirm leadership's commitment to diversity and inclusion.	Diversity and inclusion enhances employees' positive attitudes toward their jobs and improves organizational outcomes.
Overt discrimination may become more prevalent within organizations.	Communicate leadership's continuing diversity and inclusion commitment.	Policies and laws influence not only the dictated behaviors but others as well.
Subtle discrimination may become more prevalent within organizations.	Model inclusive behavior.	Modeling by leaders sets social norms that employees emulate.
Discrimination may be overlooked in organizations.	Establish or reassess accountability systems to ensure that policies and norms are followed.	Employees learn social norms by observing the outcomes that result from following or defying norms.

act by observing others' behaviors and attitudes. Leaders can further model the norm of ongoing support by ensuring that Asian employees are represented in the task forces or other entities charged with addressing the challenges that COVID-19 raises for the organization.

Establish or Reassess Accountability Systems to Ensure That Policies & Norms Are Followed

It is not enough to simply say that an organization does not tolerate xenophobia; the organization must also have processes and procedures for assessing inclusivity (such as holding focus groups and conducting surveys) and addressing discrimination (such as following established procedures and taking appropriate actions against wrongdoers).[48] As social learning theory implies, it is important for employees to see that people who discriminate are held accountable for their actions.[47] By observing others, people learn not only which attitudes and behaviors are acceptable but also what the outcomes of these attitudes and behaviors are. Thus, when people see others either getting away with or being punished for discriminatory behaviors or attitudes, they come to expect similar outcomes for themselves. Moreover, simply having systems of accountability signals to employees who might be targets of discrimination that they belong and that discrimination against them will not be tolerated.[49] Studies have shown that having a person or department that is responsible for diversity-related efforts can help to increase organizational diversity[48] and may maximize the organization's ability to emerge from crises with outcomes that are in line with its diversity and inclusion goals. See Table 1 for a summary of our recommendations and the behavioral science principles behind them.

Concluding Thoughts

The COVID-19 pandemic has unleashed a significant rise in discrimination against Asian individuals. The diversity and inclusion most organizations claim to value are threatened when prejudice and bias are left unchecked and allowed to flourish without response. Behavioral science reveals actions leaders can take to prevent such discrimination: gathering a crisis team, reinforcing organizations' commitment to diversity, communicating this commitment to stakeholders, visibly enacting antidiscrimination norms, and ensuring systems of accountability. By heeding these policy recommendations, organizations can fight long-standing and increased anti-Asian xenophobia and ensure that fairness, inclusion, and belonging persist during a time of great uncertainty.

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references

1. Perito, R., Higham, M., Mack, R., & Sackey, J. (2020, February 3). *Community update related to the novel coronavirus (2019-nCoV).* Tufts University. https://announcements.tufts.edu/announcement/community-update-related-novel-coronavirus-2019-ncov
2. Campbell, J. (2020, April 21). FBI concerned about potential for hate crimes during coronavirus pandemic. *CNN.* https://www.cnn.com/2020/04/21/politics/fbi-hate-crimes-coronavirus/index.html
3. Jeung, R., & Nham, K. (2020, April 23). *Incidents of coronavirus-related discrimination: A report for A3PCON and CAA*. Asian Pacific Policy & Planning Council. http://www.asianpacificpolicyandplanningcouncil.org/wp-content/uploads/STOP_AAPI_HATE_MONTHLY_REPORT_4_23_20.pdf
4. Choi, C., & Kulkarni, M. P. (2020, April 24). *In one month, STOP AAPI HATE receives almost 1500 incident reports of verbal harassment, shunning and physical assaults* [Press release]. http://www.asianpacificpolicyandplanningcouncil.org/wp-content/uploads/Press_Release_4_23_20.pdf
5. Liu, E. (2020, April 11). Covid-19 has inflamed racism against Asian-Americans. Here's how to fight back. *CNN.* https://www.cnn.com/2020/04/10/opinions/how-to-fight-bias-against-asian-americans-covid-19-liu/index.html
6. Chapman, L., & Frier, S. (2020, February 6). Uber and Lyft cars become vector for racism amid coronavirus fears. *Los Angeles Times*. Retrieved from https://www.latimes.com/business/technology/story/2020-02-06/asian-uber-drivers-passengers-racism-amid-coronavirus-fears
7. Dill, E. (2020, February 5). Coronavirus is prompting alarm on American campuses. Anti-Asian discrimination could do more harm. *The Chronicle of Higher Education*. https://www.chronicle.com/article/Coronavirus-Is-Prompting-Alarm/247999
8. Lee, B. Y. (2020, June 24). Trump once again calls Covid-19 coronavirus the 'Kung flu.' *Forbes*. Retrieved from https://www.forbes.com/sites/brucelee/2020/06/24/trump-once-again-calls-covid-19-coronavirus-the-kung-flu/#222125701f59
9. Bursztynsky, J. (2020, February 13). NYC small business chief: Chinatown hit hard because of 'unfounded fears' over coronavirus. *CNBC*. https://www.cnbc.com/2020/02/13/nyc-small-business-chief-gregg-bishop-coronavirus-fears-hit-chinatown.html
10. Centers for Disease Control and Prevention. (2020, August 18). *COVID-19 hospitalization and death by race/ethnicity.* https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html
11. National Association for the Advancement of Colored People. (2020, March 17). *Civil rights and racial justice organizations denounce discrimination against Asian Americans and urge unity in responding to coronavirus pandemic.* https://www.naacp.org/latest/civil-rights-racial-justice-organizations-denounce-discrimination-asian-americans-urge-unity-responding-coronavirus-pandemic/
12. Bar Association of San Francisco. (2020, March 24). *Racism and xenophobia are deplorable and undermine collective efforts to fight the coronavirus pandemic* [Press release]. https://www.sfbar.org/about-us/newsroom/03242020-2/
13. American College of Surgeons. (2020, April 3). *ACS statement on discrimination*. https://www.facs.org/covid-19/discrimination
14. Harvard University. (2020, April 23). *Joint statement on xenophobic and racist actions in response to COVID-19*. https://hutchinscenter.fas.harvard.edu/joint-statement-xenophobic-and-racist-actions-response-covid-19
15. Stevens, M. (2020, March 29). How Asian-American leaders are grappling with xenophobia amid coronavirus. *The New York Times*. https://www.nytimes.com/2020/03/29/us/politics/coronavirus-asian-americans.html
16. Al-Arshani, S. (2020, January 29). A Costco sample-stand worker turned away a kid wearing a face mask because she thought he was from China and could give her the coronavirus. Retrieved from https://www.insider.com/wuhan-coronavirus-kid-turned-away-food-samples-at-costco-2020-1
17. Silicon Valley Leadership Group. (2020, March 2020). *Statement in response to recent incidents and rhetoric targeting Asian Americans*. https://www.svlg.org/statement-in-response-to-recent-incidents-and-rhetoric-targeting-asian-americans/
18. Kight, S. W. (2013, August 23). Apple, Cisco, IBM speak out against Trump's immigration policies. *Axios.* https://www.axios.com/apple-cisco-ibm-trump-h1b-immigration-64e726f4-d23e-4753-a9e3-53723137fa3a.html
19. Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. *Advances in Experimental Social Psychology, 40,* 61–49.
20. Knight, J. L., King, E. B., & Hebl, M. (2010). The influence of economic threat on aspects of stigmatization. *Journal of Social Issues, 66,* 446–460.
21. IW Group. (2020). #WashTheHate [About page]. https://www.washthehate.com/#aboutUs
22. University of Wisconsin–Madison. (2020, May 19). *Resources during COVID-19: Supporting our pan-Asian communities in this time of crisis.* Retrieved from https://diversity.wisc.edu/2020/05/resources-during-covid-19-supporting-our-pan-asian-communities-in-this-time-of-crisis/
23. i4cp. (2020, April 1). *COVID-19 response: Diversity & inclusion.* https://www.i4cp.com/file/4397/download
24. Emond, L., & Maease, E. (2020, April 13). *Evolving COVID-19 responses of world's largest companies.* Gallup. https://www.gallup.com/workplace/308210/evolving-covid-responses-world-largest-companies.aspx
25. Lockwood, N. R. (2005). Crisis management in today's business environment: HR's strategic role. *Society for Human Resource Management Research Quarterly, 4,* 1–9.
26. Simola, S. K. (2005). Organizational crisis management: Overview and opportunities. *Consulting Psychology Journal: Practice and Research, 57,* 180–192. https://doi.org/10.1037/1065-9293.57.3.180
27. American Psychological Association. (2016, June 1). *Workplace well-being linked to senior leadership support, new survey finds* [Press release]. https://www.apa.org/news/press/releases/2016/06/workplace-well-being
28. Harter, J. (2018, August 26). *Employee engagement on the rise in the U.S.* Gallup. https://news.gallup.com/poll/241649/employee-engagement-rise.aspx

29. Gallup. (2015). *State of the American manager: Analytics and advice for leaders*. Retrieved from https://www.gallup.com/services/182138/state-american-manager.aspx

30. Hamill, L. (2019, August 14). How organizations can actively show employees they care. *Forbes*. https://www.forbes.com/sites/forbeshumanresourcescouncil/2019/08/14/how-organizations-can-actively-show-employees-they-care/#2aa4271c252e

31. Su, A. J. (2019, December 16). Do you really trust your team? (And do they trust you?). *Harvard Business Review*. https://hbr.org/2019/12/do-you-really-trust-your-team-and-do-they-trust-you

32. Zak, P. J. (2017, January–February). The neuroscience of trust. *Harvard Business Review*. https://hbr.org/2017/01/the-neuroscience-of-trust

33. Schneider, B. (1987). The people make the place. *Personnel Psychology, 40,* 437–453.

34. Eswaran, V. (2019, April 29). *The business case for diversity in the workplace is now overwhelming.* World Economic Forum. https://www.weforum.org/agenda/2019/04/business-case-for-diversity-in-the-workplace/

35. Fridman, A. (2019, June 4). *What's really at the core?* https://prohabits.com/blog/whats-really-at-the-core/

36. Hewlett, S. A., Marshall, M., & Sherbin, L. (2013, December). How diversity can drive innovation. *Harvard Business Review*. https://hbr.org/2013/12/how-diversity-can-drive-innovation

37. Dolan, K., Hunt, V., Prince, S., & Sancier-Sultan, S. (2020, May 19). *Diversity still matters.* McKinsey & Company. https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-still-matters

38. Lipton, D. (2019, April 13). *Boosting growth through diversity in financial leadership*. International Monetary Fund. https://www.imf.org/en/News/Articles/2019/04/13/sp041319-boosting-growth-through-diversity-in-financial-leadership

39. Chamorro-Premuzic, T. (2020, April 10). Are women better at managing the Covid19 pandemic? *Forbes*. Retrieved from https://www.forbes.com/sites/tomaspremuzic/2020/04/10/are-female-leaders-better-at-managing-the-covid19-pandemic/#12fd814528d4

40. Sergent, K., & Stajkovic, A. D. (2020). Women's leadership is associated with fewer deaths during the COVID-19 crisis: Quantitative and qualitative analyses of United States governors. *Journal of Applied Psychology, 105,* 771–783. https://doi.org/10.1037/apl0000577

41. Asian Pacific American Labor Alliance. (2020). *In response to COVID-19.* https://www.apalanet.org/covid19.html

42. Barron, L. G., & Hebl, M. (2013). The force of law: The effects of sexual orientation antidiscrimination legislation on interpersonal discrimination in employment. *Psychology, Public Policy, and Law, 19,* 191–205.

43. Hebl, M., Barron, L., Cox, C. B., & Corrington, A. R. (2016). The efficacy of sexual orientation anti-discrimination legislation. *Equality, Diversity and Inclusion: An International Journal, 35,* 449–466.

44. Madera, J. M., King, E. B., & Hebl, M. R. (2013). Enhancing the effects of sexual orientation diversity training: The effects of setting goals and training mentors on attitudes and behaviors. *Journal of Business and Psychology, 28*, 79–91.

45. Bell, M. P. (2007). *Diversity in organizations*. Thomson South-Western.

46. Rynes, S., & Rosen, B. (1995). A field survey of factors affecting the adoption and perceived success of diversity training. *Personnel Psychology, 48,* 247–270.

47. Bandura, A. (1977). *Social learning theory.* Prentice-Hall.

48. Kalev, A., Dobbin, F., & Kelly, E. (2006). Best practices or best guesses? Assessing the efficacy of corporate affirmative action and diversity policies. *American Sociological Review, 71,* 589–617.

49. Krentz, M., Dean, J., Garcia-Alonso, J., Taplett, F., Tsusaka, M., & Vaughn, E. (2019, January 12). *Fixing the flawed approach to diversity.* Boston Consulting Group. https://www.bcg.com/en-us/publications/2019/fixing-the-flawed-approach-to-diversity.aspx

finding

Gender differences in preventing the spread of coronavirus

Irmak Olcaysoy Okten, Anton Gollwitzer, & Gabriele Oettingen

abstract

Social distancing, handwashing, and mask wearing are key to preventing the spread of COVID-19. However, people vary in the degree to which they follow these practices. Previous findings have indicated that women adhere more to preventive health practices than men do. We examined whether this pattern held true for the COVID-19 pandemic by comparing women and men in three studies. In Study 1, women reported a greater degree of social distancing and handwashing. In Study 2, conducted in three different states in the northeastern United States, a greater percentage of women wore masks in public. In Study 3, anonymous county-level GPS data collected from approximately 15 million smartphones per day between March 9 and May 29, 2020, indicated that counties with a greater percentage of women exhibited greater social distancing. These data suggest that during pandemics, policymakers may benefit from disseminating preventive health messages that are purposely tuned to motivate adherence by men.

Olcaysoy Okten, I., Gollwitzer, A., & Oettingen, G. (2020). Gender differences in preventing the spread of coronavirus. *Behavioral Science & Policy* 6(2), 109–122. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

The guidelines for preventing COVID-19's spread are straightforward.[1] Medical experts have unanimously emphasized the importance of social distancing (avoiding physical contact with others), personal hygiene (such as handwashing), and mask wearing. Yet individuals and communities vary in their adherence to these guidelines.[2–4] Although some people have carefully followed shelter-in-place orders, others have flocked to packed beaches or gone on pub crawls.[5,6] The individual and group differences that underlie such divergences in compliance should inform policymakers' understanding of how to motivate people to engage in preventive measures during viral pandemics and whom to target.

In this article, we examine whether gender helps explain variance in individual and group responses to COVID-19-related public health guidelines. Specifically, do women adhere to the recommendations more than men do? We hypothesized that women would follow the guidelines more assiduously. For one, they typically engage in preventive health practices more in their daily lives: for example, they visit and comply with the recommendations of doctors and make use of preventive health services more than men do.[7] Women also pay more attention to their own and others' health-related needs and react more empathetically to others' pain.[8–14] Moreover, women are more likely to avoid risky behaviors and decisions, including risks related to their health.[15,16]

We conducted three studies to test whether women are more likely than men to endorse and engage in COVID-19 preventive behaviors. In Study 1, we examined whether women report greater social distancing and handwashing. We also looked into possible factors that could motivate reported compliance with these preventive measures, such as listening to medical experts and exhibiting alarm and anxiety over health threats posed by COVID-19. In Study 2, we looked at whether these results extend to actual behavior—do a greater percentage of women wear masks in public? Finally, in Study 3, we used GPS data of approximately 15 million people in the United States to assess whether people living in counties with a greater percentage of women than men exhibited greater social distancing by reducing general movement and visits to nonessential retailers (that is, nonessential stores and services) between March 9 and May 29, 2020.

Study 1

Method

Participants. We initially recruited 800 participants from the United States via the recruitment service Prolific. On April 8, 2020, participants completed a five-minute survey that was programmed on Qualtrics. We excluded 30 participants for inattention or because their gender was nonbinary. Of the remaining 770 participants, 442 were women. The average age was 30.7 years. The distribution of participant ethnicity was 61.9% White, 7.4% Black or African American, 13.7% Asian, 9.4% Hispanic, 5.4% mixed, 0.7% American Indian, 0.1% Native Hawaiian, and 1.7% other. See the Supplemental Material for details on the power analysis, participant recruitment, and participant characteristics.

Measures. Five questions assessed preventive COVID-19 practices. Participants reported the number of days they had had in-person contact with others in the past week (0–7 days), the number of days they had had in-person contact with friends and family in the past week (0–7 days), their frequency of handwashing, their tendency to stay home (other than shopping for groceries), and their tendency to maintain six feet of distance from others. Participants responded to the last three items on a scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. It is important to note that self-report items similar to these items are correlated with actual social distancing behaviors (as assessed by smartphone step counters and GPS tracking).[17] See the Supplemental Material for a complete list of the questions included in Study 1.

We assessed individuals' reported reliance on a number of external sources when deciding the extent to which they would socially distance: medical experts, the president, religious leaders, their governor, national media, social media,

other countries' experiences, their family, their friends, and their neighbors. We also assessed participants' reported reliance on internal sources: their own health history, anxiety, feelings of responsibility for themselves, and feelings of responsibility for others. Specifically, participants were asked, "How are the following factors influencing to what extent you are socially distancing yourself from others?" Participants answered on a scale ranging from 1 = *Not at all* to 7 = *Very much*.

Participants reported their anxiety ("Thinking about Covid-19 makes me feel extremely anxious") on a scale of 1 = *Strongly disagree* to 7 = *Strongly agree*, preoccupation ("How much preoccupied are you by the current Coronavirus pandemic?") on a scale of 1 = *Not at all* to 7 = *Extremely*, and uncertainty regarding COVID-19 ("How much uncertainty do you experience in your daily life as a result of the current Coronavirus pandemic?") on a scale of 1 = *Not at all* to 7 = *Extremely*.

To explore whether additional factors might have influenced responses to these questions, we had participants answer several other questions. They reported their daily frequency of checking COVID-19 news in an open-ended question. They also reported how knowledgeable they felt about the disease on a scale of 1 = *Not at all knowledgeable* to 7 = *Extremely knowledgeable*. They reported whether they belonged to a vulnerable population for contracting COVID-19 (such as due to health, age, profession, or other reasons), whether they knew anyone who contracted the disease, the likelihood of their contracting COVID-19 in the future (1 = *Not at all likely*, 7 = *Very likely*), how important not contracting the disease was to them (1 = *Not at all important*, 7 = *Very important*), and how much their daily routines changed during the pandemic (1 = *Not at all*, 7 = *Extremely*). All these questions were presented in random order. We also assessed whether participants' answers were skewed by a desire to respond in a socially acceptable or desirable way.[18] Finally, we asked participants to report their number of on-site workdays in the past week, as well as demographic characteristics, including political orientation (1 = *Very conservative*, 7 = *Very liberal*).

Results

Results are shown in Table 1 and, more fully, in Table S1 in the Supplemental Material.

Preventive Practices. Women reported engaging in four of the five measured preventive practices to a greater degree than men—maintaining six feet of distance, handwashing, staying at home, and having less frequent in-person contact with family and friends. The only item without a gender difference was the frequency of in-person contact with people other than family or friends, although the means were in the predicted direction.

Sources of Information for Social Distancing. Women reported relying on information from data-driven sources (medical experts, their governor, other countries' experiences, media) more than men did when deciding to what extent they should social distance. Additionally, compared with men, women reported being more influenced by all four internal sources (health history, anxiety, feeling responsible for others, feeling responsible for oneself). The tendency to listen to data-driven sources and the tendency to consult internal sources both positively correlated with preventive health practices, suggesting that women were more likely to listen to sources that motivate compliance with preventive COVID-19 health practices. Women and men, however, were about equally likely to turn to less data-oriented external sources, such as the president, religious leaders, and familiar others. The reported influence of these sources showed either weak correlations (in both directions) or no significant correlations with preventive health practices. See Table S2 in the Supplemental Material for specific correlations.

Psychological Experience. Women reported experiencing negative emotions (anxiety, preoccupation, uncertainty) in response to COVID-19 to a greater degree than men did.

Other Factors. Most of the other factors we examined did not influence the observed

Table 1. Study 1 results: Gender differences in self-reported measures

Variable	Women (n = 442)	Men (n = 328)		95% CI		
	M (SD)	M (SD)	p	Lower bound	Upper bound	Cohen's d
Preventive practices						
In-person contact with family or friends (days per week)	4.18 (2.97)	4.72 (2.86)	.011	0.12	0.96	0.19
In-person contact with others (days per week)	1.61 (2.07)	1.81 (2.08)	.191	−0.10	0.49	0.09
Handwashing	6.37 (1.07)	6.17 (1.25)	.020	−0.36	−0.03	−0.17
Staying at home (other than shopping)	5.83 (1.65)	5.51 (1.83)	.013	−0.57	−0.07	−0.19
Attention to maintaining six-foot distance	6.29 (1.14)	6.03 (1.20)	.003	−0.42	−0.09	−0.22
Source of information for social distancing						
External						
The president	2.87 (2.09)	2.91 (1.93)	.775	−0.24	0.33	0.02
Religious leaders	2.03 (1.73)	1.98 (1.65)	.714	−0.29	0.20	−0.03
Your governor	5.03 (1.95)	4.48 (1.87)	<.001	−0.82	−0.27	−0.28
Medical experts	6.23 (1.24)	5.98 (1.36)	.009	−0.43	−0.06	−0.19
National media	4.75 (1.78)	4.29 (1.72)	<.001	−0.71	−0.21	−0.26
Social media	3.93 (2.06)	3.51 (1.85)	.003	−0.70	−0.14	−0.22
Other countries	5.51 (1.75)	5.15 (1.69)	.004	−0.61	−0.12	−0.21
Your family	4.62 (2.01)	4.68 (1.82)	.662	−0.21	0.33	0.03
Your friends	3.74 (1.97)	3.76 (1.88)	.891	−0.26	0.29	0.10
Your neighbors	2.51 (1.84)	2.34 (1.71)	.582	−0.32	0.18	−0.04
Internal						
Your health history	4.08 (2.25)	3.52 (1.99)	<.001	−0.87	−0.26	−0.27
Your anxiety	4.92 (1.92)	4.04 (1.90)	<.001	−1.16	−0.61	−0.46
Your feeling of responsibility for others	6.10 (1.34)	5.78 (1.32)	.001	−0.51	−0.13	−0.24
Your feeling of responsibility for yourself	6.06 (1.34)	5.70 (1.42)	<.001	−0.56	−0.17	−0.28
Psychological experience						
Feeling extremely anxious	4.94 (1.65)	4.09 (1.67)	<.001	−1.09	−0.61	−0.51
Feeling preoccupied	4.71 (1.50)	4.41 (1.55)	.007	−0.52	−0.08	−0.20
Feeling uncertain	4.88 (1.56)	4.61 (1.57)	.016	−0.50	−0.05	−0.17
Other factors						
Subjective knowledge	5.22 (1.09)	5.09 (1.07)	.089	−0.29	0.02	−0.12
Frequency of checking news	3.88 (4.43)	3.82 (4.04)	.828	−0.68	0.55	−0.02
Social desirability	0.43 (0.23)	0.41 (0.23)	.348	−0.05	0.02	−0.07
Number of on-site workdays (per week)	0.75 (1.70)	0.98 (1.89)	.088	−0.03	0.49	0.13
Change in routines	5.33 (1.67)	5.27 (1.63)	.634	−0.29	0.18	−0.03
Expectancy of getting the virus	3.72 (1.48)	3.58 (1.45)	.188	−0.35	0.07	−0.09
Importance of not getting the virus	5.88 (1.41)	5.68 (1.51)	.060	−0.41	0.01	−0.14

Note. Where the variances across women and men were not equal, we report the p value generated by a statistical test that takes into account of this unequal variance. In technical terms, we generated the p values from a t test that was conducted based on an adjusted degrees of freedom accounting for dissimilar variances across the two groups (details are available in the Supplemental Materials). M = mean; SD = standard deviation; CI = confidence interval.

gender differences in preventive actions, sources of information, or emotional response (see the Supplemental Material for details). Men in our sample were, however, more conservative than women, $t(767) = 4.44$, $p < .001$ (see note A for a discussion of the statistical notations used in this article). When we controlled for political conservatism, the effect size of many of the observed findings decreased by between 43% and 6%, although the results remained significant in most cases. These results suggest that some latent factor underlying male gender and conservatism may have influenced our results. In the future, researchers should test whether psychological constructs related to both maleness and conservatism—for instance, a greater sense of power, more assertiveness, or greater feelings of autonomy and independence[10,17,19,20]—help explain the observed gender differences.

Study 2

Although Study 1 revealed gender differences, it remains possible that the reported behaviors do not reflect actual behavior. To address this concern, in Study 2, we used observational methodologies to test whether women are more likely than men to wear face coverings in public during the COVID-19 pandemic. Observational methods are thought to be more valid for reflecting real-world behavior than are methods that merely rely on self-reports.[21–24] Differences found in the field are also more convincing because they show up in spite of other contextual influences (that is, in spite of noise or error variance in the data).[25] Based on the results of Study 1 and on previous work on gender differences in preventive health behavior, we predicted that women would be more likely than men to wear masks in public.

Method

Observation Locations & Participants. We conducted our observations in three U.S. locations, identified by zip code: 10012 in New York City; 06511 in New Haven, Connecticut; and 08901 in New Brunswick, New Jersey. Although these locations are all in the northeastern United States, they differ on a variety of demographic variables, such as income, the race and ethnicity of inhabitants, the median age of the inhabitants, and the average number of people per household. (See the Supplemental Material for details.) The percentages of male and female inhabitants were similar across the three locations, however. All three observation locations had main streets with paved sidewalks that are convenient for walking.

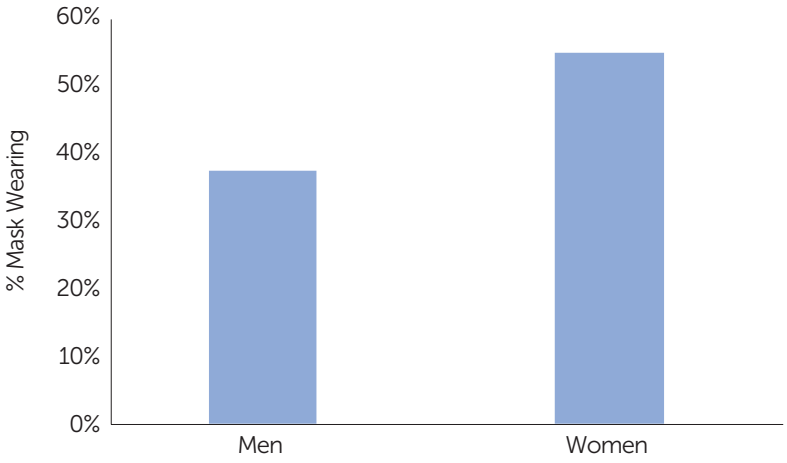
Participants. Before beginning the study, we made an observation plan and preregistered it, as described in the Supplemental Material. Specifically, we determined that each of us would observe 100 pedestrians in our assigned zip code region. Observations were made over two hours on May 4 in New York and Connecticut and over approximately eight hours across May 4 and May 5 in New Jersey (because of low pedestrian traffic). We observed 127 women and 173 men in total.

Procedure. Because we were self-quarantining in our respective homes in the three locations, we selected one street, or several blocks close by to observe pedestrians. We assessed and tallied the gender of each observed individual (including individuals on bikes but not those in cars) and noted whether the individual was wearing a mask. A person was deemed to be wearing a mask if his or her chin, mouth, and nose were covered (whether with cloth or with an actual mask). An individual who had a mask around his or her neck or in his or her hands was counted as not wearing a mask.

Results

The results are shown in Figure 1 (for details, see Table S3 in the Supplemental Material). A chi-square analysis revealed a significant association between gender and mask wearing, with women being more likely than men to wear masks, as compared with chance, $p = .003$. Follow-up analyses showed that a significantly higher percentage of women wore a mask (55.1%) than did not wear a mask (44.9%), $p < .05$. In contrast, the proportion of men who wore a mask (37.6%) was significantly lower than the proportion of those who did not (62.4%), $p < .05$. Although we did not make a prediction

Figure 1. Study 2 results: Percentage of mask wearing in men versus women



about a gender difference in the number of people in public, we observed more men (57.7%) than women (42.3%) on the street, $p = .008$, despite the fact that the overall gender distribution of the examined zip code locations was largely evenly split. This result aligns with the finding of Study 1 that women reported a higher tendency to stay at home during the pandemic.

Study 3

Consistent with the self-reported gender differences observed in Study 1, measures of an observed behavior—mask wearing—in Study 2 indicated that women are more likely than men to engage in COVID-19 preventive practices. However, the samples of Studies 1 and 2 were not completely representative of the U.S. population. For instance, the sample in Study 1 differed from the general population in being younger by about 10 years, being more educated, and having a higher proportion of Asians and lower proportions of Black and Hispanic individuals (see note B). Additionally, the sample in Study 2 was limited to people seen in three specific U.S. locations. Therefore, in Study 3, we tested whether our results extend to social distancing behavior at the U.S. county level.

Using the aggregated geotracking data of approximately 15 million people around the United States per day (tracked via individuals' smartphone GPS location coordinates), we examined whether the gender makeup of approximately 3,000 U.S. counties predicts the extent to which people in those counties practiced social distancing early in the COVID-19 pandemic, between March 9 and May 29, 2020. Social distancing was measured via (a) overall reduction in movement and (b) reduction in visits to nonessential retailers (encompassing stores and services) as compared with movement and visits before the pandemic started in the United States (that is, before March 9). See the Supplemental Material for a fuller definition of *nonessential retailer*.

Method

Participants. The aggregated movement data of approximately 15 million people across the United States per day between March 9 and May 29, 2020 were shared by Unacast (a software company that provides location and map services).[26] These data are anonymized in that they aggregate GPS coordinates by county. The data set included information from 3,054 counties. Twenty-nine counties with 2,000 or fewer inhabitants were removed from this number for the analyses. We excluded 952 additional counties from the analyses involving visits to nonessential retailers because of missing data.

Measures

Social Distancing. As noted earlier, social distancing was assessed in two ways: by decreases in overall movement and decreases in visits to nonessential retailers (as compared with pre-COVID-19 movement and visits, individually controlled for in each county). For more details, see Study 3 in the Supplemental Material.

County Gender Percentages. Counties' gender breakdowns were provided by https://github.com/JieYingWu/COVID-19_US_County-level_Summaries.

Additional Considerations. Descriptions of covariates (variables we controlled for in additional analyses) and of the coding of these variables can be found in Table S4 in the Supplemental Material. The variables are also listed in the Results section below.

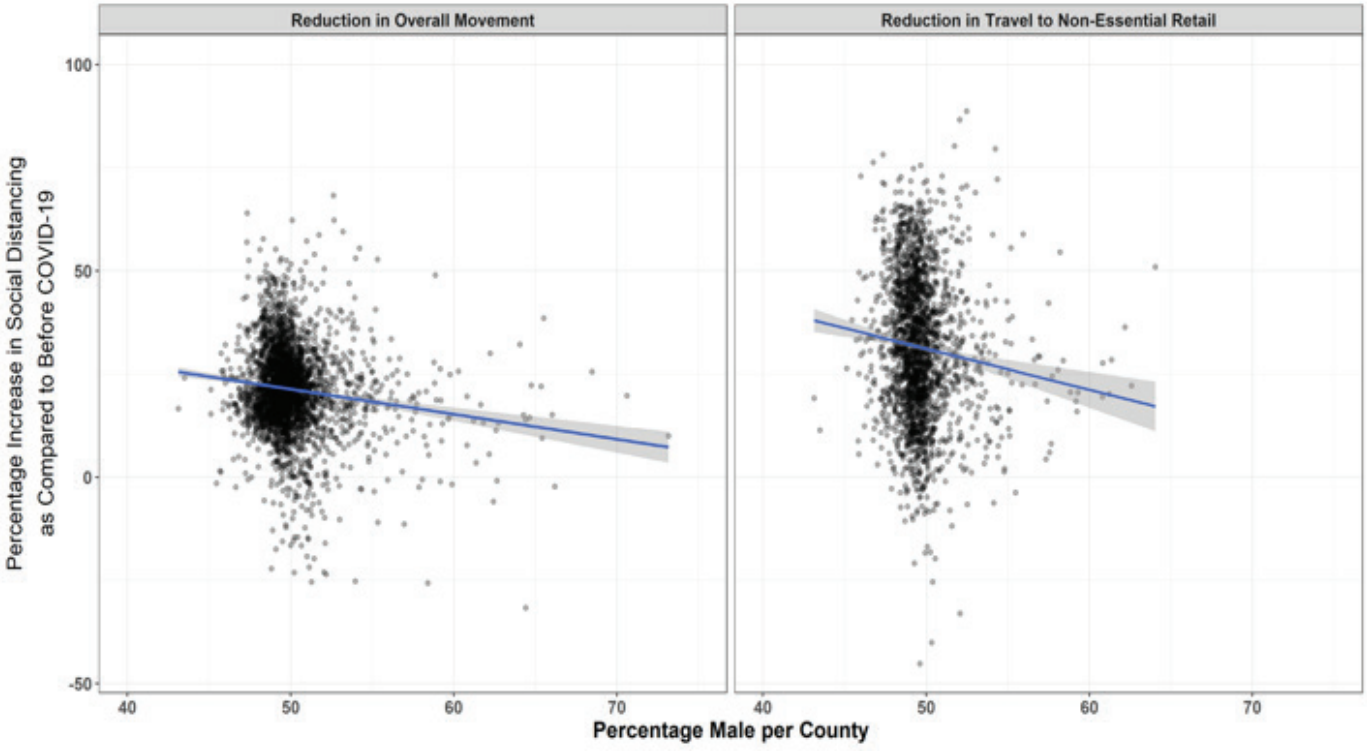
Results

We examined whether the percentage of men versus women in a county predicted an individual county's degree of social distancing between March 9 and May 29, 2020. We took into account that social distancing policies were instituted around mid-March and loosened toward the middle and end of April; thus, social distancing increased and then decreased over time. For more details on how we conducted all the data analyses discussed in this Results section, see the Supplemental Material.

Not surprisingly, social distancing—in terms of both reduced general movement and reduced visits to nonessential retailers—was higher in places with higher per capita rates of infection, on the weekends, in high-income counties (where people are more likely to be able to work from home), and when stay-at-home policies were in place (see Figure S2 in the Supplemental Material). Regarding counties' gender distribution (calculated as [total # of males]/[total # of males + total # of females]*100; *M* = 50.07%, *SD* = 2.26%, minimum value = 43.13%, maximum value = 73.16%), we found, as shown in Figure 2, that counties with a higher proportion of males (by 2 standard deviations above the mean) reduced general movement 4.02 percentage points less and reduced their visits to nonessential retailers 9.08 percentage points less than did counties with an average gender distribution (See note C for statistical details. Also see the base model statistics in Tables S6 and S7 of the Supplemental Material.)

We further examined how the link between gender distribution and social distancing changed over time during the study period. Then, to examine the robustness of this relation, we reran the test while controlling for several potential covariates. These variables included COVID-19 cases per capita (cumulative cases divided by county population, measured for each specific day in the included date range), state policy (whether a stay-at-home order was

Figure 2. Study 3 results: Increase in social distancing (March 9, 2020–May 29, 2020) at the county level as a function of the percentage of male raw scores



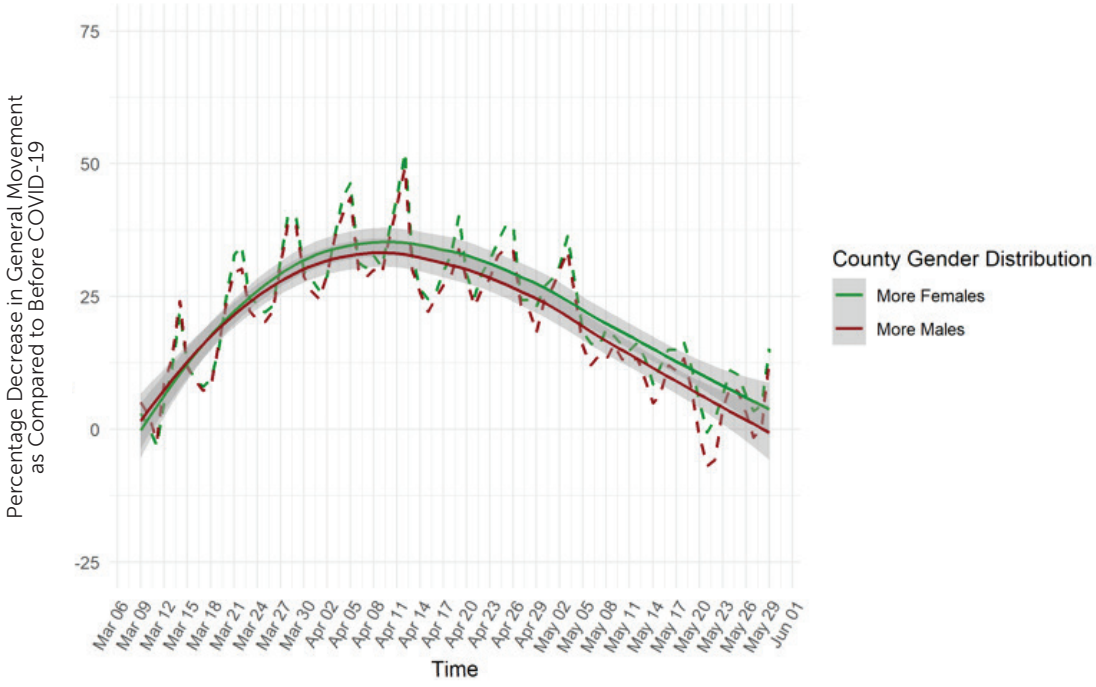
Note. Social distancing was assessed by degree of overall movement and visits to nonessential retailers (stores and services) in the United States as measured by anonymous GPS data from more than 3,000 counties. Counties with a higher percentage of men had lower levels of social distancing.

in effect in a specific state on a specific day), whether a day fell on a weekend or weekday, median income, median age, population density (in terms of population per square mile of land area), religiosity (rate of religious adherents per 1,000 people), percentage of employed residents, economic inequality, percentage of adults who only have a high school diploma, percentage of adults with a college degree, and percentage of adults who have at least a bachelor's degree. (See Table S4 in the Supplemental Material for descriptions of and sources for the variables.)

We found that counties with a higher percentage of males showed comparatively less and less social distancing as the COVID-19 pandemic progressed between March 9 and May 29, 2020, as measured both by movement (see Figure 3) and by visits to nonessential retailers (see Figure 4). See note D for the statistical details. In other words, the difference between males and females increased over time. These findings were observed while including the control variables noted earlier (such as COVID-19 cases per capita and median income). The interaction between gender and time can be seen in the highlighted rows in the main model and saturated model in Tables S6 and S7 in the Supplemental Material.

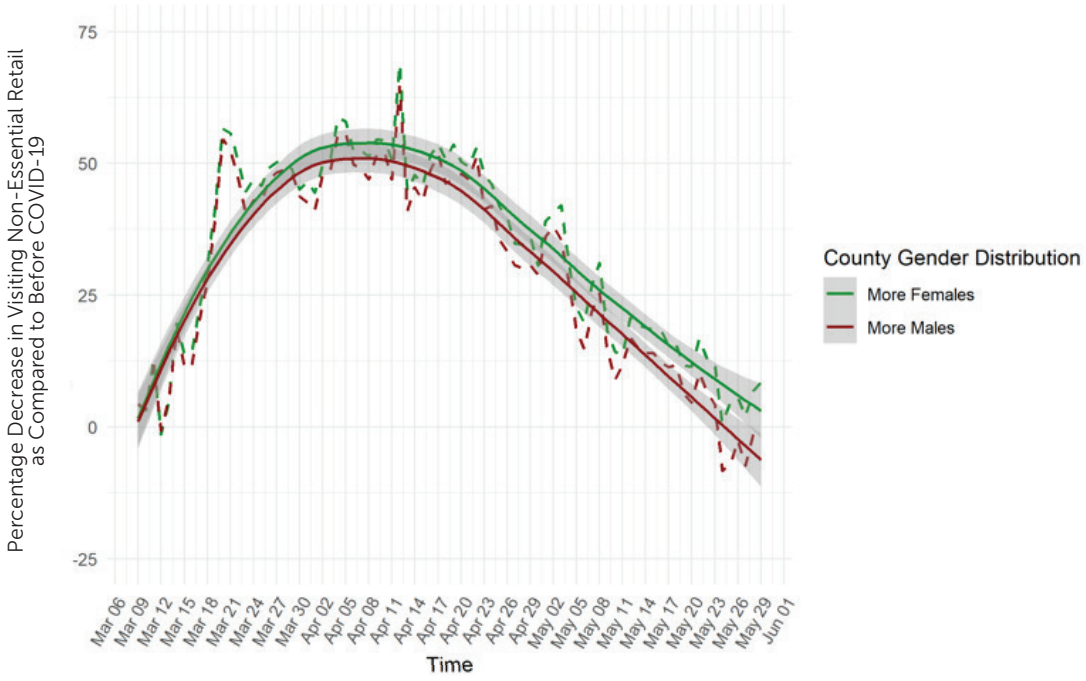
In theory, factors other than those already considered could have confounded the results. For instance, the findings could have conceivably been driven by men and women holding jobs that differ as to whether they are considered essential during the pandemic. Adding in counties' percentages of employment in various types of professions to our test, however, did not account for our findings. As is shown in Table S8 in the Supplemental Material, the results were unchanged when we controlled for counties' percentage of workers in a long list of job areas—among them, agriculture, mining,

Figure 3. Study 3 results: U.S. counties' average social distancing (percentage reduction in general movement) as a function of time & counties' gender distribution



Note. This figure compares movement in counties with more males to movement in counties with more females (split in terms of above the median of counties' gender distribution versus below the median of counties' gender distribution for the purposes of the figure). Dashed lines depict the daily average across counties. Solid lines depict these same data after smoothing (that is, after removal of random variation and plotting of the overall trend). Estimates were composed from raw scores. The analysis controlled for prepandemic social distancing (that is, distancing before March 9, 2020).

Figure 4. Study 3 results: U.S. counties' average social distancing (percentage reduction in visits to nonessential retailers) as a function of time & counties' gender makeup



Note. This figure compares visits to nonessential retailers in counties with more males to visits in counties with more females (split in terms of above the median of counties' gender distribution versus below the median of counties' gender distribution for the purposes of the figure). Dashed lines depict the daily average across counties. Solid lines depict these same data after smoothing (after removal of random variation and plotting of the overall trend). Estimates were composed from raw scores. The analysis controlled for prepandemic social distancing (that is, distancing before March 9, 2020).

utilities, construction, manufacturing, wholesale trade, retail trade, health care and social assistance, and accommodation and food services (*ps* < .001).

We also explored the effect of political orientation. The effect of gender distribution on reduced physical distancing over time did not substantially decrease when we accounted for counties' percentage of votes for Donald Trump over Hillary Clinton in 2016 (except in one specific analysis, in which the effect was reduced but remained significant). See Tables S9 and S10 in the Supplemental Material for details.

The findings in Study 3 could potentially have been driven by gender differences in behavior within households during the pandemic (such as men doing more of the grocery shopping than women were). To test this possibility, we examined counties' total number of families versus single people. Overall, household type did not consistently moderate the influence of gender on social distancing across the study period, as is illustrated in Tables S11 and S12 and Figures S4–S7 in the Supplemental Material.

Discussion

In three studies, we observed gender differences in preventive practices meant to limit the spread of COVID-19. In Study 1, we found that women are more likely than men to report engaging in social distancing and handwashing, as well as to listen to data-driven and internal sources (such as medical experts and feelings of responsibility to themselves and others) when making social distancing decisions.

Because of the potential limitations of self-report survey measures (gender differences may occur more in reporting than in actual behavior),

we used behavioral methodologies in two other studies to investigate the links between gender and preventive behavior. Specifically, Study 2 extended the findings of Study 1 to actual preventive behavior in the form of wearing masks in public. We observed that a greater percentage of women than men wore masks in public in three different locations of the northeastern United States (New Haven, Connecticut; New York, New York; and New Brunswick, New Jersey).

Study 3 extended these results to the group level. We examined whether the gender distribution of U.S. counties predicted the degree of social distancing behavior in these counties as assessed by the movements of approximately 15 million GPS smartphone coordinates per day across the United States between March 9 (close to the start of the pandemic in the United States) and May 29, 2020. Our analyses revealed that U.S. counties with more male constituents exhibited less social distancing, as measured by general movements and visits to nonessential retailers, and this pattern became more pronounced as the pandemic progressed.

Exploratory analyses in Study 1 suggested that political ideology might be one factor underlying the reported gender differences in preventive health measures. Consistent with this suggestion, other research has recently documented that political conservatives, as compared with more politically liberal respondents, engage in less social distancing, feel more in control over their own COVID-19 preventive actions, and feel less responsible for the prevention of the spread of the virus.[27–29] Although political ideology only partly accounted for the gender differences observed in Study 1 (at the individual level) and did not account for the link between counties' gender distribution and social distancing in Study 3 (at the group level), future research could involve a systematic investigation of the exact role that ideology and other ideology-relevant constructs (such as masculinity and endorsement of traditional gender roles) may play in people's adherence to public health recommendations for limiting the spread of COVID-19.

Limitations

Our studies had several limitations. First, the observed gender differences in social distancing might be explained by structural factors (such as employment conditions or family composition) rather than by individuals' personal motivation to maintain preventive health practices. In Study 1, we accounted for one such factor by demonstrating that the number of on-site workdays at the time of the study did not account for or contribute to the observed gender differences. And, in Study 3, potentially gendered behavior in families (such as shopping and childcare) did not appear to account for the observed results: the number of single versus family households in a county did not moderate our findings. Finally, controlling for factors related to socioeconomic status (SES)—that is, annual income, economic inequality, education, employment, and type of profession—at the county level in Study 3 did not change our results. Nevertheless, all these county-level factors were analyzed on the basis of prepandemic data (that is, these data did not take into account the shifts in SES that resulted from the pandemic) and therefore should be interpreted with caution. Future research should investigate the role of behaviors within households and other structural factors that could influence how gender contributed to social distancing decisions and practices as the COVID-19 pandemic was unfolding.

Second, the behavioral observations in Study 2 were restricted to the three locations where we were located while stay-at-home orders were in place. Although these locations vary in annual household income, household composition, age, and ethnicity, one should be cautious in generalizing these findings to the entire U.S. population. Also, all three locations were in "blue" counties and states that voted for Clinton over Trump in the 2016 election. Although Study 3, in which we examined millions of data points from across the entire United States (including conservative counties), largely remedies these concerns, future research should nonetheless test whether the observed gender differences in mask wearing extend to other locations and demographics.

Third, in Study 3, although the link between counties' gender distribution and social distancing was robust to a number of covariates, this link was not very strong. That is, including further covariates in the analyses would likely at some point eliminate the observed effects of counties' gender distribution on social distancing. We note, though, that this would not be particularly surprising, because the added variables would probably pick up on the psychological influences that underlie the reasons why maleness is linked to reduced social distancing in the first place (such as the tendency to react to perceived threats to one's masculinity and a propensity for risk-taking).

Finally, the present studies do not eliminate the potential role of biological factors in gender differences in the severity of COVID-19 cases and mortality, such as the greater prevalence of hypertension, cardiovascular diseases, and other relevant health problems among men than women. That is, our findings are more relevant to understanding gender differences in the potential spread of COVID-19 (due to differences in engaging in preventive health practices) than to understanding gender differences in the severity of the cases and mortality rates.

Policy Implications

Collectively, our results suggest that failing to engage in preventive practices may be putting men at higher risk of catching and spreading COVID-19. As such, alerting men in particular to the protective power of social distancing, handwashing, and mask wearing may be helpful in reducing the spread of the virus. To fine-tune preventive health policies so that they do a better job of influencing men, policymakers might target men's illusions of invulnerability (which are supported by traditional views of masculinity)[20,30] and remind them of their responsibilities to others and themselves during this critical period.[8,31] Disseminating prevention messages particularly in places where men frequently get together can be an effective strategy.[32,33]

Alternatively, interventions that target perceptions of masculinity by inviting men to critically reflect on the social norms of manhood may make them aware of the obstacles that might stand in the way of their taking preventive actions during COVID-19.[34] Research has shown that educational sessions that are led by male role models and allow young men to discuss masculinity norms have been effective in improving other preventive health behaviors.[35] Similar strategies could be applied in the service of COVID-19 prevention, perhaps through interactive online platforms.

A self-regulation strategy called WOOP (wish, outcome, obstacle, plan) may also be helpful, as it has been shown to facilitate behavior changes in various domains, including the health domain.[36,37] WOOP includes four simple steps: (a) identifying a wish, (b) identifying and imagining the best outcome of attaining this wish, (c) identifying and imagining the internal obstacle (such as an emotion, an irrational belief, or a bad habit) that stands in the way of fulfilling the identified wish, and (d) forming an if-then plan to overcome the identified obstacle ("if my obstacle occurs, then I will act in a way that will overcome this obstacle"). In the current context, people could be asked to identify a wish related to reducing the spread of COVID-19, the best outcome of fulfilling this wish (such as "My family will remain healthy"), and the internal obstacle that stands in their way (such as "I may look like a coward if I wear a mask"). Finally, they can form a specific if-then plan to overcome their inner obstacle and engage in preventive health behaviors (as in, "If I think I will look like a coward, then I will remember my family and wear a mask"). In light of the finding that hospitalization and fatality rates from COVID-19 have so far been higher among men,[38–40] interventions focused on men may be particularly effective at attenuating the number of people who fall ill and die from the disease.

end notes

A. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming that there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the cutoff for statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis. Statistical tests such as the *F* test and *t* test are *parametric:* they make some assumptions about the characteristics of a population, such as that the compared groups have an equal variance on a compared factor. In cases where these assumptions are violated, researchers make adjustments in their calculations to take into account dissimilar variances across groups. A 95% confidence interval (CI) for a given metric indicates that in 95% of random samples from a given population, the measured value will fall within the stated interval. Standard deviation (SD) is a measure of the amount of variation in a set of values. Approximately two-thirds of the observations fall between one standard deviation below the mean and one standard deviation above the mean. In addition to the chance question, researchers consider the size of the observed effects, using such measures as Cohen's *d* or Cohen's *h*. Cohen's *d* or *h* values of 0.2, 0.5, and 0.8 typically indicate small, medium, and large effect sizes, respectively.

B. The percentage of White individuals in our sample in Study 1 matched the proportion in the U.S. population (which, in 2018, was 60.4%).[41] However, compared with the U.S. population, our sample was younger (*Mdn* = 38.2 years),[41] and included a higher proportion of Asian individuals (U.S. population in 2018: 5.9%) and lower proportions of Black (U.S. population in 2018: 13.4%) and Hispanic individuals (U.S. population in 2018: 18.3%).

C. In Study 3, we found that people in counties with a higher proportion of males reduced general movement 4.02 percentage points less and reduced their visits to nonessential retailers 9.08 percentage points less than did people in counties having an average gender distribution. The statistical results were as follows: $B_{movement} = -2.01$, 95% CI [−2.79, −1.21], $p < .001$, and $B_{visitation} = -4.54$, 95% CI [−5.89, −3.18], $p < .001$. *B* values here indicate the change in the predicted variable (reduction in general movement or reduction in visits to nonessential retailers) as a function of a unit change in the predicting variable. One unit change in the predicting variable in these statistical models captures a change of 2.26 (1 standard deviation) because gender distribution was *z* scored in the models. So, for instance, for general movement, the *B* coefficient can be interpreted as follows: A change of 2.26 percentage points in gender distribution (for example, 50.00% male versus 52.26% male) is linked to a 2.01 percentage point decrease in social distancing (see the negative *B* value of −2.01 for general movement). In other words, counties with a greater male percentage (by 2.26 percentage points) were significantly less likely to reduce general movement (that is, 2.01 percentage points less).

D. In Study 3, we found that counties with a higher percentage of males showed comparatively less and less social distancing as the COVID-19 pandemic progressed (between March 9 and May 29, 2020), as measured both by movement and by visits to nonessential retailers. The statistical results were as follows: $B_{movement} = -0.42$, 95% CI [−0.47, −0.38], $p < .001$, and $B_{visitation} = -0.35$, 95% CI [−0.46, −0.25], $p < .001$.

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supplemental material

- https://behavioralpolicy.org/publication
- Methods & Analyses

references

1. Centers for Disease Control and Prevention. (2020, April 11). *How to protect yourself & others.* https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html
2. Tabri, N., Hollingshead, S. J., & Wohl, M. J. A. (2020, March 31). *Framing COVID-19 as an existential threat predicts anxious arousal and prejudice towards Chinese people*. PsyArXiv. https://doi.org/10.31234/osf.io/mpbtr
3. Aleem, Z. (2020, March 15). A new poll shows a startling partisan divide on the dangers of the coronavirus. https://www.vox.com/2020/3/15/21180506/coronavirus-poll-democrats-republicans-trump
4. Bruce, G., Nguyen, H., Ballard, J., & Sanders, L. (2020, March 27). *COVID-19 report: How the virus is affecting everything, from politics to brands.* YouGov. https://today.yougov.com/topics/science/articles-reports/2020/03/12/covid-19-report-how-virus-affecting-world-politics
5. Dusenbury, W. (2020, March 16). Some of Florida's top beaches closed to prevent coronavirus, but not everybody got the message. *Sun Sentinel*. https://www.sun-sentinel.com/coronavirus/fl-ne-clearwater-beach-coronavirus-20200316-pag4de6onnauffkaykbfz6l654-story.html
6. Rahman, K. (2020, March 15). St. Patrick's Day revelers in Chicago and Louisiana flout coronavirus warnings to stay at home. *Newsweek*. https://www.newsweek.com/st-patricks-flout-coronavirus-warnings-fill-bars-1492376
7. Waldron, I., & Johnston, S. (1976). Why do women live longer than men? *Journal of Human Stress, 2*(2), 19–30.
8. Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science & Medicine, 34,* 907–917.
9. Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Harvard University Press.
10. Gilligan, C., & Wiggins, G. (1988). The origins of morality in early childhood relationships. In C. Gilligan, J. V. Ward, & J. M. Taylor (Eds.), *Mapping the moral domain* (pp. 111–138). Harvard University Press.
11. Karniol, R., Grosz, E., & Schorr, I. (2003). Caring, gender role orientation, and volunteering. *Sex Roles, 49*(1–2), 11–19.
12. Cheng, Y., Decety, J., Lin, C. P., Hsieh, J. C., Hung, D., & Lee, P. L. (2007). Sex differences in the spinal excitability during observation of bipedal locomotion. *Neuroreport, 18,* 887–890.
13. Marzoli, D., Palumbo, R., Domenico, A. D., Penolazzi, B., Garganese, P., & Tommasi, L. (2011). The relation between self-reported empathy and motor identification with imagined agents. *PLOS ONE, 6,* Article e14595. https://doi.org/10.1371/journal.pone.0014595
14. Hoffman, M. L. (1977). Sex differences in empathy and related behaviors. *Psychological Bulletin, 84,* 712–722.
15. Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin, 125,* 367–383.
16. Liang, W., Shediac-Rizkallah, M. C., Celentano, D. D., & Rohde, C. (1999). A population-based study of age and gender differences in patterns of health-related behaviors. *American Journal of Preventive Medicine, 17,* 8–17.
17. Gollwitzer, A., Martel, C., Marshall, J., Höhs, J., & Bargh, J. A. (2020, June 4). *Connecting self-reported social distancing to real-world behavior at the individual and U.S. state level*. PsyArXiv. https://doi.org/10.31234/osf.io/kvnwp
18. Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 38,* 119–125.
19. Kray, L. J., Howland, L., Russell, A. G., & Jackman, L. M. (2017). The effects of implicit gender role theories on gender system justification: Fixed beliefs strengthen masculinity to preserve the status quo. *Journal of Personality and Social Psychology, 112,* 98–115.
20. Courtenay, W. H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 50,* 1385–1401.
21. Oettingen, G., & Seligman, M. E. (1990). Pessimism and behavioural signs of depression in East versus West Berlin. *European Journal of Social Psychology, 20,* 207–220.
22. Saarni, C. (1984). An observational study of children's attempts to monitor their expressive behavior. *Child Development, 55,* 1504–1513.
23. Skitka, L. (2019, February). *Presidential plenary: Behavior is worth 1,000 words.* [Paper presentation]. Annual meeting of the Society of Personality and Social Psychology, Portland, OR, United States.
24. Talhelm, T., Zhang, X., & Oishi, S. (2018, April 25). Moving chairs in Starbucks: Observational studies find rice-wheat cultural differences in daily life in China. *Science Advances, 4*(4), Article eaap8469. https://doi.org/10.1126/sciadv.aap8469
25. Cialdini, R. (2019, February). *Which behavior speaks loudest?* [Paper presentation]. Annual meeting of the Society of Personality and Social Psychology, Portland, OR, United States.
26. Unacast. (2020). *Social distancing scoreboard.* https://www.unacast.com/covid19/social-distancing-scoreboard
27. Everett, J. A. C., Colombatto, C., Chituc, V., Brady, W. J., & Crockett, M. (2020, March 20). *The effectiveness of moral messages on public health behavioral intentions during the COVID-19 pandemic*. PsyArXiv. https://doi.org/10.31234/osf.io/9yqs8
28. Rothgerber, H., Wilson, T., Whaley, D., Rosenfeld, D. L., Humphrey, M., Moore, A. L., & Bihl, A. (2020, April 22). *Politicizing the COVID-19 pandemic: Ideological differences in adherence to social distancing*. PsyArXiv. https://doi.org/10.31234/osf.io/k23cv
29. Gollwitzer, A., Martel, C., Brady, W. J., Pärnamets, P., Freedman, I., Knowles, E., & Van Bavel, J. J. (2020, May 24). *Partisan differences in physical distancing predict infections and mortality during the coronavirus pandemic*. PsyArXiv. https://doi.org/10.31234/osf.io/t3yxa
30. Mahalik, J. R., Burns, S. M., & Syzdek, M. (2007). Masculinity and perceived normative health behaviors as predictors of men's health behaviors. *Social Science & Medicine, 64,* 2201–2209.
31. White, R. (2002). Social and political aspects of men's health. *Health, 6,* 267–285.
32. Robertson, S., Zwolinsky, S., Pringle, A., McKenna, J., Daly-Smith, A., & White, A. (2013). "It is fun, fitness and football really": A process evaluation of a football-based health intervention for men. *Qualitative Research in Sport, Exercise and Health, 5,* 419–439.
33. Aoun, S., Donovan, R. J., Johnson, L., & Egger, G. (2002). Preventive care in the context of men's health. *Journal of Health Psychology, 7,* 243–252.

34. Fleming, P. J., Lee, J. G., & Dworkin, S. L. (2014). "Real men don't": Constructions of masculinity and inadvertent harm in public health interventions. *American Journal of Public Health, 104,* 1029–1035.

35. Pulerwitz, J., Michaelis, A., Verma, R., & Weiss, E. (2010). Addressing gender dynamics and engaging men in HIV programs: Lessons learned from Horizons research. *Public Health Reports, 125,* 282–292.

36. Oettingen, G. (n.d.). The science behind WOOP. WOOP. https://woopmylife.org/en/home

37. Wittleder, S., Kappes, A., Oettingen, G., Gollwitzer, P. M., Jay, M., & Morgenstern, J. (2019). Mental contrasting with implementation intentions reduces drinking when drinking is hazardous: An online self-regulation intervention. *Health Education & Behavior, 46,* 666–676.

38. Grasselli, G., Zangrillo, A., Zanella, A., Antonelli, M., Cabrini, L., Castelli, A., Cereda, D., Coluccello, A., Foti, G., Fumagalli, R., Iotti, G., Latronico, N., Lorini, L., Merler, S., Natalini, G., Piatti, A., Ranieri, M. V., Scandroglio, A. M., Storti, E., . . . Pesenti, A. (2020). Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. *JAMA, 323,* 1574–1581. https://doi.org/10.1001/jama.2020.5394

39. Garg, S., Kim, L., Whitaker, M., O'Halloran, A., Cummings, C., Holstein, R., Prill, M., Chai, S. J., Kirley, P. D., Alden, N. B., Kawasaki, B., Yousey-Hindes, K., Niccolai, L., Anderson, E. J., Openo, K. P., Weigel, A., Monroe, M. L., Ryan, P., Henderson, J., . . . Fry, A. (2020, April 17). Hospitalization rates and characteristics of patients hospitalized with laboratory-confirmed coronavirus disease 2019—COVID-NET, 14 states, March 1–30, 2020. *Morbidity and Mortality Weekly Report, 69,* 458–464. https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6915e3-H.pdf

40. Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. (2020). The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19)—China 2020. *China CDC Weekly, 2*(8), 113–122. https://doi.org/10.46234/ccdcw2020.032

41. United States Census Bureau. (2019, June 20). *2018 population estimates by age, sex, race and Hispanic origin* [Press release]. https://www.census.gov/newsroom/press-kits/2019/detailed-estimates.html

essay

A community-based sociocultural network approach to controlling COVID-19 contagion: Seven suggestions for improving policy

Timothy R. Hannigan, Milo Shaoqing Wang, Christopher W. J. Steele, Marc-David L. Seidel, Ed Cervantes, & P. Devereaux Jennings

abstract

We showcase the usefulness of a community-based sociocultural network approach to understanding and combating COVID-19 contagion. Rather than recommending the standard approach to modeling contagion, which uses the individual person as the unit of interest (SEIR-type modeling), we encourage researchers and policymakers to focus on social units (such as households) and to conceive of the social units as being part of a community (a local configuration of a sociocultural network) that is embedded in a regional or national culture. Contagion occurs via culturally conditioned interactions between social units in these community networks. On the basis of this approach and our preliminary simulation results, we offer three policy suggestions for analysts, two for policymakers, and two for practitioners.

Hannigan, T. R., Wang, M. S., Steele, C. W. J., Seidel, M.-D. L., Cervantes, E., & Jennings, P. D. (2020). A community-based sociocultural network approach to controlling COVID-19 contagion: Seven suggestions for improving policy. *Behavioral Science & Policy* 6(2), 123–136. Retrieved from https://behavioralpolicy.org/journal_issue/covid-19/

Policies meant to control the spread of COVID-19 are designed to address both near- and long-term goals. As Thomas Pueyo highlighted in a recent *Medium* post (see Figure 1), they aim initially to "hammer down" the curves representing cases and deaths over time by reducing the transmission rate through hand washing, mask wearing, physical distancing, canceling large gatherings, and closing schools and businesses.[1] Then, to prevent resurgences, they engage in a "dance," trying to balance the relaxation of the policies with renewed tightening as needed (assisted by monitoring and testing).

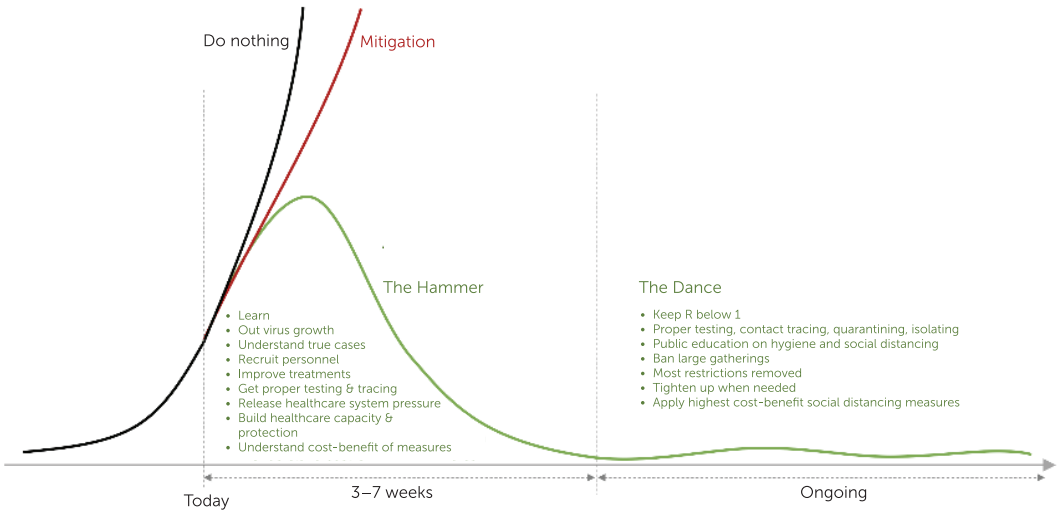
To enhance the success of such policies and the modeling that informs them,[2,3] we present a sociocultural network approach for understanding and combating contagion in communities. We base this approach on established social science research on social networks,[4,5] computational social science,[6–9] organizational community dynamics,[10–12] and the interpretation of sociocultural data.[13–16] The approach views a community as containing networks of interacting social units—such as households or workplaces—and being embedded in a wider regional or national culture, and it can be used to examine how changes within and across communities affect contagion rates at the social-unit level. It suggests several ways to improve strategies for predicting patterns of COVID-19 contagion, to craft community-level policies for controlling its spread, and to customize communication of those policies so that they achieve their intended outcomes. We offer three suggestions for policy analysts interested in why contagion patterns flow as they do, two for the policymakers who decide what policies are needed, and two for the policy practitioners who decide how best to carry out the recommendations.

Suggestions for Policy Analysts

1. Better Understand Contagion by Conceptualizing Dynamics at the Community Level Using Sociocultural Networks

The standard epidemiological approach to predicting the speed and extent of an infectious disease's spread in a given place (say, a city, state, or country) uses the individual person as the unit of analysis.[17,18] Models assess individuals' susceptibility to infection, their exposure and infection status, the frequency of their interactions with others, and whether they recover or die (i.e., they use an SEIR-type model). The approach usually works well when

Figure 1. Flattening the curve



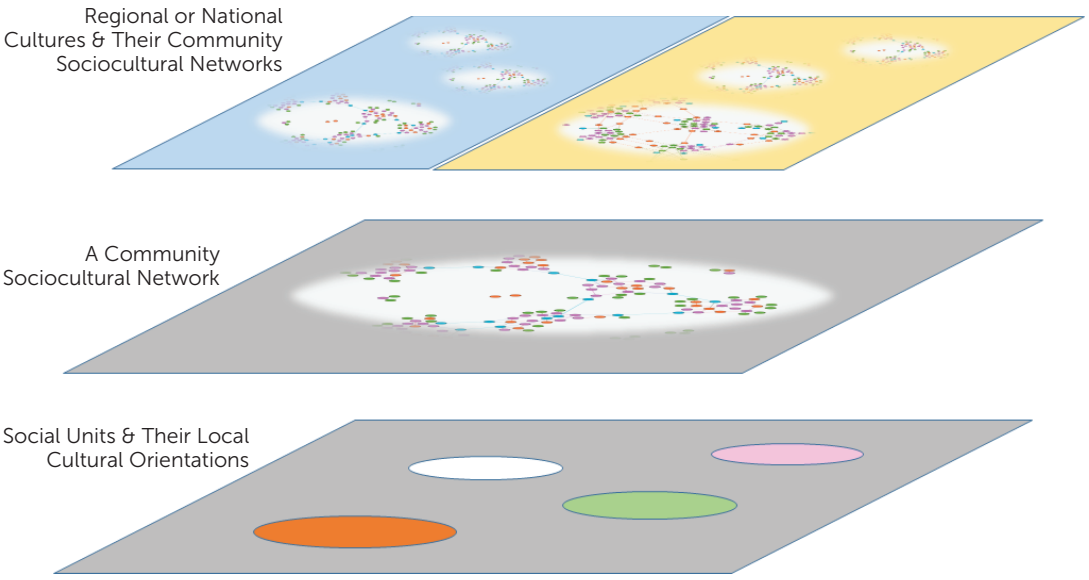
Note. From "Coronavirus: The Hammer and the Dance," by T. Pueyo, March 19, 2020 (https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56). Copyright 2020 by T. Pueyo. Reprinted with permission.

the place of concern is culturally homogeneous and individuals act independently. But it can miss differences in contagion patterns in subsets of a diverse population or when the reactions of individuals are intertwined with those of larger groups or networks; consequently, its results can lead to policy decisions that work better for some communities and nations than others.

To address that drawback, we model contagion in a way designed to reveal community-level features that can affect the success of public health policies. Instead of our analytic unit being the individual person, we use social units (such as households, farms, or workplaces), in which people interact and with which they identify (see Figure 2).[19] As we have already noted, we view communities as being composed of multiple social units that are linked to one another—that is, as sociocultural networks—and that are embedded in a wider regional or national culture.[20,21] When analyzing contagion patterns, we take into account that each social unit's behavior is conditioned by particular culturally influenced attitudes toward activities of interest (such as to physical distancing) as well as by the structure of the unit's social network (such as whether relatively few units do most of the interacting or whether many units interact with one another). We also attend to the ways that the linkages create distinctive patterns of contagion within a community. For instance, a dense residential area encompassing many households that are related to one another would be characterized by many interactions between households and thus by greater contagion than would a more rural area in which households tend to keep to themselves.

This conception of sociocultural networks makes it clear that a unit's behavioral responses to policies for limiting the spread of COVID-19 (such as physical distancing, quarantining of communities, or convalescing at home) will be influenced by the specific unit's cultural orientation and by the norms and the interactivity of both the local, community-level sociocultural network and the broader region or nation. The message for policy analysts is equally clear: Sociocultural networks can enhance or inhibit the effects of COVID-19 policies, with the effects varying from one community to another and within subsets of communities. These differences become particularly pronounced in culturally diverse communities.

Figure 2. Levels of analysis in the community sociocultural network approach



Note. The four colors seen in the circles on the social unit cultural orientation level represent the four different types of cultural orientation: engagers, connectors, dividers, and loners.

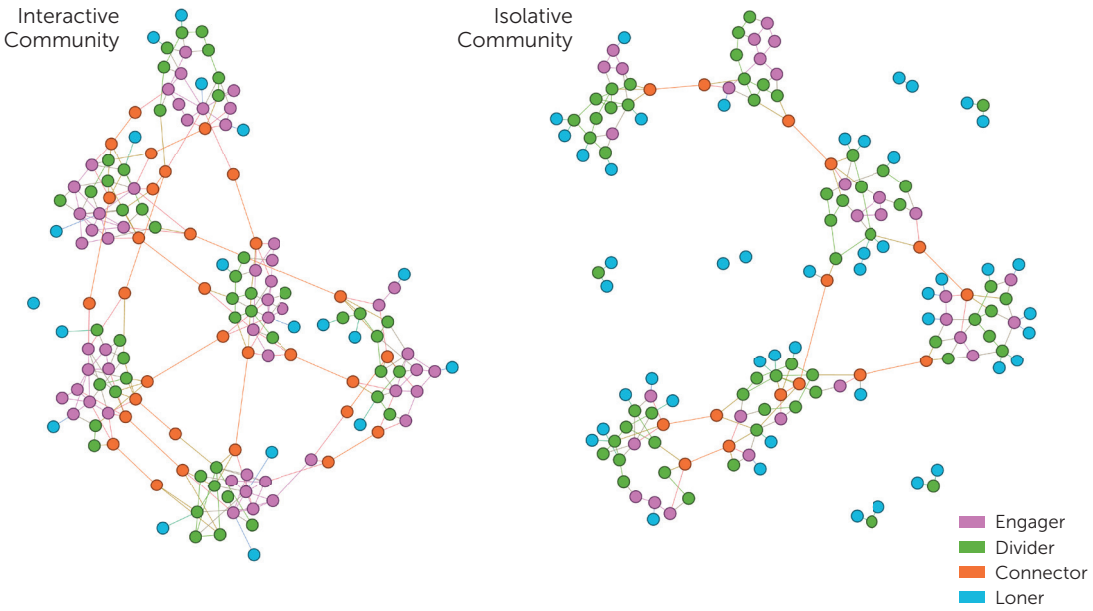
2. Build Models That Exemplify Different Kinds of Communities, Representing These Archetypes as Sociocultural Networks

To gain insight into the factors that most affect contagion patterns in communities, we modify standard agent-based modeling (ABM), which predicts population-level patterns of activity by having different individuals in the population (the agents) follow particular sets of rules for making decisions.[22] Our agents are the social units we have previously mentioned, which represent the different types of units likely to occur in a community. In the case of COVID-19, as shown at the bottom layer in Figure 2, we start with social units such as households. We define *households* more broadly than economists do—as being the standard living arrangement of an individual or group of individuals (home, apartment, or sets of linked living unit in a neighborhood). These units frequently differ from one another and are distinguished in contagion models according to the degree and types of social interactions they engage in and their physical proximity, that is, in what can be called their "cultural orientation" to distancing. This rubric yields four types of social units: *engagers* (units that are socially close and physically interact regularly), *connectors* (units that are socially close but physically distanced), *dividers* (who are socially distant but physically near to other units), and *loners* (units who are socially and physically distant from most other units). The four colors in the bottom of Figure 2 represent these four types of cultural orientation.

Next, the interactions among these social units are modeled as forms of what are called "small world networks," such as the community sociocultural network depicted in the middle layer of Figure 2. In these community sociocultural networks, clusters of units (or *neighborhoods*, in small world terms) can differ from one another in the units' physical proximity and social connectedness, and some of the units connect across clusters. Certain clusters will be denser and more connected than others.[23] As shown in the top layer of Figure 2, the community social networks are embedded in a regional or country culture; hence, these cultures can confer some sociocultural features on the community that influence contagion apart from the influence exerted by the structure of the sociocultural network itself. The sociocultural network structure and these other cultural factors will strongly shape the patterns of interaction among units and, hence, the likelihood of spreading the coronavirus. A social unit's location and types of interaction in its community sociocultural network gives the unit a particular rate of susceptibility, exposure, infection, and recovery (or fatality); among modelers, these rates are known as SEIR factors.

Combining the variety of social units and their orientation toward interaction, their network ties, and the cultural milieu of the locale in which they are embedded allows us to generate archetypes of sociocultural networks. Figure 3 shows two archetype communities. To produce the archetypes, we first adjusted the specific likelihoods of physical and social interaction (based on their cultural orientations) for each social unit, using as a guide observed current patterns in neighborhoods of midsize North American cities. Next, we seeded the composition of each community. We populated one of them with 60% engagers and connectors and 40% dividers and loners, and we then set a rule for modifying (at random) a number of ties to the units based on the unit type (up to three for engagers, two for connectors, one for dividers, and one for loners). We populated the second community with 40% engagers and connectors and 60% dividers and loners, and we based the ties among the units on our random tie formation rule. Then we used an algorithm that generates small world networks to apply our rules to 150 *nodes* (social units)—an optimal number (that is, their *Dunbar number*) for this kind of small world modeling. The resulting archetypal *interactive* sociocultural network is depicted on the left side of Figure 3, and the archetypal *isolative* network is on the right. In the figure, we color each node according to its cultural orientation, which affected the placement of the node within the network. In each network, the connector units are the ones that

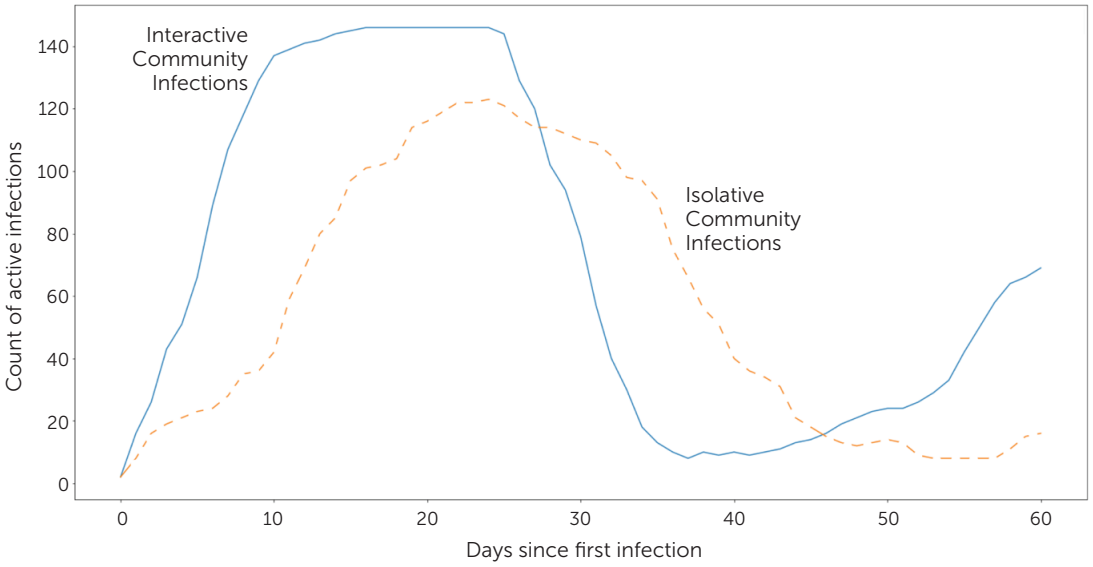
Figure 3. Interactive versus isolative community sociocultural networks



form links between clusters, and loners have only single ties to other nodes.

With the archetypes in hand, we modeled their levels of contagion. Agent-based models of contagion typically calculate changes in terms of single days and assign each agent a specific chance of bumping into (that is, interacting directly with) a neighbor. We also used the day as our time period but based interaction rates for social units on a unit's cultural orientation and the structure of its network. We simulated the system for periods of 30, 60, 90, and 120 days to check contagion curves (that is, active infections in each community). Figure 4 shows the results for 60 days, a period that appears sufficiently long to capture some of the dynamics of the first wave of contagion.

Figure 4. Contagion levels for an interactive versus isolative communities



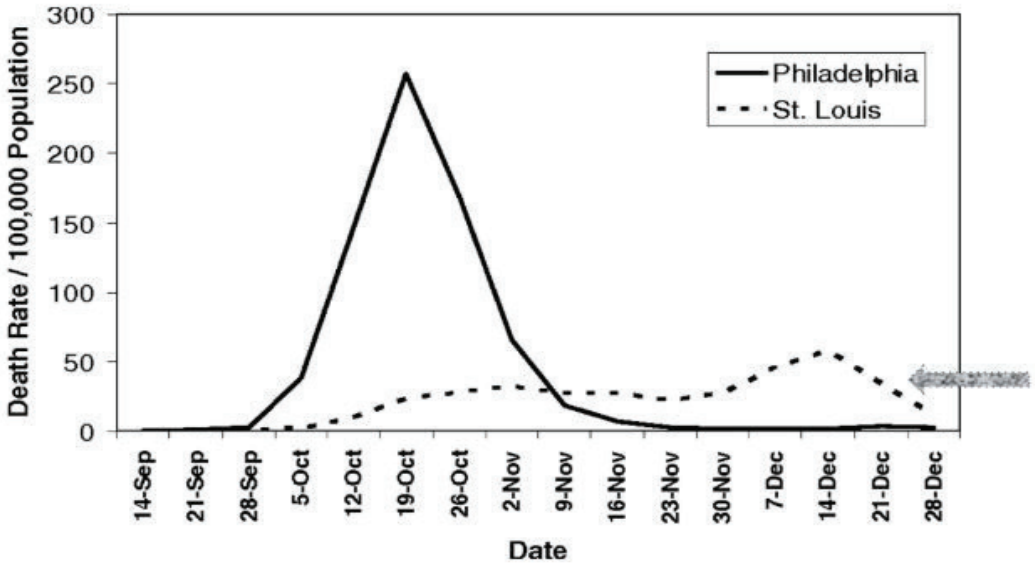
As one would expect, these analyses demonstrate that households in interactive communities become infected more quickly and in higher numbers (that is, they have a higher contagion rate) than is true in isolative communities. This is true even if both social worlds exist within the same city and region. As a more counterintuitive finding, households whose members contract COVID-19 in the interactive community tend to recover slightly more quickly, even though their network location puts them at risk of reinfection (see note A).

Follow-up analyses also suggest that engagers and connectors who increase barriers to entry into their units (that is, who do not allow others in their neighborhood) may, as intended, suffer lower contagion rates than less-protected units do. However, even they will need to interact somewhat with the outside world, and these linkages, by chance, will often lead to some contagion. In light of these preliminary sociocultural simulations, policy analysts would be wise to adjust their usual epidemiological and agent-based models to include insights about sociocultural network diversity and thus take better account of the ways that different communities behave and spread disease.

3. Model Future Waves by Incorporating Community-Level Learning From Previous Waves

Initially, analysts rightly spent a great deal of time modeling the first wave of the pandemic and identifying hammer-type interventions to flatten it by comparing death rates in countries that have passed the contagion peak.[1,24–26] But analysts now recognize the need to attend to future waves as well. Data from the Spanish flu pandemic of 1918 are very illustrative here.[27,28] Worldwide data show, on average, three peaks for the Spanish flu, with the second being the highest. Yet there was a great deal of community-level variation. We compare death rates in Philadelphia and St. Louis in Figure 5. Philadelphia, which was a more interactive community that instituted policy interventions more slowly, had one wave of deaths that peaked high and fast. St. Louis, being more isolative and quicker to respond, saw two more gradual and much smaller waves of death, with the second wave rising somewhat higher than the first (see note B).

Figure 5. 1918 Spanish flu: Philadelphia versus St. Louis



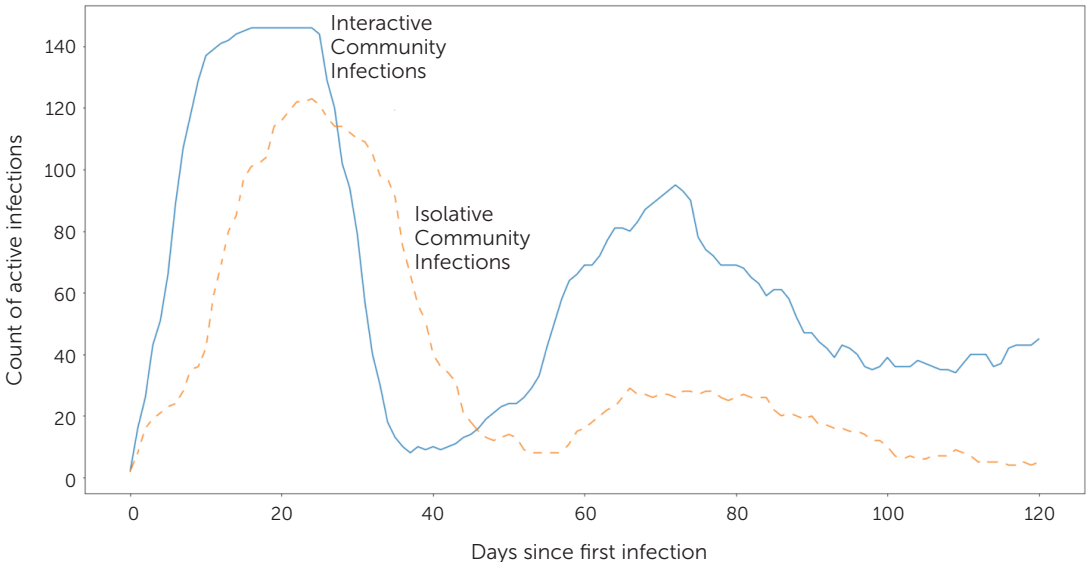
Note. From "Public Health Interventions and Epidemic Intensity During the 1918 Influenza Pandemic," by R. J. Hatchett, C. E. Mecher, and M. Lipsitch, 2007, *Proceedings of the National Academy of Sciences, USA, 104,* p. 7583. Copyright 2007 by The National Academy of Sciences of the USA.

In our sociocultural models, which we refine regularly, we see strong evidence of a second wave that begins around day 45 in interactive communities and day 65 in isolative ones (see Figure 6). These model runs are based on some simple but realistic assumptions. One is that social units learn to distance themselves. They do so by changing their cultural orientation (likelihood of interacting) such that all four types distance more relative to their prior level. A second assumption is that the distancing and a lack of interaction between social units will break some network ties at random. A third assumption is that loner and divider units, who reportedly are likely to have fewer psychic and material resources than do engager and connector units,[29,30] will have lower recovery rates. In the modeling that produced the evidence of the second wave, we ran the experiment out to 120 days and applied these three assumptions after day 60.

Somewhat surprisingly—and alarmingly—in the second wave, the interactive community still experienced high overall contagion rates. It also appeared that a third wave started around day 115. In the isolative community, wave 2 peaked at around 80 days but at a much lower level than wave 1 and dropped toward a zero rate of infection by day 120. This drop, unfortunately, is not due to herd immunity (the whole community having been infected and now being immune) but is simply due to the structure of the community's sociocultural network and its units' cultural orientations.[31] The isolative network creates enough isolation to break the contagion cycle, but not enough to prevent it from restarting later. As long as the main social units that interact with connector units are not infected or as long as the connectors are immune from reinfection, many very small neighborhoods (known in social network analysis as *cliques*) and barely linked dividers and loners will not be infected via the bridges formed by connectors (see Figure 3).

An unresolved issue is whether, over time, breaking social ties and having fewer interactions will cause already isolative communities to hit a threshold at which the social fabric of their local neighborhood—and of the social unit itself—will begin to dissolve. In the COVID-19 pandemic so far, people do not seem to be stealing goods from or committing violence against infected individuals. But some neighborhoods or communities that have particularly low levels of resources (as can be the case in very rural areas) or violent cultures might be at risk of crossing this threshold should the pandemic stretch through all of 2021.[32] Further sociocultural modeling that explores such issues should be particularly informative for anticipating the

Figure 6. Second waves in the interactive & isolative communities



effect on future waves of different approaches to lessening restrictions—such as the gradual bubble expansion being followed by New Zealand and parts of Canada (that is, the travel zone is slowly extended and increased interactions are allowed gradually), the cautiously phased opening of industries or geographic regions throughout many global regions, or the somewhat more extreme reopening plans in certain U.S. regions while infection rates are still rising.

Suggestions for Policymakers

4. Tailor Policies to Types of Communities & the Broader Sociocultural Networks in Which They Are Anchored

Policymakers, quite sensibly, have been following the guidance of past public health and epidemiological research and focusing their initial interventions on hammering down the curve.[33–35] To be as useful and effective as possible, though, they should apply different interventions to different communities, using the archetypes described in Section 2 as a guide. Consider, for example, the policy of encouraging people to limit social interactions (social distancing) and to stay six feet apart when they are physically proximate (physical distancing). These practices appear to be essential for interactive communities even if many engager and connector social units dislike them. In contrast, calls for social distancing would be expected to make relatively little difference in communities that are already isolative. There, the encouragement would serve more as a reminder than as a powerful hammer. In fact, in such communities, it might be important to also declare when and how a modicum of interaction should be pursued by the divider and loner social units, so as to combat psychic and material depletion. In other words, policymakers should probably consider "dual-band" policies: two policies with similar goals but using different methods for adjusting the contagion paths. In some circumstances, a multiband policy might be needed.

Implicitly or explicitly, many U.S. states have begun to follow this dual- (or multi-) band strategy. As we write this article, New York City is just emerging from lockdown and full distancing rules. In contrast, outlying areas of New York State have already been allowing more local travel, onsite work in some manufacturing facilities, and discretion when choosing to make social visits. At the provincial or canton level, Ontario in Canada, much like Hubei in China, has closed its borders.[36] However, Manitoba in central Canada, like Shaanxi in northwestern China, has experienced lower rates of contagion and has therefore maintained open borders and allowed its population to exercise more discretion over distancing.

Policies might be further fine-tuned by permitting communities to have some say in their modeled profiles and then adjusting policy prescriptions if the models indicate that alterations would be beneficial. Quite isolated rural indigenous communities, for instance, might identify themselves as having highly interactive local sociocultural networks, which would imply that such communities were prone to high contagion rates.[37] Policymakers in these kinds of rural areas need to recognize that these communities probably do not fit the usual rural mold of isolative communities and may well be highly isolated varieties of interactive communities. To reduce contagion, policymakers would need local communities to adjust their own policies on the basis of information about what has worked best for other similar sociocultural communities.[38]

5. Benchmark Against Communities That Have Similar Regional & Local Cultural Orientations, Social Network Structures, & Social Unit Diversity

In part due to media reports, policymakers have recently begun to note that national and regional cultures act as powerful filters of experiences and information and thereby can strongly affect people's behavior. This understanding is evident, for instance, in articles that have attempted to understand the differences between contagion patterns—especially death rates—in Wuhan, China, versus Lombardy, Italy.[39] Consistent with observations of culture's powerful filtering effect, sociocultural network modeling suggests that policymakers should design similar policies for communities that

have similar local and national cultural orientations, social network structures, and diversity profiles.[22] Comparisons, in other words, should try to take into account the three layers of the cultural approach described in Figure 2 to consider how the regional culture in which a community social network is embedded is quite similar to or very different from the policymakers' target community.

The importance of taking these features into account becomes evident when considering people's interpretation of the term *social distancing*. Interactive communities (and their engagers and connectors) in one place do not necessarily interpret the phrase in the same way as do those in another. For instance, people in New York interpret it to mean limiting either physical or social distancing or sometimes both. Although many people were quick to reduce their visits to local workplaces and to work from home instead, they had more difficulty reducing their social distancing, engaging in impromptu visits to parks, gyms, and small restaurants until further enforcement occurred.[40,41] In contrast, social distancing in Seoul, Korea, was understood to include reductions in both physical and social distancing and to involve both work and nonwork activities, and restricted movement and testing became part of people's new routines.[42] Thus, in making community-contagion models, policymakers not only need to consider the starting differences, they also need to take extra care in choosing which comparator communities they select to justify policies for their own district. It would be unreasonable, for instance, to presume that the social units in New York City would pursue the same level of distancing reduction and the same degree of testing as social units in Seoul or to set up those expectations in others by publicizing that comparator.

Similarly, cultures and communities can differ in the value they place on various types of social gatherings and activities that interventions may target. This divergence is particularly true for events that mark key points in the life course, such as births, graduations, marriages, and deaths. Richard J. Hatchett and his colleagues have found, for example, that prohibitions on attending funerals during the Spanish flu pandemic did not reduce the rate of contagion in either St. Louis or Philadelphia, two very different community types.[27,28] People in both went to funerals anyway. During the COVID-19 pandemic, Italy has also had to ban funerals, because many families were ignoring less draconian restrictions.[43] This step has caused much anger, sadness, and even pushback, requiring further enforcement by the police and military (see note C). Policymakers should not create blanket policies about such life course events, nor should they unthinkingly adopt the policies of noncomparable sociocultural communities. Doing so risks building resistance to policies and to those who enforce them.

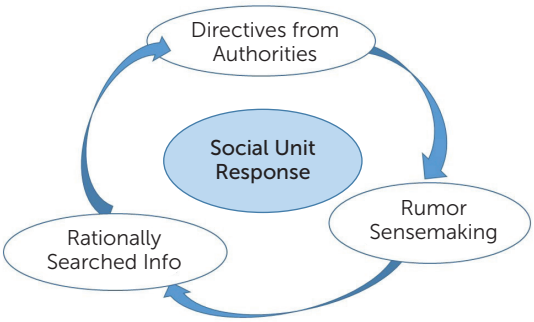
Suggestions for Policy Practitioners

6. Policy Practitioners Should Craft Directives so That Their Merit Is Reinforced by Both the Informal (Grapevines) & the Formal Sources of Information That Social Units Consult

In turbulent times, policymakers often feel pressure to act immediately and may therefore resort to issuing directives without worrying about subtleties or how recipients of the prompts feel.[44,45] However, as discussed at the end of Section 5, where we raised the notion of resistance, our sociocultural network perspective suggests that it is critical to deliver directives in ways that will maximize the likelihood that recipients will hear about and decide to follow them. A simple model of policy communication is helpful here; see Figure 7.

This model takes the social unit's point of view, with its behavior (response) at the core. That response is also the target of policy practitioners. When crises occur, the social unit tries to make sense of the situation and determine how to respond.[22] The people making up the social unit gather information through the grapevine to figure out what is going on (in what is called "rumor sensemaking"), thus learning informally from friends or other trusted people in their network. They also actively seek information provided by experts (in what is called "rational

Figure 7. The communication cycle



search"), and they listen, to varying degrees, to policy directives (and then adhere somewhat to the authorities' rules and instructions). As the crisis unfolds, this information begins to cycle rapidly. New information arises in rumor mills and also in scientifically grounded portals, and more directives are issued or modified in light of the crisis and this information. The social unit must revise its possible responses by collecting those forms of information and putting them together sensibly. The adjustment we made to the social unit response after 60 days in our model of contagion was based on this conception of sensemaking and these assumptions. The more rapid the cycle is and the greater the volume of information, the more difficulty the social unit has in drawing conclusions. This difficulty may reduce the likelihood of adjustment and increase the likelihood of a nonresponse or a contrary one. Consequently, policy directives need to be crafted carefully to increase the odds that the directive will float up in this swirl of information and be acted on—and this care needs to be maintained in the follow-on cycles that communicate updated information.

One way of communicating successfully is to consciously seek the uptake of messages into both the rational information and the rumor mill channels to create a positive, constructive swirl of information. Take the directive to wear masks as an example.[46] In many Asian communities, mask wearing has long been mandated when contagious diseases arise. Directives are simple: individuals are told to "wear your mask" in signs on the doors of public places and in communications seen on public transportation, on TV, and through other channels. Social media posts reinforce the practice, as does official information available on public health portals.

In contrast, at the outset of the COVID-19 crisis in many European and North American communities, governments recommended but did not require masks and called for their use only by those who had symptoms of the disease or who might have been exposed to it. What is more, mask wearing was often stigmatized on social media (for instance, by being jokingly mocked or depicted as signifying that a person was likely to spread disease). At the same time, health policy portals and industry sources alluded to mask shortages in hospitals and to panicked doctors, indirectly implying that the public should not wear masks so that more would be available for health care workers. Overall, a negative loop increased uncertainty around and distrust of directives that pushed mask wearing. That negative cycle has only gradually been broken, and only in some countries.

7. In Health Crises, Respected Health Care Experts in a Community Should be Chosen to Communicate Directives to the Community, With Their Efforts Supported by Political & Cultural Leaders

In turbulent times, policymakers typically rely on key respected policy leaders—such as political leaders; heads of recognized international organizations, like the United Nations; and domain experts, like central bank directors—to make statements to calm local populaces.[45,47] Often that decision appears reasonable, given that communication generally resonates most with people if the speaker can plug the recommendations into broad, positive cultural narratives (for example, about the gradual upward progress of countries as they globalize or the need to leave none behind).[48,49] In a pandemic, however, as experience with COVID-19 has shown, populations are more responsive to particular types of leaders, especially to health care experts. The crisis focuses attention on the health care domain, and the search for information, rumor sensemaking, and directives absorbed are primarily about that domain.

As we discussed in Section 2, the social unit is embedded in sociocultural networks, and

information (directives, rumors, and rational search results) is filtered through the lens of these networks. Therefore, community-based experts who can reach a wide variety of social unit types via multiple linkages (such as those seen in Figure 3) are particularly useful for communicating policy directives and helping implement them. If the people with stature and authenticity are health experts, then they will probably become trusted sources of information. The more they are trusted, the more likely it is that health information will be acted on and that health communications will create a positive reinforcing loop like that discussed in Section 6.

The great influence that medical experts have had during the COVID-19 pandemic is evident around the world. In Wuhan, China, for example, Li Wenliang, the physician who first pointed to the possibility of a coronavirus outbreak and was rebuked by authorities, eventually became a cultural hero. Awareness of the efforts Li made before his death from the virus spurred other medical professionals forward in the face of their own local communities' reticence to combat the pandemic as early as possible. In the United States, Anthony Fauci, the director of the National Institute of Allergy and Infectious Diseases of the National Institutes of Health, has become a trusted figure because of his willingness to stand up for health science and against some of the current administration's policies. Bonnie Henry, the chief provincial health officer of British Columbia, Canada, not only is now listened to at the national level but also has become a cultural icon, celebrated in public art murals and fashion, with her own charity edition of Fluevog shoes.

However, political leaders in some countries and regions have felt threatened by the visibility and messaging of health care experts. Many subtle undermining acts, such as sharing the stage for the message unequally or having the final say during a press conference, undermine the experts. Political leaders may overshadow key messages by trying to ensure that news outlets do not post the expert's picture too often, too centrally, or in flattering forms. Recently, the Brazilian health minister, in spite of his popularity and evidence of impact, was fired. Similar threats were made in the United States against Fauci.[50,51] We encourage policy practitioners to combat this behavior so as to keep trusted public information high in quality, frequently shared, and culturally accepted.

Conclusion

Policy analysts can improve their modeling and understanding of the COVID-19 pandemic and future pandemics as well by adopting a sociocultural network approach to community contagion, focusing their modeling on variations in contagion rates across archetypical communities, and attending to the likely dynamics of future waves. Meanwhile, policymakers will deliver more impactful guidelines and recommendations if they craft multiband policies tailored to different communities and seek insights from communities that are culturally aligned with the communities under their aegis. People responsible for implementing policies will increase their effectiveness if they can ensure that their directives are delivered in ways that gain the endorsement of informal community leaders as well as formal sources of information and by enlisting or supporting respected local health care experts as spokespeople. In short, both now and in the future, the sociocultural approach is key to best addressing pandemics.

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author note

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endnotes

A. Consistent with our theory, in our social-unit-based modeling (what might be called "SBM") of interactive types of communities, we slightly increased recovery rates for engager social units beyond the modeled baseline if the node was connected to other engager social units.

B. The community-contagion patterns described for Philadelphia and St. Louis, as noted by Richard J. Hatchett and his colleagues, were surely influenced by interventions, so they are not pure contagion-only examples (in other words, policy effects are reflected in the data).[27]

C. In Italy, a BBC reporter interviewed a funeral home worker named Andrea Cerato about the handling of bodies: "'We take on all responsibility for them,' says Andrea. 'We send the loved ones a photo of the coffin that will be used, we then pick up the corpse from the hospital and we bury it or cremate it. They have no choice but to trust us.'"[52]

references

1. Pueyo, T. (2020, March 19). Coronavirus: The hammer and the dance. *Medium*. https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56
2. Bedford, J., Farrar, J., Ihekweazu, C., Kang, G., Koopmans, M., & Nkengasong, J. (2019, November 7). A new twenty-first century science for effective epidemic response. *Nature, 575,* 130–136.
3. Ladner, J. T., Grubaugh, N. D., Pybus, O. G., & Andersen, K. G. (2019). Precision epidemiology for infectious disease control. *Nature Medicine, 25,* 206–211.
4. Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2018). *Analyzing social networks*. Sage.
5. Rao, H., & Greve, H. R. (2018). Disasters and community resilience: Spanish flu and the formation of retail cooperatives in Norway. *Academy of Management Journal, 61,* 5–25.
6. Kitchin, R., & McArdle, G. (2016). What makes big data, big data? Exploring the ontological characteristics of 26 datasets. *Big Data & Society, 3*(1). https://doi.org/10.1177/2053951716631130
7. Tinati, R., Halford, S., Carr, L., & Pope, C. (2014). Big data: Methodological challenges and approaches for sociological analysis. *Sociology, 48,* 663–681.
8. Edelmann, A., Wolff, T., Montagne, D., & Bail, C. A. (2020). Computational social science and sociology. *Annual Review of Sociology, 46,* 61–81. https://doi.org/10.1146/annurev-soc-121919-054621
9. Lazer, D., Adamic, L., Pentland, A. S., Aral, S., Barabási, A.-L., Brewer, D., Christakis, N., Contractor, N., Fowler, J., Gutmann, M., Jebara, T., King, G., Macy, M., Roy, D., & Van Alstyne, M. (2009, February 6). Computational social science. *Science, 323,* 721–723.
10. DiMaggio, P. (2015). Adapting computational text analysis to social science (and vice versa). *Big Data & Society, 2*(2). https://doi.org/10.1177/2053951715602908
11. Lounsbury, M., & Glynn, M. A. (2019). *Cultural entrepreneurship: A new agenda for the study of entrepreneurial processes and possibilities.* Cambridge University Press.
12. Seidel, M. D. L., & Greve, H. R. (2017). Emergence: How novelty, growth, and formation shape organizations and their ecosystems. *Research in the Sociology of Organizations, 50,* 1–27.
13. Hannigan, T. R., Haans, R. F. J., Vakili, K., Tchalian, H., Glaser, V. L., Wang, M. S., Kaplan, S., & Jennings, P. D. (2019). Topic modeling in management research: Rendering new theory from textual data. *Academy of Management Annals, 13,* 586–632. https://doi.org/10.5465/annals.2017.0099
14. Greve, H. R., & Seidel, M. D. L. (2015). The thin red line between success and failure: Path dependence in the diffusion of innovative production technologies. *Strategic Management Journal, 36,* 475–496.
15. Wang, M. S., Raynard, M., & Greenwood, R. (in press). From grace to violence: Stigmatizing the medical profession in China. *Academy of Management Journal*.
16. Zhao, E. Y., Ishihara, M., & Jennings, P. D. (2020). Strategic entrepreneurship's dynamic tensions: Converging (diverging) effects of experience and networks on market entry timing and entrant performance. *Journal of Business Venturing, 35*(2), Article 105933. https://doi.org/10.1016/j.jbusvent.2019.04.001
17. Lourenco, J., Paton, R., Ghafari, M., Kraemer, M., Thompson, C., Simmonds, P., . . . Gupta, S. (2020). Fundamental principles of epidemic spread highlight the immediate need for large-scale serological surveys to assess the stage of the SARS-CoV-2 epidemic. *MedRxiv*. https://doi.org/10.1101/2020.03.24.20042291
18. Compartmental models in epidemiology. (2020, April 29). In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Compartmental_models_in_epidemiology&oldid=953799045
19. Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology, 91,* 481–510.
20. Padgett, J. F., & Ansell, C. K. (1993). Robust action and the rise of the Medici, 1400–1434. *American Journal of Sociology, 98,* 1259–1319.
21. Scott, J. (1991). Networks of corporate power: A comparative assessment. *Annual Review of Sociology, 17,* 181–203.
22. Hannigan, T., Wang, M. S., Steele, C., Seidel, M.-D. L., Cervantes, E., & Jennings, P. D. (2020, March 30). *A cultural network approach for amending COVID-19 policy*. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3566053
23. Watts, D. J. (2004). *Small worlds: The dynamics of networks between order and randomness* (Vol. 9). Princeton University Press.
24. Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet, 395,* 931–934.
25. Stevens, H. (2020, March 14). Why outbreaks like coronavirus spread exponentially, and how to "flatten the curve." *Washington Post*. https://www.washingtonpost.com/graphics/2020/world/corona-simulator/
26. Cyranoski, D. (2020, March 30). 'We need to be alert': Scientists fear second coronavirus wave as China's lockdowns ease. *Nature*. https://www.nature.com/articles/d41586-020-00938-0
27. Hatchett, R. J., Mecher, C. E., & Lipsitch, M. (2007). Public health interventions and epidemic intensity during the 1918 influenza pandemic. *Proceedings of the National Academy of Sciences, USA, 104,* 7582–7587. https://doi.org/10.1073/pnas.0610941104
28. Crosby, A. W. (2003). *America's forgotten pandemic: The influenza of 1918*. Cambridge, United Kingdom: Cambridge University Press.
29. Chen, Q., Liang, M., Li, Y., Guo, J., Fei, D., Wang, L., He, L., Sheng, C., Cai, Y., Li, X., Wang, J., & Zhang, Z. (2020). Mental health care for medical staff in China during the COVID-19 outbreak. *The Lancet Psychiatry, 7,* e15–e16. https://doi.org/10.1016/S2215-0366(20)30078-X
30. Xiong, S. (2020, May 25). How to reduce your risk of PTSD in a post-COVID-19 world. *New York Times*.
31. Ferguson, N., Laydon, D., Nedjati-Gilani, G. N., Imai, N., Ainslie, K., Baguelin, M., Bhatia, S., Boonyasiri, A., Cucunubá, Z., Cuomo-Dannenburg, G., Dighe, A., Dorigatti, I., Fu, H., Gaythorpe, K., Green, W., Hamlet, A., Hinsley, W., Okell, L. C., van Elsland, S., Ghani, A. C. (2020). *Report 9—Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand*. Imperial College London. https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-9-impact-of-npis-on-covid-19/
32. Ranscombe, P. (2020). Rural areas at risk during COVID-19 pandemic. *The Lancet Infectious Diseases, 20*(5), Article P545. https://doi.org/10.1016/S1473-3099(20)30301-7

33. Government of Canada. (2020). *Coronavirus disease (COVID-19).* Retrieved June 9, 2020, from https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html

34. Matrajt, L., & Leung, T. (2020). Evaluating the effectiveness of social distancing interventions to delay or flatten the epidemic curve of coronavirus disease. *Emerging Infectious Diseases, 26*(8), 1740–1748. https://doi.org/10.3201/eid2608.201093

35. World Health Organization. (2020). *Rolling updates on coronavirus disease (COVID-19).* Retrieved May 24, 2020, from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen

36. Gollom, M. (2020, April 7). Many provinces, territories enforcing border checkpoints and travel restrictions. *CBC News.* https://www.cbc.ca/news/canada/coronavirus-checkpoints-travel-restrictions-border-province-1.5522467

37. CanCOVID. (2020, April 29). *CanCOVID speaker series: Dr. Carrie Bourassa* [Video file]. YouTube. https://www.youtube.com/watch?v=OEFuRFKHThw

38. How Canada will cope with community transmission of the coronavirus. (2020, March 5). *CBC News.* https://www.cbc.ca/news/health/coronavirus-community-transmission-1.5486080

39. Pisano, G., Sadun, R., & Zanini, M. (2020, March 27). Lessons from Italy's response to coronavirus. *Harvard Business Review.* https://hbr.org/2020/03/lessons-from-italys-response-to-coronavirus

40. Editorial Board. (2020, May 18). Social distancing, without the police. *New York Times*. https://www.nytimes.com/2020/05/18/opinion/nypd-coronavirus-arrests-nyc.html

41. Branch, J. (2020, March 22). Deniers and disbelievers: "If I get corona, I get corona." *New York Times*. https://www.nytimes.com/2020/03/22/us/deniers-and-disbelievers-if-i-get-corona-i-get-corona.html

42. McCurry, J. (2020, April 23). Test, trace, contain: How South Korea flattened its coronavirus curve. *The Guardian*. https://www.theguardian.com/world/2020/apr/23/test-trace-contain-how-south-korea-flattened-its-coronavirus-curve

43. Horowitz, J., & Bubola, E. (2020, March 16). Italy's coronavirus victims face death alone, with funerals postponed. *New York Times*. https://www.nytimes.com/2020/03/16/world/europe/italy-coronavirus-funerals.html

44. Horowitz, B. (2020). *Peacetime CEO/wartime CEO.* Andreessen Horowitz. https://a16z.com/2011/04/14/peacetime-ceowartime-ceo-2/

45. Waldman, D. A., Ramirez, G. G., House, R. J., & Puranam, P. (2001). Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Academy of Management Journal*, *44,* 134–143.

46. Tufekci, Z. (2020, March 17). Why telling people they don't need masks backfired. *New York Times.* https://www.nytimes.com/2020/03/17/opinion/coronavirus-face-masks.html

47. Harmon, D. J. (2019). When the Fed speaks: Arguments, emotions, and the microfoundations of institutions. *Administrative Science Quarterly, 64,* 542–575.

48. Cornelissen, J. P., & Werner, M. D. (2014). Putting framing in perspective: A review of framing and frame analysis across the management organizational literature. *Academy of Management Annals, 8,* 181–235.

49. Giorgi, S. (2017). The mind and heart of resonance: The role of cognition and emotions in frame effectiveness. *Journal of Management Studies, 54,* 711–738.

50. Duster, C., Acosta, J., & Liptak, K. (2020, April 13). Trump retweets call to fire Fauci amid coronavirus criticism. *CNN.* https://www.cnn.com/2020/04/13/politics/donald-trump-anthony-fauci-tweet/index.html

51. Taylor, A. (2020, May 1). WH blocking Fauci testimony, House panel spokesman says. *PBS NewsHour.* https://www.pbs.org/newshour/health/white-house-blocking-fauci-testimony-panel-spokesman-says

52. Bettiza, S. (2020, March 25). Coronavirus: How COVID-19 is denying dignity to the dead in Italy. *BBC News.* https://www.bbc.com/news/health-52031539

proposal

Behavioral insights for minimizing loneliness during the COVID-19 pandemic

Kelly A. Nault, Benjamin A. Rogers, Ovul Sezer, & Nadav Klein

abstract

Social distancing is a necessary policy with an unfortunate name. Although maintaining geographical, or physical, distance from one another is important for slowing the spread of COVID-19, people should strive to maintain social connections even while physically apart. That is because the lack of connection and the attendant loneliness that can result from physical distancing are not benign: loneliness can impair well-being and harm health. In this article, we review evidence demonstrating the ill effects of loneliness and summarize actions that psychological science suggests can enhance social connection during the COVID-19 pandemic despite physical distancing. We also discuss ways that governments, nonprofit organizations, and for-profit organizations can help motivate people to adopt these actions. Efforts to mitigate the medical risks of COVID-19 should not have to exacerbate the public health problem of loneliness.

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Some form of social distancing—a necessary policy with an unfortunate name—has been in force in every American state and much of the rest of the world to slow the spread of COVID 19. Despite the word *social* in the term, the phrase actually refers to maintaining geographical, or physical, distance between people. Everyone should, in fact, strive to maintain social connections while physically apart. The reason: Whereas geographical distancing has the potential to improve public health, true social distancing can exacerbate loneliness and thereby pose a grave risk to psychological and physical health.

Loneliness was understood to be a public health problem by researchers[1,2] and policymakers[3] well before the COVID-19 pandemic. The chronic feeling that one is alone can cause substantial psychological damage.[4,5] Lack of social connection predicts mortality to roughly the same degree as heavy alcohol consumption, smoking, obesity, and high blood pressure do.[6] The physiological sensations that a lack of social connection can produce resemble those induced by hunger, pain, or cold.[7–9] This commonality occurs because social connection is a fundamental human need, as studies have shown in multiple cultures.[10,11] People who feel more socially connected tend to have a stronger sense of meaning in life, are happier, and have greater motivation to achieve than people who feel less connected.[12–15]

Psychological research has accumulated evidence that the actions we describe in this article can increase feelings of social connection. These actions can be implemented even when people are geographically apart from others. However, simply because people can readily engage in activities that boost social connection while physically apart does not necessarily mean they will do so. Research in behavioral science documents this gap between intentions and actions: people know that maintaining a healthy diet, exercising, and saving for old age are important, but they fail to engage in these activities as frequently and regularly as they would ideally like.[16,17] The same goes for maintaining social links: people may not use opportunities to connect with others when geographically distant because doing so requires modifying established habits, schedules, and norms—demands that create barriers to behavior change.

Governments, nonprofits, and for-profit organizations can help spur people to connect with others by creating environments that minimize the behavior change required to act and that thereby reduce the intention–action gap. To be sustainable, the interventions will have to not only enhance social connection but also be consistent with the interests and motivations of the organizations and governments delivering them. With each action we propose for enhancing social connection despite physical distance, we highlight steps that governments, nonprofits, and for-profit organizations might undertake to reduce the intention–action gap. (Table 1 summarizes the recommendations.)

Actions That Can Enhance Social Connection

Use Social Media to Actively Connect With Others

The question of how social media use affects social connection and well-being is of obvious interest in a time of sheltering in place. The emerging research suggests that the answer depends on how people use social media. Actively participating in direct exchanges with others (for example, by sending messages, posting status updates, or commenting on posts) has been found to increase feelings of connectedness and well-being in both correlational and experimental studies.[18–20] In contrast, using social media passively—by merely observing other people's posts, comments, and likes—reduces well-being, as was found in an experiment in which participants were instructed to use Facebook either actively or passively.[21] This decline in well-being may occur partly because the self-disclosure that is missing during passive observation is a key determinant of social closeness;[22] disclosing one's thoughts and feelings to others on social media can help transition online interactions from superficial talk into deeper exchanges.[23]

Table 1. Actions that can reduce loneliness from physical distancing

Actions individuals can take	How governments and organizations can help
Use social media to actively connect with others rather than passively observing other people's posts.	Social media companies can encourage people to initiate interactions and share information about themselves on their websites.
Do something for others.	Nonprofits can provide people with opportunities to donate to and help others, enhancing social connection most by targeting the help to specific individuals rather than to others in general.
Engage in activities in synchrony with others.	Local governments, in particular, can move existing classes and cultural events online. Online streaming services can create platforms in which people can communicate with each other as they watch movies and television shows while physically apart.
Create or reenact rituals with others.	Individuals are better suited than governments or organizations to adapt existing rituals to a remote world.
Pursue joint goals with others.	Schools and civic organizations can connect people who are pursuing shared goals, such as parents who are homeschooling their respective children or members of interest groups.
Adopt a mindset of gratitude.	Local governments can create processes by which community members can send thanks to first responders, medical professionals, and others.

These results suggest that to maintain a sense of social connection, people should use social media to actually connect with others rather than to merely observe their activities. It is interesting that this research also found that people typically spend more time observing others than actively connecting with them on social media, suggesting that people may need some nudging to become more interactive.[21]

Private companies have a built-in incentive to promote the value proposition they offer in the marketplace, and enhancing social connection among consumers is a way to do that. For example, they can use their social media platforms to encourage active participation by periodically reminding users to post status updates or respond to others' online posts or by requiring such actions in exchange for some benefit. For example, well before the current crisis, the online employer-review website Glassdoor encouraged engagement and ultimately connection by requiring users to contribute information about their employers to the website in return for seeing evaluations by others.[24]

Do Something for Others

Helping is known to facilitate social connection and well-being.[25] Experiments testing the effects of performing small acts of kindness, such as volunteering or spending money for others' benefit, consistently find that helping others promotes connection and happiness.[26–29] The same is true for giving help to organizations: engaging in charitable acts leads to higher levels of well-being.[30] Of course, when the giver and receiver are in different locations, helping can be more difficult. Nevertheless, some forms of help—especially gifts, money transfers, or words of support and encouragement—can be proffered from a distance.

One psychological explanation for why helping engenders social connection is that aiding others—especially helping specific individuals[31]—is a conduit for thinking about other people, and the mere act of thinking about another person[32] increases the sense of connection to that person, as experiments have shown.[33–35] This salutary psychological process does not depend on geographical closeness.

Nonprofit organizations are particularly well positioned to motivate people to take helpful actions, given that to succeed in their missions, these organizations need to bolster public engagement with their goals; offering opportunities to help is one way of increasing engagement. For example, the nonprofit Children International enables people to donate funds to help specific children, which fosters social connections between donors and recipients. In another example, the NorthShore University HealthSystem, a hospital system in

the Chicago metropolitan area, has a charitable foundation that allows people to donate and that regularly communicates about its work in providing testing and treatment during the COVID-19 pandemic.

Engage in Activities in Synchrony With Others

If being with others is not possible, doing activities synchronously—in parallel with—them can boost social connection. Research finds that synchronous behavior leads to stronger feelings of affiliation between the participants.[36–39] Most of these experiments have tested basic behaviors, such as tapping or singing in time, but the findings extend to synchronous activities outside the lab, such as doing yoga or attending religious services at the same time.[40] Because synchrony does not necessitate physical proximity, social connection can plausibly be enhanced by engaging simultaneously in activities through video chat applications, such as watching television shows with one's extended family, having lunch with colleagues, or exercising with friends.

Before the pandemic, many local governmental agencies already provided multiple opportunities for social connection through synchronous activities such as fitness classes and musical and cultural events. Many of these events can be conducted virtually. In addition, private companies, especially online streaming services, can support synchronous activities by facilitating virtual watch parties—making it easy for people to watch movies or TV shows simultaneously and comment to one another in real time despite being in different places.[41]

Create or Reenact Rituals With Others

Rituals are symbolic activities that are typically enacted at or in honor of meaningful events, such as religious holidays or the death of a loved one. However, rituals can also be idiosyncratic and relationship specific, such as family traditions or activities surrounding the periodic rewatching of a favorite movie. One important psychological function that rituals fulfill is cementing social bonds.[42] Rituals direct people's attention to a shared experience, create synchronous behavior (see the previous section), and signal that the participants are part of an "in group."[43–45] One experiment that linked an arbitrary ritual to a necklace-beading activity found that children who performed the ritual felt a stronger social connection to one another than did children who engaged only in necklace beading without the ritual.[46]

One implication of this research is that creating and preserving rituals can mitigate loneliness. Although many existing rituals involve physical proximity, some can be adapted to a shelter-in-place world. For example, a weekly card game at a player's home can be carried out using game software while videoconferencing. A monthly dinner at a neighborhood restaurant can be replaced by having meals delivered from the same restaurant but eaten separately while communicating through a joint videoconference. Friends who have taken the possibility of meeting in person for granted—and thus may have continuously postponed doing so because of constant busyness—may nurture friendships by making periodic phone and video calls.

Beyond creating shared experiences, rituals may help to reduce loneliness by evoking *nostalgia*, which is defined as an emotion that results from reflecting on a happy period in the past that cannot be repeated in the present. Research has shown that nostalgic experiences involve memories of oneself interacting with close others, are triggered in part by loneliness, and bolster the sense of connection to others.[47] Nostalgic feelings also allow people to maintain feelings of well-being as they face the limitations that accompany aging.[48] Remembering happy times spent with others seems to have positive effects even if the feeling of nostalgia is bittersweet because it was triggered by memories of unrepeatable experiences. Although research has not directly linked rituals and nostalgia, it seems reasonable to think that the former can evoke the latter and, in so doing, reduce loneliness.

Because rituals are often idiosyncratic, individuals are better positioned than organizations and governments to modify them in ways that

accommodate geographical distance. Fortunately, people engage in their existing rituals by default, and so maintaining them at a distance may require only relatively small degrees of behavior change.

Pursue Joint Goals With Others

It has been well established that social incentives—such as accountability to others and information about others' performance—can motivate behavior aimed at attaining goals.[49,50] An equally well established but perhaps less emphasized finding is that pursuing joint goals can also foster social connections between people.[51] Pursuing goals together—such as exercising regularly, reading particular books, or homeschooling children who are in the same grade—can facilitate not only the attainment of goals but the strengthening of connections. For example, people who exercise at home can have virtual check-in sessions, members of book clubs can meet virtually, and parents who are homeschooling their respective children can set learning objectives together and help teach one another's children virtually. Jointly setting goals, reporting on progress, and reflecting on challenges can be beneficial for both reaching goals and enhancing social connection without the need for physical proximity.

Schools are naturally positioned to facilitate the setting of shared goals as well as the holding of periodic virtual meetups that provide accountability, information sharing, and connection. Similarly, civic organizations, such as interest groups, amateur sports clubs, or community-sponsored reading clubs, can facilitate the pursuit of joint goals by providing consistent contact among members for tracking goal progress and providing advice and encouragement—say, through periodic meetings or check-ins. In addition, local government agencies can frame public policies as joint goals to be pursued by the entire community, such as by providing information about citywide progress toward disease prevention, sustainability benchmarks, or other important goals. For example, the Singaporean government sends daily updates to citizens on progress toward reducing the number of COVID-19 cases relative to relevant benchmarks.

Adopt a Mindset of Gratitude

The objective events that happen in people's lives rarely influence their well-being as much as their interpretations of these events do.[52,53] The practice of interpreting events by focusing on the positive can markedly improve well-being by engendering gratitude for the good things one has (and for the bad things one has avoided). For example, in one field experiment, participants in the experimental condition were asked to list things they were grateful for each week for 10 weeks. At the end of the study period, these participants scored higher on measures of well-being than did the participants in the control condition.[54] Moreover, a set of experiments asking people to express gratitude to others for something the individuals had done in the past increased the grateful people's sense of social connection to the individuals they thanked.[55]

Being grateful and expressing gratitude do not require physical proximity and are effective ways of maintaining social connection with others. Local governments can help people express gratitude by creating processes that enable them to send words of gratitude and donations to such groups as first responders and medical professionals.

Conclusion

The ill effects of loneliness are serious, but people can reduce loneliness and remain socially connected even while being physically apart. Further, governments and organizations can facilitate such actions. Mitigating the medical risks posed by COVID-19 should not have to exacerbate the public health problem of loneliness.

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references

1. Holt-Lunstad, J., Robles, T., & Sbarra, D. A. (2018). Advancing social connection as a public health priority in the United States. *American Psychologist, 72,* 517–530.
2. House, J. S., Landis, K. R., & Umberson, D. (1988, July 29). Social relationships and health. *Science, 241,* 540–545.
3. Prime Minister's Office. (2018, October 15). *PM launches Government's first loneliness strategy* [Press release]. Gov.UK. https://www.gov.uk/government/news/pm-launches-governments-first-loneliness-strategy
4. Chen, Z., Poon, K. T., DeWall, C. N., & Jiang, T. (2020). Life lacks meaning without acceptance: Ostracism triggers suicidal thoughts. *Journal of Personality and Social Psychology, 119*(6), 1423–1443. https://doi.org/10.1037/pspi0000238
5. Cacioppo, J. T., Hawkley, L. C., & Bernston, G. G. (2003). The anatomy of loneliness. *Current Directions in Psychological Science, 12,* 71–74.
6. Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLOS Medicine, 7*(7), Article e1000316. https://doi.org/10.1371/journal.pmed.1000316
7. Gardner, W. L., Pickett, C. L., & Brewer, M. B. (2000). Social exclusion and selective memory: How the need to belong influences memory for social events. *Personality and Social Psychology Bulletin, 26,* 486–496.
8. Chester, D. S., DeWall, C. N., & Pond, R. S. (2016). The push of social pain: Does rejection's sting motivate subsequent social reconnection? *Cognitive Affective Neuroscience, 16,* 541–550.
9. Inagaki, T. K., & Eisenberger, N. I. (2013). Shared neural mechanisms underlying social warmth and physical warmth. *Psychological Science, 24,* 2272–2280.
10. Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. *Journal of Personality and Social Psychology, 101,* 354–365.
11. Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497–529.
12. Stavrova, O., & Luhmann, M. (2016). Social connectedness as a source and consequence of meaning in life. *The Journal of Positive Psychology, 11,* 470–479.
13. Lambert, N. M., Stillman, T. F., Hicks, J. A., Kamble, S., Baumeister, R. F., & Fincham, F. D. (2013). To belong is to matter: Sense of belonging enhances meaning in life. *Personality and Social Psychology Bulletin, 39,* 1418–1427.
14. Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology, 102,* 513–532.
15. Diener, E., & Seligman, M. E. P. (2002). Very happy people. *Psychological Science, 13,* 81–84.
16. Shafir, E. (Ed.). (2013). *The behavioral foundations of public policy.* Princeton University Press.
17. Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness.* Yale University Press.
18. Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. In *CHI '10: Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 1909–1912). Association for Computing Machinery.
19. Deters, F. G., & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science, 4,* 579–586.
20. Knowles, M. L., Haycock, N., & Shaikh, I. (2015). Does Facebook magnify or mitigate threats to belonging? *Social Psychology, 46,* 313–324.
21. Verduyn, P., Lee, D., Park, J., Shablack, H., Orvell, A., Bayer, J., Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General, 144,* 480–488.
22. Collins, N. L., & Miller, L. C. (1994). Self-disclosure and liking: A meta-analytic review. *Psychological Bulletin, 116,* 457–475.
23. Aron, A., Melinat, E., Aron, E. N., Vallone, R., & Bator, R. (1997). The experimental generation of interpersonal closeness: A procedure and some preliminary findings. *Personality and Social Psychology Bulletin, 23,* 363–377.
24. Glassdoor. (2019). *Give to get policy.* Retrieved from https://help.glassdoor.com/article/Give-to-get-policy/en_US
25. Weinstein, N., & Ryan, R. M. (2010). When helping helps: Autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology, 98,* 222–244.
26. Aknin, L. B., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., Norton, M. I. (2013). Prosocial spending and well-being: Cross-cultural evidence for a psychological universal. *Journal of Personality and Social Psychology, 104,* 635–652.
27. Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008, March 21). Spending money on others promotes happiness. *Science, 319,* 1687–1688.
28. Klein, N. (2017). Prosocial behavior increases perceptions of meaning in life. *The Journal of Positive Psychology, 12,* 354–361.
29. Harbaugh, W. T., Mayr, U., & Burghart, D. R. (2007, June 14). Neural responses to taxation and voluntary giving reveal motives for charitable donations. *Science, 316,* 1622–1625.
30. Schervish, P., & Szántó, A. (2006). Wealth & giving by the numbers. *Reflections: Excerpts from Wealth & Giving Forum Gatherings,* (2), 31–49.
31. Lee, S., & Heely, T. H. (2016). The identifiable victim effect: A meta-analytic review. *Social Influence, 11,* 199–215.
32. Zhang, Y., & Epley, N. (2012). Exaggerated, mispredicted, and misplaced: When "it's the thought that counts" in gift exchanges. *Journal of Experimental Psychology: General, 141,* 667–681.
33. Poerio, G. L., Totterdell, P., Emerson, L. M., & Miles, E. (2016). Helping the heart grow fonder during absence: Daydreaming about significant others replenishes connectedness after induced loneliness. *Cognition & Emotion, 30,* 1197–1207.
34. Gentile, D. A., Sweet, D. M., & He, L. (2019). Caring for others cares for the self: An experimental test of brief downward social comparison, loving-kindness, and interconnectedness contemplations. *Journal of Happiness Studies, 21,* 765–778.
35. Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotion, 8,* 720–724.
36. Hove, M. J., & Risen, J. L. (2009). It's all in the timing: Interpersonal synchrony increases affiliation. *Social Cognition, 27,* 949–961.

37. Paladino, M.-P., Mazzurega, M., Pavani, F., & Schubert, T. W. (2010). Synchronous multisensory stimulation blurs self-other boundaries. *Psychological Science, 21,* 1202–1207.

38. Valdesolo, P., Ouyang, J., & DeSteno, D. (2010). The rhythm of joint action: Synchrony promotes cooperative ability. *Journal of Experimental Social Psychology, 46,* 693–695.

39. Wiltermuth, S. S., & Heath, C. (2009). Synchrony and cooperation. *Psychological Science, 20,* 1–5.

40. Fischer, R., Callander, R., Reddish, P., & Bulbulia, J. (2013). How do rituals affect cooperation? An experimental field study comparing nine ritual types. *Human Nature, 24,* 115–125.

41. Trepany, C. (2020, March 17). Netflix Party lets friends have movie nights while social distancing. Here's how it works. *USA Today.* https://www.usatoday.com/story/entertainment/tv/2020/03/17/coronavirus-netflix-party-lets-friends-do-movie-nights-quarantine/5072347002/

42. Hobson, N. M., Schroeder, J., Risen, J. L., Xygalatas, D., & Inzlicht, M. (2018). The psychology of rituals: An integrative review and process-based framework. *Personality and Social Psychology Review, 22,* 260–284.

43. Henrich, J. (2009). The evolution of costly displays, cooperation, and religion: Credibility enhancing displays and their implications for cultural evolution. *Evolution and Human Behavior, 30,* 244–260.

44. Páez, D., Rimé, B., Basabe, N., Wlodarczyk, A., & Zumeta, L. (2015). Psychosocial effects of perceived emotional synchrony in collective gatherings. *Journal of Personality and Social Psychology, 108,* 711–729.

45. Sezer, O., Norton, M. I., Gino, F., & Vohs, K. D. (2016). Family rituals improve the holidays. *Journal of the Association for Consumer Research, 1,* 509–526.

46. Wen, N. J., Herrmann, P. A., & Legare, C. H. (2016). Ritual increases children's affiliation with in-group members. *Evolution and Human Behavior, 37,* 54–60.

47. Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: Content, triggers, functions. *Journal of Personality and Social Psychology, 91,* 975–993.

48. Hepper, E. G., Wildschut, T., Sedikides, C., Robertson, S., & Routledge, C. D. (in press). Time capsule: Nostalgia shields psychological wellbeing from limited time horizons. *Emotion.* Advance online publication. https://doi.org/10.1037/emo0000728

49. Ashraf, N., & Bandiera, O. (2018). Social incentives in organizations. *Annual Review of Economics, 10,* 439–463.

50. Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effect of accountability. *Psychological Bulletin, 125,* 255–275.

51. Pettigrew, T. F. (1998). Intergroup contact theory. *Annual Review of Psychology, 49,* 65–85.

52. Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology, 75,* 617–638.

53. Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology, 36,* 917–927.

54. Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84,* 377–389.

55. Kumar, A., & Epley, N. (2018). Undervaluing gratitude: Expressers misunderstand the consequences of showing appreciation. *Psychological Science, 29,* 1423–1435.

finding

Fear & anxiety in the time of COVID-19: How they influence behavior

Christina K. Zigler, Nicole Lucas, Debra M. Henke, & Ilona Fridman

abstract

The emotional factors that influence adherence to public health guidelines for containing the spread of COVID-19 are poorly understood and are limiting policymakers' ability to elicit compliance. In this article, we report the results of a nationwide survey conducted in April 2020 to gain insight into the relation between emotional stress and adherence to the public health guidelines of the U.S. Centers for Disease Control and Prevention (CDC). We found that levels of anxiety and perceived risk from COVID-19 correlated with adherence to the CDC's recommended cleanliness behaviors, such as handwashing. High anxiety increased individuals' adherence in part by increasing the perceived seriousness of the risk COVID-19 posed to them. Anxiety and perceived risk were not, however, associated with adherence to social distancing guidelines. Our findings highlight a need for more research into the emotional factors that predict public compliance with the CDC's recommendations. The results also indicate that policymakers may need to deliver different messages to promote different COVID-limiting behaviors, such as handwashing and social distancing.

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Adherence to public health recommendations is essential for the success of any country's response to a pandemic, including the COVID-19 outbreak.[1] Emotional responses to a pandemic would be expected to influence such adherence, yet little is known about the extent to which distress has affected the public's compliance with the COVID-19 guidelines issued by the U.S. Centers for Disease Control and Prevention (CDC). This lack of knowledge can significantly limit the ability of policymakers to design interventions that successfully elicit behaviors that can lessen the spread of COVID-19 and other infectious diseases.

In early spring 2020, we suspected that people who felt the most anxious about COVID-19 would adhere more firmly to the CDC's guidelines than would people who were feeling less anxious and that this response would be explained in part by anxiety increasing their sense of personal risk. To explore the associations among anxiety, perceived risk, and adherence, we conducted a national survey in April 2020 in which respondents reported on their anxiety and on their perception of the risks COVID-19 posed, as well as on their compliance with the CDC's recommendations. In this article, we discuss the findings and their implications for policy interventions.

Methods

We administered the survey to adults across the United States through the online survey platform Qualtrics. Participants were not paid to take part in this particular project, but the company offers participation incentives, such as points for taking surveys that can be exchanged for rewards. Our survey was open from April 10 through April 14, 2020, a time window that offered critical insight into respondents' feelings and behavior relatively early in the pandemic's spread in the United States. Because almost all states and U.S. territories were under mandatory stay-at-home orders by that time, we assumed that participants knew that the pandemic was underway and that those who believed behavior change was necessary to limit COVID's spread had started to alter their daily actions.

Nine of the surveyed respondents did not verify their age, which left a total sample of 1,234 participants. As planned, participant characteristics (see Table S1 in the Supplemental Material) were generally representative of the U.S. population as it was described in 2018 by the U.S. Census Bureau.[2] Twenty-two percent of the respondents were unemployed, and 27% reported experiencing food insecurity in the past month. Eleven percent reported a suspected or confirmed infection with COVID-19. Consistent with our assumption that most people in the United States were being personally affected by the pandemic, the vast majority of participants (79%) reported that they were under a mandatory stay-at-home order (at either the state or the local level); only 6% indicated that they were not sure whether a stay-at-home order was in place.

We elicited self-reports of anxiety by using a well-established instrument, the Patient-Reported Outcomes Measurement Information System (PROMIS) short form measure of anxiety.[3] Participants reported how frequently they experienced particular feelings in the preceding seven days by responding to survey items such as "I felt fearful," "My worries overwhelmed me," and "I felt uneasy" using a scale that ranged from 1 = *Never* to 5 = *Always*.

To assess risk perception, we asked participants to rate how serious a health concern they believed COVID-19 was for them personally, for their immediate family, and for the world. The scale ranged from 1 = *Not serious at all* to 4 = *Very serious*.

We collected detailed information on the frequency with which participants engaged in specific behaviors in four domains: cleanliness, social distancing, staying at home, and use of personal protective equipment in the form of masks and gloves. We selected behaviors included in the CDC guidelines,[4] and we preclassified them as being positive (associated with reduced risk of infection) or negative (associated with increased risk of infection). Examples of the positive behaviors included washing hands for at least 20 seconds, standing at least 6 feet away from people when outside

the home, and wearing a mask when in public. Examples of negative behaviors included meeting face-to-face with others, going to someone's home, hugging or touching people who were not part of the individual's household, and inviting friends or family to visit. The self-reported ratings for cleanliness, social distancing, and use of personal protective equipment used a 5-point scale that ranged, depending on the items, from 1 = *Never* or *Not at all* to 5 = *Always* or *Several times a day.* To assess the extent to which people stayed at home, we asked participants how many times they left their house in the last seven days.

See the Supplemental Material for fuller details on our methods, data analyses, and results.

Results

Emotions

Overall, participants reported higher levels of anxiety than were reported in the general population before the COVID-19 pandemic began.[5] Specifically, the survey population's average score on the PROMIS measure of anxiety was 62—one standard deviation (*SD* = 10.5) higher than that of a representative sample of adults before the pandemic began.

The perception of risk varied, although the majority of people saw COVID-19 as at least somewhat of a threat: 37% of participants rated it a very serious health concern to them personally, 25% considered it serious, and 28% said it was somewhat serious; 10% judged the threat to be not at all serious.

Behavior

Participants reported mixed adherence to the cleanliness behavior recommendations. We considered participants to be adherent to all recommended cleanliness behaviors if they responded *Usually* or *Always* to the three handwashing items in the survey (washing hands after being out in public, washing hands before eating, and washing hands for at least 20 seconds) and responded at least *Daily* to the item about wiping down frequently touched surfaces. Just about half of respondents (48.8%) said they adhered to recommended levels of all cleanliness behaviors.

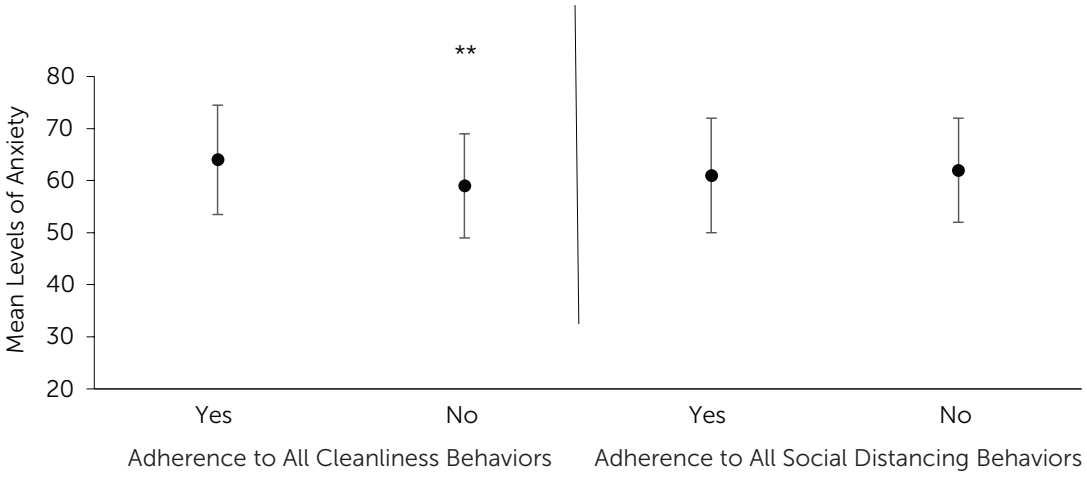
Less than 40% of participants reported adhering to all social distancing behaviors. We considered participants to be adherent to all social distancing behaviors if they responded *Not at all* when asked how frequently in the past week they had hugged or touched someone outside the household, walked close to someone outside the household, met face-to-face with people who did not live with them, attended gatherings with five or more people, went inside someone else's dwelling, and had friends or family over to visit. Forty percent of participants had at least one person from outside their household enter their home, with almost 3% saying they had five or more individuals enter their home, an action that directly contradicted CDC guidance and many state-level restrictions on social gatherings.

The vast majority of participants (83%) reported leaving their home six or fewer times in the past week, but this number was not a useful measure of adherence to stay-at-home recommendations because it was affected by employment status. Of individuals who reported having left their home, 59.7% reported always staying 6 feet away from others, but only 31.5% reported always wearing a mask. The low mask-wearing figure is striking in that the survey was administered more than a week after the CDC recommended that all individuals wear nonsurgical cloth face covers when out in public.

Anxiety & Adherence

As Figure 1 shows, individuals who adhered to all cleanliness behaviors reported higher levels of anxiety (M = 64, SD = 10.5) than did individuals who did not adhere to all of those behaviors (M = 59, SD = 10); (for the difference between the means, 95% CI [5.9, 3.6], $p < .001$). (For information about the statistical terms used in this article, see note A.) However, we saw no significant difference in anxiety levels between individuals adhering to all social distancing behaviors (M = 61, SD = 11) versus those who did not (M = 62, SD = 10; p = .114). Likewise, we found no relationship between anxiety and the number of times people left their house

Figure 1. Comparison of mean self-reported anxiety levels between U.S. adults who did or did not adhere to CDC recommended behaviors designed to reduce the spread of COVID-19



Note. CDC = U.S. Centers for Disease Control and Prevention. Anxiety was measured using the Patient-Reported Outcomes Measurement Information System short form measure of anxiety. Anxiety is reported in standard scores; that is, the raw data were adjusted so that they could be compared with data from the general population, which is represented as having a mean anxiety score of 50 (*SD* = 10). Error bars indicate 1 standard deviation above and below the mean. Anxiety predicted cleanliness behaviors but not social distancing.

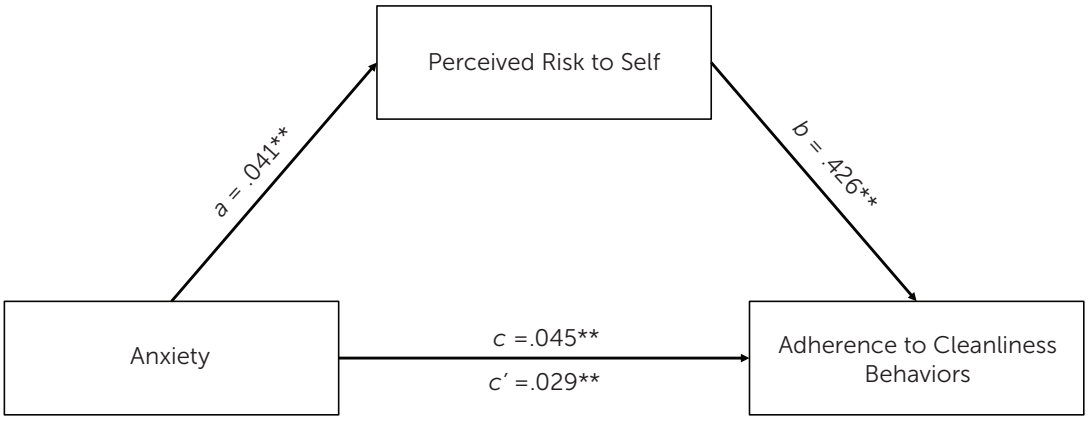
$^{**}p < .001$.

(Spearman's $\rho = -.03$) or between anxiety and the number of people who entered their home (Spearman's $\rho = -.08$). Anxiety did not strongly predict the donning of masks or gloves: the correlations between anxiety and the frequency of wearing personal protective equipment inside and outside the home were small to moderate (Spearman's ρs = .11 and .29, respectively).

We used mediation analyses to explore the mechanism by which high anxiety might lead to enhanced compliance with cleanliness recommendations; such analyses can help explain why certain relationships show up between variables. We found that increased anxiety predicted increased perceptions of personal risk. Moreover, as the perception of risk increased, so did participants' likelihood of reporting that they usually or always washed their hands before eating, washed their hands after being out in public, performed the ablutions for at least 20 seconds, and wiped down frequently touched surfaces in their homes daily. That is, to some extent, greater anxiety led to greater compliance by increasing the perception of risk. In more technical terms, when the relative effects of perceived risk and anxiety were dissected in the mediation analysis, the degree of influence predicted by anxiety alone decreased, which is a sign that perceived risk accounted for the difference. In other words, perceived risk partially mediated the relation between anxiety and adherence. See Figure 2 for the data and a diagram of the relationships.

Because we did not find a relationship between anxiety and adherence to social distancing recommendations, we could not run a mediation analysis involving anxiety, perceived risk, and social distancing. However, we did explore further whether perceived risk for oneself, one's immediate family, or the world predicted social distancing. We found statistically significant correlations, but the effect sizes were so small that measuring perceived risk on any of these dimensions did not improve predictions of whether people would practice social distancing. We also found that being under a stay-at-home order did not correlate with social distancing: individuals who were and were not under a stay-at-home order reported similar levels of adherence.

Figure 2. Anxiety's effects on adherence to cleanliness behaviors as mediated by an individual's perceived risk from COVID-19



Indirect effect (ab) = .017 (*95% Bootstrap CI:* .012–.023)

Note. A mediation analysis of data from a national sample of U.S. adults demonstrated that self-reported anxiety increased self-reported compliance with the U.S. Centers for Disease Control and Prevention's cleanliness guidelines in part by increasing people's perception that COVID-19 posed a serious personal risk to them. The numbers on the plots indicate how much a change in one variable accounted for a change in another variable. The pathway *c* = .045 is the *total effect*, an estimate of the effect of anxiety on adherence when the role of perceived risk is not included in the model. The adjusted pathway *c'* = .029 represents the *direct effect*, the effect on adherence attributed to anxiety alone when the influence of perceived risk is included in the model and controlled for. The .017 *indirect effect* is an estimate of the pathway that runs from anxiety through perceived risk to adherence. The 95% bootstrap confidence interval for the indirect effect is [.012, .023]; it is the interval that resulted when the test was run repeatedly to ensure the stability of the estimates.
**$p < .001$.

Discussion & Implications for Policy

To our knowledge, this is one of the first national explorations of how anxiety and perceived risk might be associated with adherence to CDC-recommended guidelines for minimizing the spread of COVID-19. Only a small number of participants indicated that they adhered to all of the cleanliness and social distancing behaviors suggested by the CDC in April 2020.[4] This level of disregard is striking in self-reports because investigators always expect to see some inflation of reported compliance: respondents tend to provide answers that enhance their image of themselves as responsible members of society (a phenomenon termed *social desirability bias)*. We found that more individuals said they adopted handwashing and disinfecting guidelines than adopted social distancing guidelines, such as limiting hugging and home visitors. Although it is somewhat surprising that people would engage more in one prevention approach than in another, this pattern is similar to results found in other cohorts and using different data collection methods during the same time period at local[6] and national levels.[7]

Our results support the hypothesis that anxiety and perceived risk from COVID-19 could motivate people to adhere to cleanliness guidelines, such as by washing their hands and disinfecting surfaces. As shown in our mediation analysis, anxiety levels largely tracked with how seriously people viewed COVID-19 as a threat to themselves, and this association facilitated compliance with cleanliness guidelines. This pattern is similar to associations found during the H1N1 influenza pandemic in 2009.[8] It suggests that highlighting personal risk may assist policymakers in their efforts to convince the public to increase cleanliness behaviors.

In contrast, anxiety and perceived risk were not related to adherence to social distancing guidance during a time when most individuals were under mandatory stay-at-home orders. This finding indicates that leaning on anxiety and fear of COVID-19 may not help policymakers move the needle on social distancing.

The lack of a correlation between anxiety and social distancing could have a number of explanations. Close social relationships often reduce anxiety,[9] which in turn, could hinder people's motivation to change or curtail socializing during stressful times. In other words, during a pandemic, individuals might seek out contact with people close to them even though repeated face-to-face interactions could increase the likelihood of perpetuating the outbreak. In addition, even for people who have a high level of anxiety and believe that COVID-19 is a serious threat to them personally, social distancing may be hard to implement. Barriers to full social distancing could include having a job that requires working outside of the home, having a living situation that makes it hard to avoid others who are not social distancing, or being homeless. Finally, some individuals who are able to social distance may refuse to do so because they feel it limits their personal freedom.[10] After the H1N1 outbreak, focus groups revealed that even hypothetical social distancing measures were not well received by the public and that trust in the authorities who issued the guidelines was vital to adherence to and adoption of these behaviors.[11] Although Americans complied with the CDC's guidelines imperfectly in early spring, their significant changes in behavior ultimately helped to reduce infection rates.[12] This change, however, came with emotional costs[13] (such as anxiety, depression, loneliness, and panic) and economic costs (such as business[14] and school closures[15]). If the pandemic continues for another year or two, the emotional and financial burdens on families are likely to grow larger and become an even greater barrier to adherence to social distancing recommendations.[16]

Our work provides evidence that articulating personal risk may enhance the effectiveness of messages that urge adherence to cleanliness recommendations but likely will have little impact on social distancing. Our findings also highlight the limitations of current interventions that focus on the danger that COVID-19 poses to individuals. Like others before us,[17] we propose deeper qualitative work on this topic as an important next step in identifying interventions that may better remove barriers to and actively promote social distancing among Americans. Such work would include interviews with individuals and families about the factors that influence whether they adhere to public health recommendations. These interviews will probably need to be ongoing to capture changes that occur with time and world events.

Our study has a number of strengths and limitations worth noting. We developed the survey on the basis of existing high-quality questionnaires, thereby providing support for its validity and allowing us to compare results from our sample with results from past surveys administered to representative samples of Americans. Our design was also preregistered along with a detailed analysis plan to further enhance its validity. We collected data during a unique time in the pandemic that allowed us to capture individuals' behaviors during early stages of the United States' response, before pandemic fatigue and the politicization of responses set in.

One limitation is that our sample differed from the general U.S. population in that it skewed young and had more middle-class participants. These differences are important for two reasons. First, the reported risk at the time of the study was represented as being lower for younger individuals. Second, the higher incomes of the middle-class participants could have enabled our population to exercise more choice over how much they practiced social distancing than was true of people who live in low-income communities. In addition, our study was cross-sectional, providing a snapshot of emotions and behaviors at one point in time. Thus, we were unable to look at changes in anxiety levels and adherence to recommendations; it will be important for researchers conducting future studies to examine such changes.

Conclusions

By early October 2020, the worldwide number of confirmed cases of COVID-19 had reached nearly 36 million, with over 7 million cases in the United States alone.[18] Continued research into the public's developing response to COVID-19 is vital, as was the case with the SARS outbreak in 2003.[19] In light of the finding that anxiety and

perceived risk from COVID-19 promoted handwashing and related cleaning activities but did not motivate survey participants to follow social distancing guidelines, policymakers will need to gain a deeper understanding of the emotional factors that can prompt individuals to restrict their social activities. This understanding is critical if public health messages are to succeed in changing the public's behavior along multiple dimensions as the fight to control the pandemic continues.

In the meantime, our findings and other research suggest actions that should be taken now and refined in light of the findings of future studies. The first is to continue to develop communications that inform people about the serious personal risk posed by the virus, although clearly this tack alone is insufficient. We also recommend that policymakers monitor emotional reactions to communications and dissect when the messages are helpful and when they are counterproductive. Further, it is extremely important for policymakers and information sources to foster a sense of trust, especially when asking individuals to make significant changes to their personal behavior. Finally, we recommend that policymakers recognize that different approaches and messages may well be needed to improve the public's adherence to different guidelines, such as the need for hand hygiene and the need to practice social distancing.

endnote

A. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the *t* test, or the *F* test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. An *r* value or a Spearman's ρ represents the correlation between two variables; values can range from –1 to 1, with 0 indicating no correlation, 1 indicating a perfect positive relationship, and –1 indicating a perfect inverse relationship. The *p* value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis)*. Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis. Standard deviation is a measure of the amount of variation in a set of values. Approximately two-thirds of the observations fall between one standard deviation below the mean and one standard deviation above the mean. Standard error uses standard deviation to determine how precisely one has estimated a true population value from a sample. For instance, if one were to take enough samples from a population, the sample mean ± 1 standard error would contain the true population mean around two-thirds of the time. A 95% confidence interval for a given metric indicates that in 95% of random samples from a given population, the measured value will fall within the stated interval.

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author note

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supplemental material

- https://behavioralpolicy.org/publication
- Methods & Analyses

references

1. Fong, M. W., Gao, H., Wong, J. Y., Xiao, J., Shiu, E. Y. C., Ryu, S., & Cowling, B. J. (2020). Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings—Social distancing measures. *Emerging Infectious Diseases, 26,* 976–984.
2. U.S. Census Bureau. (2018). *QuickFacts.* https://www.census.gov/quickfacts/fact/table/US/PST045218
3. Pilkonis, P. A., Choi, S. W., Reise, S. P., Stover, A. M., Riley, W. T., Cella, D., & PROMIS Cooperative Group. (2011). Item banks for measuring emotional distress from the Patient-Reported Outcomes Measurement Information System (PROMIS®): Depression, anxiety, and anger. *Assessment, 18,* 263–283. https://doi.org/10.1177/1073191111411667
4. Centers for Disease Control and Prevention. (2020). *Coronavirus disease 2019.* https://www.cdc.gov/coronavirus/2019-ncov/index.html
5. HealthMeasures. (2019). *Anxiety* [Scoring manual]. http://www.healthmeasures.net/images/promis/manuals/PROMIS_Anxiety_Scoring_Manual.pdf
6. Duke COVID19 Digital Lab. (2020, April 2). *Are North Carolinians social distancing? Survey says: Yes, but many report activities that may spread the coronavirus.* https://ssri.duke.edu/news/are-north-carolinians-social-distancing-survey-says-yes-many-report-activities-may-spread
7. Unacast. (2020, April 15). *Social distancing scoreboard.* Retrieved from https://www.unacast.com/covid19/social-distancing-scoreboard
8. Gilles, I., Bangerter, A., Clemence, A., Green, E. G. T., Krings, F., Staerklé, & Wagner-Egger, P. (2011). Trust in medical organizations predicts pandemic (H1N1) 2009 vaccination behavior and perceived efficacy of protection measures in the Swiss public. *European Journal of Epidemiology, 26,* 203–210.
9. Lee, R. M., & Robbins, S. B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity [Editorial]. *Journal of Counseling Psychology, 45,* 338–345. https://doi.org/10.1037/0022-0167.45.3.338
10. Gostin, L. O., & Wiley, L. F. (2016). *Public health law: Power, duty, restraint* (3rd ed.). University of California Press.
11. Baum, N. M., Jacobson, P. D., & Goold, S. D. (2009). "Listen to the people": Public deliberation about social distancing measures in a pandemic. *The American Journal of Bioethics, 9*(11), 4–14. https://doi.org/10.1080/15265160903197531
12. Courtemanche, C., Garuccio, J., Le, A., Pinkston, J., & Yelowitz, A. (2020). Strong social distancing measures in the United States reduced the COVID-19 growth rate. *Health Affairs, 39*(7). https://doi.org/10.1377/hlthaff.2020.00608
13. Dubey, S., Biswas, P., Ghosh, R., Chatterjee, S., Dubey, M. J., Chatterjee, S., . . . Lavie, C. J. (2020). Psychosocial impact of COVID-19. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14,* 779–788.
14. Bartik, A. W., Bertrand, M., Cullen, Z., Glaeser, E. L., Luca, M., & Stanton, C. (2020). The impact of COVID-19 on small business outcomes and expectations. *Proceedings of the National Academy of Sciences, 117,* 17656–17666. https://doi.org/10.1073/pnas.2006991117
15. Psacharopoulos, G., Patrinos, H., Collis, V., & Vegas, E. (2020, April 29). The COVID-19 cost of school closures [Blog post]. Retrieved from https://www.brookings.edu/blog/education-plus-development/2020/04/29/the-covid-19-cost-of-school-closures/
16. Blake, K. D., Blendon, R. J., & Viswanath, K. (2010). Employment and compliance with pandemic influenza mitigation recommendations. *Emerging Infectious Diseases, 16,* 212–218.
17. Asmundson, G. J. G., & Taylor, S. (2020). How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. *Journal of Anxiety Disorders, 71,* Article 102211. https://doi.org/10.1016/j.janxdis.2020.102211
18. Johns Hopkins University. (2020). *COVID-19 dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU).* Retrieved July 29, 2020, from https://coronavirus.jhu.edu/map.html
19. Institute of Medicine. (2004). *Learning from SARS: Preparing for the next disease outbreak: Workshop summary.* The National Academies Press. https://doi.org/10.17226/10915

proposal

Vicarious learning in the time of coronavirus

Christopher G. Myers

abstract

Health professionals confronting the COVID-19 pandemic need to learn vicariously—that is, learn the lessons of others' experiences—if they are to adopt and spread best practices for treatment, avoid costly repetition of prior mistakes, and not waste time "reinventing the wheel." Digital communication tools and social media could be leveraged to facilitate this vicarious learning in much the same way that they are being used to support other types of interpersonal interactions amid social distancing. Yet these tools are often not used to their full potential for learning and knowledge sharing among health professionals fighting COVID-19. Drawing on organizational and behavioral science research into how individuals and organizations learn from others' experiences, I recommend guidelines, policies, and practices that can increase both the use and the effectiveness of technological tools and social media to enhance vicarious learning among the health professionals at the front lines of pandemic care.

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In the face of a pandemic, such as the current COVID-19 crisis, health professionals around the world struggle to acquire the information and skills needed to meet the challenge of providing high-quality care. These outbreaks disrupt existing routines and resources, testing the abilities of individuals and organizations to learn and be resilient as circumstances change and difficulties escalate. In many ways, responding successfully to a pandemic depends on effective vicarious learning—learning that occurs through being exposed to and making sense of others' experiences[1]—and on applying the lessons of those experiences to the situation at hand. As the disease spreads, learning from others' earlier successes and failures in addressing it can help speed the deployment of effective treatment practices while also helping to minimize the amount of time spent repeating prior mistakes.

This need to learn vicariously from others' pandemic experience to increase the effectiveness of one's own efforts is consistent with findings of a significant body of organizational and behavioral research. This research has explored the process of vicarious learning at a variety of organizational levels—among, for example, individuals, teams, units, and firms—and has documented how vicarious learning can improve performance in a wide range of industry settings, from information technology and banking to pharmaceutical research and aerospace exploration.[2–7]

Like companies in these other industries, health care organizations devote significant effort to enabling vicarious learning—for instance, by forming quality improvement collaboratives to share knowledge and learn from others' innovations.[8] Efforts to foster such learning in the face of COVID-19 have built on these existing practices, providing valuable ways to incorporate lessons from others' experiences with treating the disease. For instance, efforts to document and disseminate information on early patient testing and treatment in Asia provided an opportunity for health professionals in other countries to learn vicariously from these early experiences with COVID-19 and thereby enhance their own treatment efforts.[9–12]

Yet as the global spread of the disease continues, there is clearly room for improvement in learning from others' experiences with COVID-19. Diffusion of knowledge about effective treatments and policies for combating the disease remains slow, with different countries unfortunately "reinventing the wheel" in their approach to the disease rather than learning from the errors and successes of earlier efforts.[13] The reasons for this suboptimal vicarious learning are varied, of course, but they include a tendency to rely on formal, static mechanisms for sharing experiences with the disease; inadequate opportunities for health care providers to directly interact with peers who are treating the disease in other countries; and a lack of leadership in organizing and clearing away obstacles to engaging in those interactions. In the text that follows, I address processes identified in organizational research that can facilitate more effective vicarious learning and suggest actions that leaders can take to increase such learning by health professionals on the front lines of the COVID-19 crisis.

Processes That Facilitate Vicarious Learning

Moving Beyond Formal, One-Way Knowledge Dissemination

Part of the challenge of engaging in vicarious learning about COVID-19 is that much of the knowledge about others' experiences with the disease comes through high-level, static documentation rather than active discussion or interaction. Stories of others' experiences treating COVID-19 are often shared through outlets such as news articles or governmental reports that attempt to capture a dynamic experience and summarize it in a medium or document meant for independent consumption. During this summarization process, much of the nuance or contextualized understanding of the experience can be lost, either unintentionally or as a by-product of fitting the experience to a particular perspective, leaving readers less able to draw useful insights for applying lessons to their own situations.

Recent organizational research has pointed out the inadequacy of relying solely on these arm's length, one-way forms of vicarious learning,

particularly in complex, dynamic environments like those in which health professionals work.[1] Learning from others in these environments often requires more significant interaction and back-and-forth discussion between the people who are conveying their experiences and the recipients who are learning from them—a give-and-take that allows for questioning, analyzing, and refining one's understanding of the experiences in ways that enable better contextualization and adaptation.[1,14]

Engaging in Peer-to-Peer Vicarious Learning Interactions

Beyond being one-way, static communications, much of the documentation mentioned above targets a broad population of readers, which limits its value for helping frontline health professionals learn from their peers' experiences. The questions and knowledge needs of those engaged in on-the-ground patient care often differ from those of the general public or government officials. Health professionals are likely to learn more if they can communicate directly with their peers (rather than having these communications mediated through reports or media documents). Peer-to-peer interactions allow health professionals to share more nuanced, tacit knowledge, because they can rely on common terminology and norms that make it easier to draw lessons from one another's stories and experiences.

Organizational and behavioral research in health settings has repeatedly demonstrated the value of peer-to-peer vicarious learning as a way for health professionals to gain knowledge and enhance patient care. For example, surgeons practicing in a group setting or engaging in comparatively more peer interactions have been shown to perform better on recertification exams,[15] consistent with evidence that formal continuing medical education (CME) efforts are more effective in changing behavior when they involve interaction or peer discussion.[16] Other research has shown that cardiac surgeons' post-operative mortality rates are influenced not only by the surgeons' own past successes and failures but also by the experiences of their peers.[17] Likewise, emergency department clinicians have been shown to be motivated to learn from stories of other clinicians' patient care experiences and, in particular, from stories of these colleagues' exceptionally successful cases.[18]

Ways That Technology Can Support Vicarious Learning About COVID-19

These findings suggest that frontline health professionals can benefit greatly from meeting to share and discuss stories with one another about their successes and failures in treating COVID-19. Unfortunately, the global dispersion of this pandemic and those treating it, alongside the mandate to practice greater social distancing to curb the disease's spread, make it difficult to enact policies to encourage interpersonal learning interactions. Yet more technological tools exist today to address these barriers than during any prior pandemic. And although technology for treating COVID-19 patients has advanced considerably—for example, telemedicine allows health care workers to conduct some types of patient screening and treatment while maintaining social distancing[19]—these same tools have yet to be fully adopted to enable vicarious learning among the health professionals providing the treatment.

Technological tools such as videoconferencing and social media allow for greater connection and collaboration across the globe and have been increasingly playing a role in health professionals' interactions and learning in recent years.[20–22] A variety of different social media groups on platforms such as Facebook and Twitter have emerged as community forums for health professionals, often focusing on a particular specialty or area of interest. For instance, one closed-membership Facebook group of robotic surgeons from around the world (some of whom may be the only one in their geographical area performing robotic procedures) has allowed members to connect with one another and post questions, photos, or surgical videos to share their techniques or seek others' advice.[23,24] Groups such as these provide opportunities for learning and rapid dissemination of ideas and techniques and can amplify the benefits of vicarious learning, allowing for knowledge sharing by experts who

may be geographically remote while also multiplying the number of potential learners who can benefit from the information that is discussed.

Some efforts are already underway to make use of these technology-mediated, virtual vicarious learning interactions in the fight against COVID-19. News stories have documented the use of social media to rapidly spread clinical information and combat misinformation on COVID-19 and increase interaction and collaboration among physicians.[25] Other reports have noted the use of teleconferencing by health professionals in Italy and the United States to learn from their counterparts treating the disease in China.[26,27] Yet these efforts are often too sporadic or isolated to have a systematic impact on the pandemic. And there are multiple obstacles to their use, not least being that many health professionals are uncomfortable with or lack knowledge of how to apply these technologies for peer learning. Indeed, some health care professionals have been hesitant to use these tools owing to concerns about privacy (both their own and their patients'), as well as about their reputation, their potential malpractice liability, or simply the burden of trying to participate in or manage a worldwide community forum.[24,28] As a result, efforts to engage these frontline health professionals in technology-enabled vicarious learning still face significant challenges that limit its widespread adoption in combating COVID-19.

Policy Actions to Advance Vicarious Learning in the Time of Coronavirus

These challenges are nontrivial but not insurmountable. As detailed in Table 1, leaders and policymakers—both within particular health institutions and outside of them (nationally and internationally)—can take a variety of actions to enhance and extend technology-mediated vicarious learning among health professionals.

Increase the Use & Value of Existing Vicarious Learning Technologies

In the short term, hospital and practice leaders can more extensively engage with technological conduits for vicarious learning already being used by those fighting COVID-19. Existing social media groups for health professionals represent a valuable resource for sharing knowledge—many have memberships numbering in the tens of thousands,[25] often with a core of highly active users who engage meaningfully with posted questions or information.[23] Although concerns about misinformation on these platforms are not unfounded,[25,28] developing policies and providing resources to allow individuals to better engage with these existing platforms (as opposed to avoiding or ignoring them) can help to address the worries about misinformation.

For instance, hospital leaders could identify individuals in their organizations who already engage frequently with these kinds of groups and tap them to form a social-learning initiative or committee. This committee could then serve as the designated outlet for sharing accurate, real-time data from the hospital (such as up-to-date patient counts, documented outcomes, revised protocols, or other approved information) on these social media platforms; the committee could also be tasked with interpreting and incorporating the knowledge that people from other institutions post to these groups. Creating this central contact point for knowledge flowing out of and into the hospital via social media would enable the information being shared to be better filtered for quality, allow for more systematic dissemination among care teams within the hospital, and provide a critical knowledge resource to COVID-19 decisionmakers.

At the same time, leaders and policymakers at the national level—for instance, leaders of professional associations or advocacy groups—could work in the short term to remove some of the barriers to engaging in virtual vicarious learning among health professionals. One key action would be advocating for legal protections for technology-mediated peer learning, including working to incorporate this kind of learning into existing frameworks that protect other peer-learning and quality-improvement tools (such as informal conversations or morbidity and mortality conference discussions)

Table 1. Strategies & actions for enhancing virtual vicarious learning among health professionals

Strategic goal (time frame)	Action steps for leaders and policymakers
Increasing the use and value of existing vicarious learning technologies (in the short term)	Organizational and institutional leaders can: • identify employees who are active members of online health professional groups or social media platforms and provide resources and support (such as time and recognition) for bringing in outside knowledge via these platforms to improve the organization's practices. • set up a working group or committee to organize knowledge shared and received via these online learning communities and provide them with more frequent access to pertinent data to share with others for learning and feedback (such as hospital-level case data, equipment status, or clinical-protocol revisions, in consultation with hospital legal personnel as needed to ensure compliance with regulations and privacy guidelines). • cultivate within-organization standards and norms for learning and sharing knowledge with others (not only outside the organization but also across different internal care sites or units) and for incorporating this knowledge into decisionmaking. Professional associations and national policymakers can: • use existing platforms and clout to advocate for appropriate legal protections for online vicarious-learning activities among health professionals, conferring these virtual tools with protections similar to in-person peer-learning activities (such as morbidity and mortality conferences and quality-improvement efforts). • develop a database of reputable health professional social media groups (including associations' own forums or discussion groups) and encourage engagement in online vicarious learning among association members or other constituents to help further reduce reputational barriers to engaging in peer-learning interactions.
Creating new vicarious learning opportunities and technology platforms (in the long term)	Organizational and institutional leaders can: • strengthen partnerships with neighboring organizations (such as regional associations of hospitals or partner members of health system networks) by creating shared practices and expectations for how vicarious learning (both in-person and virtual) will be carried out to help connect health professionals at each organization. • expand formal organizational connections (for example, institutional partnerships, professional-exchange programs, or information-sharing collaboratives) with a broad set of organizations around the globe to establish a network of learning relationships that can be drawn on in a future crisis or pandemic. Professional associations and national policymakers can: • engage health technology companies to establish secure, privacy-compliant platforms for online discussion and interaction to provide association members and other constituents with a reliable tool for engaging in peer-to-peer vicarious learning. • encourage the integration and cross-compatibility of online peer-learning platforms with other systems and technologies, such as electronic medical record software, to enable or potentially automate knowledge sharing (such as using analysis of de-identified, privacy-compliant data to connect health professionals experiencing similar patient challenges). • incorporate in-person or online vicarious learning or both into standard expectations and practices within professional communities (such as by including vicarious learning in continuing education expectations and credentialing processes) to embed these practices into professionals' usual workflow before they are urgently needed in a crisis or pandemic.

from undue legal challenges.[24] National associations could also take advantage of their existing networks and social platforms to increase access to virtual vicarious learning, either by providing their own forums for peer interaction (such as a member discussion hub) or by curating and promoting lists of reputable social media groups for health professionals.

Create New Vicarious Learning Opportunities & Technology Platforms

In the longer term, leaders and policymakers across all levels of the health industry can work to build a more robust infrastructure for peer-to-peer vicarious learning, helping to routinize this method of sharing knowledge before the next global pandemic or crisis arises. At the

local level, hospital leaders can work to build stronger relationships with other organizations to better position their staffs to engage in vicarious learning with these partners in the future, including by setting up in-person knowledge-sharing conferences or personnel rotation programs as well as virtual-learning opportunities. Having these relationships already established can be useful for rapid vicarious learning in times of crisis, as vicarious learning is often easier when parties share a preexisting commonality or relationship. Indeed, organizational research has shown that having more deeply embedded ties or a common identity with a partner can help reduce the perceived risks of sharing private information and facilitate knowledge transfer.[29,30]

This benefit of closer ties can help explain why the vicarious learning that has occurred so far in the fight against COVID-19 has often been driven by preexisting social relationships. For instance, infectious disease specialists at Johns Hopkins University held a videoconference to learn from Chinese physicians treating COVID-19, an opportunity realized primarily because an office mate of one of the specialists personally contacted several former medical school classmates in China.[26] Yet even among these personal contacts, some were hesitant to share their specific experience in the absence of national treatment guidelines in China (out of worry over potentially spreading incorrect information), with one hospital's leaders ultimately agreeing to participate at least partially because its physicians had already successfully held similar meetings with hospitals in Europe (see note A). This experience points to the value of hospitals forging more global partnerships and ties, so these kinds of exchanges become more routine (rather than tied to idiosyncratic personal connections) and thus can serve as reliable tools for future vicarious learning.

Finally, leaders and policymakers can encourage health technology companies to develop more secure and easy-to-use peer-learning and knowledge-sharing platforms for health professionals. Given that existing technologies already allow for virtual patient–physician engagement and telemedicine,[19] development of a similar platform for virtual knowledge sharing, advice seeking, and interactive peer-to-peer discussion among health professionals does not seem out of reach. Professional associations can take charge of these platforms, providing them as tools for their members to connect with and learn from one another and incorporating the platforms into broader learning practices. For instance, although CME programs are increasingly making use of technology platforms, they are often used to replicate formal, noninteractive continuing education modalities such as slides, readings, or recorded presentations,[31] despite evidence of the value of interactivity for both in-person and online CME.[16,32] Professional associations and accrediting bodies can also expand the use of new technological tools to include more informal peer-to-peer learning interactions—and not only by providing the platforms for doing so. They can also find ways to incorporate these interactions into professional learning requirements (such as by including in-person or online peer learning interactions in annual CME standards) and can advocate for integration of these platforms with other frequently used health technologies (such as electronic medical record systems). Doing so would help to further embed vicarious learning into the habits and routines of health professionals, allowing these interactions to become a common learning practice, both for regular times and in a pandemic.

Enhanced coordination and support for using social media as a learning tool; appropriate legal protections for virtual knowledge sharing; increased partnerships and learning relationships across organizations; and access to secure, privacy-compliant platforms for peer-to-peer learning are challenging goals for health leaders and policymakers to achieve, but they are attainable. Adopting these interventions would go a long way toward achieving more effective vicarious learning by the worldwide community of health professionals, thereby enabling more rapid dissemination of best practices and lessons learned in the fight against COVID-19 and future epidemics.

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Endnote

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references

1. Myers, C. G. (2018). Coactive vicarious learning: Toward a relational theory of vicarious learning in organizations. *Academy of Management Review, 43,* 610–634. https://doi.org/10.5465/amr.2016.0202
2. Argote, L., & Fahrenkopf, E. (2016). Knowledge transfer in organizations: The roles of members, tasks, tools, and networks. *Organizational Behavior and Human Decision Processes, 136,* 146–159. https://doi.org/10.1016/j.obhdp.2016.08.003
3. Bingham, C., & Davis, J. P. (2012). Learning sequences: Their existence, effect, and evolution. *Academy of Management Journal, 55,* 611–641. https://doi.org/10.5465/amj.2009.0331
4. Bresman, H. (2010). External learning activities and team performance: A multimethod field study. *Organization Science, 21,* 81–96. https://doi.org/10.1287/orsc.1080.0413
5. Kim, J.-Y., & Miner, A. S. (2007). Vicarious learning from the failures and near-failures of others: Evidence from the U.S. commercial banking industry. *Academy of Management Journal, 50,* 687–714. https://doi.org/10.5465/amj.2007.25529755
6. Madsen, P. M., & Desai, V. (2010). Failing to learn? The effects of failure and success on organizational learning in the global orbital launch vehicle industry. *Academy of Management Journal, 53,* 451–476. https://doi.org/10.5465/amj.2010.51467631
7. Myers, C. G. (in press). Performance benefits of reciprocal vicarious learning in teams. *Academy of Management Journal*. https://doi.org/10.5465/amj.2018.0875
8. Wells, S., Tamir, O., Gray, J., Naidoo, D., Bekhit, M., & Goldmann, D. (2018). Are quality improvement collaboratives effective? A systematic review. *BMJ Quality and Safety, 27,* 226–240. https://doi.org/10.1136/bmjqs-2017-006926
9. Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72,314 cases from the Chinese Center for Disease Control and Prevention. *JAMA, 323,* 1239–1242. https://doi.org/10.1001/jama.2020.2648
10. World Health Organization. (2020). *Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)*. https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf
11. Wang, C. J., Ng, C. Y., & Brook, R. H. (2020). Response to COVID-19 in Taiwan: Big data analytics, new technology, and proactive testing. *JAMA, 323*, 1341–1342. https://doi.org/10.1001/jama.2020.3151
12. Gawande, A. (2020, March 21). Keeping the coronavirus from infecting health-care workers. *The New Yorker*. https://www.newyorker.com/news/news-desk/keeping-the-coronavirus-from-infecting-health-care-workers
13. Pisano, G. P., Sadun, R., & Zanini, M. (2020, March 27). Lessons from Italy's response to coronavirus. *Harvard Business Review*. Retrieved from https://hbr.org/2020/03/lessons-from-italys-response-to-coronavirus
14. Bresman, H. (2013). Changing routines: A process model of vicarious group learning in pharmaceutical R&D. *Academy of Management Journal, 56,* 35–61. https://doi.org/10.5465/amj.2010.0725
15. Valentine, M. A., Barsade, S., Edmondson, A. C., Gal, A., & Rhodes, R. (2014). Informal peer interaction and practice type as predictors of physician performance on maintenance of certification examinations. *JAMA Surgery, 149,* 597–603. https://doi.org/10.1001/jamasurg.2014.183
16. Davis, D., O'Brien, M. A. T., Freemantle, N., Wolf, F. M., Mazmanian, P., & Taylor-Vaisey, A. (1999). Impact of formal continuing medical education: Do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA, 282,* 867–874. https://doi.org/10.1001/jama.282.9.867
17. KC, D., Staats, B. R., & Gino, F. (2013). Learning from my success and from others' failure: Evidence from minimally invasive cardiac surgery. *Management Science, 59,* 2435–2449. https://doi.org/10.1287/mnsc.2013.1720
18. Quinn, R. W., Myers, C., Kopelman, S., & Simmons, S. A. (in press). How did you do that? Exploring the motivation to learn from others' exceptional success. *Academy of Management Discoveries*. https://doi.org/10.5465/amd.2018.0217
19. Hollander, J. E., & Carr, B. G. (2020). Virtually perfect? Telemedicine for Covid-19. *New England Journal of Medicine, 382,* 1679–1681. https://doi.org/10.1056/NEJMp2003539
20. Vohra, R. S., & Hallissey, M. T. (2015). Social networks, social media, and innovating surgical education. *JAMA Surgery, 150,* 192–193. https://doi.org/10.1001/jamasurg.2014.1324
21. Jain, S. H. (2009). Practicing medicine in the age of Facebook. *New England Journal of Medicine, 361,* 649–651.
22. Allen, M., Sargeant, J., MacDougall, E., & Proctor-Simms, M. (2002). Videoconferencing for continuing medical education: From pilot project to sustained programme. *Journal of Telemedicine and Telecare, 8,* 131–137. https://doi.org/10.1177/1357633X0200800302
23. Myers, C. G., Kudsi, O. Y., & Ghaferi, A. A. (2018). Social media as a platform for surgical learning: Use and engagement patterns among robotic surgeons. *Annals of Surgery, 267,* 233–235. https://doi.org/10.1097/SLA.0000000000002479
24. Myers, C. G., Kudsi, Y., & Ghaferi, A. A. (2017, October 30). Surgeons are using social media to share and learn new skills. *Harvard Business Review*. Retrieved from https://hbr.org/2017/10/surgeons-are-using-social-media-to-share-and-learn-new-skills
25. Smith, M., Cortez, M. F., & Bloomberg. (2020, March 24). How doctors are using social media to develop coronavirus treatments in real time. *Fortune*. Retrieved from https://fortune.com/2020/03/24/doctors-social-media-develop-coronavirus-treatments/
26. Begley, S. (2020, March 24). Desperate for Covid-19 answers, U.S. doctors turn to colleagues in China. *STAT*. https://www.statnews.com/2020/03/24/covid-19-answers-doctors-turn-to-china/
27. China, Italy doctors share experiences of COVID-19 control via teleconference. (2020, March 7). *CGTN*. https://news.cgtn.com/news/2020-03-07/China-Italy-doctors-share-experiences-of-COVID-19-control-online-OFi0gryDVS/index.html
28. Yurieff, K. (2020). Doctors turn to Twitter and TikTok to share coronavirus news. *CNN*. https://www.cnn.com/2020/03/31/tech/social-media-doctors-coronavirus/index.html
29. Uzzi, B., & Lancaster, R. (2003). Relational embeddedness and learning: The case of bank loan managers and their clients. *Management Science, 49,* 383–399. https://doi.org/10.1287/mnsc.49.4.383.14427

30. Kane, A. A. (2010). Unlocking knowledge transfer potential: Knowledge demonstrability and superordinate social identity. *Organization Science, 21,* 643–660. https://doi.org/10.1287/orsc.1090.0469

31. Harris, J. M., Jr., Sklar, B. M., Amend, R. W., & Novalis-Marine, C. (2010). The growth, characteristics, and future of online CME. *Journal of Continuing Education in the Health Professions, 30,* 3–10. https://doi.org/10.1002/chp.20050

32. Sargeant, J., Curran, V., Jarvis-Selinger, S, Ferrier, S., Allen, M., Kirby, F., & Ho, K. (2004). Interactive on-line continuing medical education: Physicians' perceptions and experiences. *Journal of Continuing Education in the Health Professions, 24,* 227–236. https://doi.org/10.1002/chp.1340240406

proposal

Behavioral insights for containing the COVID-19 pandemic: Some practices in China

Ning Zhang

abstract

Although China's central and local governments do not have behavioral insights teams, they nonetheless incorporated strategies consistent with behavioral science research when they instituted plans to contain the COVID-19 pandemic. They made it easy for the public to implement health-protective behaviors; eliminated financial barriers to obtaining treatment; set the most stringent protocols as the default to protect health care professionals; simplified decisionmaking about which groups of people needed to self-isolate (thereby enhancing the efficiency of infection-control programs); and provided timely, tailored mental health services to those in need of psychological assistance. Adopting similar practices might help other countries contain the COVID-19 pandemic and enhance future pandemic preparedness and resiliency.

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The COVID-19 pandemic is the most severe global public health challenge in the 21st century. By November 15, 2020, the coronavirus responsible for the disease had resulted in more than 53 million cases and more than 1.3 million deaths worldwide.[1] Since the outbreak began in December 2019, governments around the world have initiated a variety of mitigation measures. The success of these strategies depends greatly on people's compliance with and commitment to health-protective behaviors, such as handwashing and social distancing. Yet prompting behavioral change in response to pandemics is a major challenge, as the responses to the 2009 H1N1 influenza outbreak demonstrated.[2,3] Even when people intend to engage in such behaviors, they often do not because of financial, physical, mental, or situational barriers.[4]

Behavioral scientists have advocated applying insights from their field to shrink the intention–behavior gap and thereby improve the efficiency of public health emergency measures.[5–10] In China, the central and local governments have embedded behavioral principles in their strategies for promoting adherence to health-protective behaviors and other mitigation measures. In this article, I share five strategies that could be of interest to other nations and could potentially be adapted for use in their own efforts to contain the pandemic. The strategies are all aligned with the EAST principle developed by the Behavioural Insights Team in the United Kingdom.[11] EAST emphasizes using interventions that are easy, attractive, social, and timely.

What China Did

One strategy used in China was to make it easy for the public to comply with recommended protective actions. For example, local governments established online sign-up systems for residents who needed face masks and offered hand sanitizer at the entrances of communities (blocks of residence buildings with shared entrances and exits) and supermarkets and inside elevators. Beyond making it easy to physically access needed supplies, these actions communicated that most people were engaging in the behaviors. As previous research has demonstrated,[12] highlighting social norms can provide strong and persuasive cues for people to engage in health-protective behaviors and can reinforce the need to continue adherence. These actions were also complemented by the tailoring of messages about mask wearing, handwashing, and social distancing to specific communities; for example, officials and volunteers from local communities used local idioms and data in videos, animations, and other communications. According to a national survey conducted by the School of Public Health of Fudan University in early February 2020, most Chinese people were engaging in the recommended health-protective behaviors by that time: 98.1% were wearing face masks, 94.2% were cleaning their hands more frequently, and 94.5% were social distancing.[13]

A second strategy involved lowering barriers to obtaining medical care to encourage people to seek timely treatment.[6–8] Ideally, all individuals who have or are suspected of having COVID-19 would receive prompt medical treatment and stay in quarantine. Yet the medical expenses for treatment can impose a major financial burden on affected families. The average expense for a patient with mild symptoms is 23,000 yuan, approximately $3,250; a patient with severe symptoms could expect a bill of 150,000 yuan, approximately $21,200. The financial concerns initially made many people reluctant to report their contact and travel histories and hesitant to seek treatment. On January 22, 2020, the National Healthcare Security Administration of China declared that the government would cover all personal medical expenses for COVID-19 beyond amounts normally paid by government-sponsored or other health insurance.[14] The guaranteed financial support significantly enhanced people's cooperation with contact tracing and adherence to treatment. In deciding to cover medical costs, the central government prioritized infection control over minimizing COVID-19's financial impact on the state. This action, of course, will not always be feasible for other countries as they try to balance the trade-offs between infection control and economic concerns.

Third, China set the default for protecting health care professionals at the highest level of rigor.

Default options, which are preset courses of action that take effect unless a decisionmaker actively makes an alternate choice,[15] have already been applied successfully to increase organ donations,[16] influenza vaccinations,[17] and the prescription of generic drugs.[18]

Early in the pandemic, inadequate protective measures led to many cases of COVID-19 among health care professionals globally. As of April 8, 2020, more than 22,000 health care workers from 52 countries around the world had been infected, according to the World Health Organization.[19] In Hubei, China, more than 3,000 health care workers were infected during the initial outbreak. On January 21, 2020, a team of experts on hospital infection control went to Wuhan, the epicenter of the pandemic in China, to help control infections among health care workers. This team set the highest protective standard (such as donning new and complete protective gear, including N95 masks and shields, when seeing each patient) as the default for protecting health care workers; it also provided on-site training and guidance on infection control in hospitals and communities in Hubei. Thereafter, no infections occurred among the 42,600 health care workers sent to assist Wuhan and other major cities in Hubei in containing the COVID-19 pandemic.[20] The standards were then adopted across the country.

Of course, to meet these standards, health facilities had to have sufficient supplies of personal protective equipment. But providing supplies is not enough by itself to achieve adherence to the standards. According to the COM-B model of behavior change proposed by Susan Michie and her colleagues,[21] behavior change requires capability, opportunity, and motivation—and interventions should be aimed at addressing any deficiencies in these requirements. In China, having sufficient supplies provided the physical opportunity to meet the stringent protective standards for health care professionals, but setting a rigorous standard as the default additionally provided a psychosocial opportunity for adherence by reducing the need for people who were overwhelmed by the challenges of treating patients to make choices about how to protect themselves.

Fourth, China made it easy to identify which groups of people needed to self-isolate. To achieve this, all levels of government required citizens who traveled outside of their homes to use an app, developed with Alibaba, that was designed to gather the information needed to identify possible exposures to the virus and make recommendations about when to quarantine, thereby minimizing the spread of COVID-19. On January 23, 2020, before the app was developed, Wuhan locked down to reduce the transmission of COVID-19 to other areas of China, and many other cities followed that lead shortly afterward. Although the lockdown enabled COVID-19 to be contained in China,[22] it was unsustainable because of its enormous economic and social impacts.

This was where the app came in. On the basis of people's health status and contact history during the past 14 days, the software displays a green, yellow, or red code indicating, respectively, whether an individual can travel without restriction or needs to stay in quarantine for seven or 14 days. Using a traffic-light coloring system to indicate risk of infection makes it easy for app users and others (such as people who monitor entrances to train stations) to readily identify which people need to stay out of circulation. The city of Hangzhou introduced the app, which is accessed through the Alipay wallet app, on February 11, and other cities and provinces soon adopted it, too. A little later, the central government issued standardized guidelines for national use. The prevalence of smartphones and electronic payment apps facilitated the app's rapid adoption by the public.

By making a person's risk of transmitting the disease visible and easy to understand, the app facilitated *precision infection control*—the prompt quarantining of those who pose the most risk of spreading the disease while minimizing interference with other people's activities. This precision enabled society as a whole to bounce back to normal while keeping the risk of human-to-human virus transmission low.

Before the central government stepped in, some provinces developed their own health-status apps, which differed in the information

being collected and the guidelines regarding the actions allowed or restricted by the color codes. Consequently, even users who had green codes sometimes had difficulty traveling across provinces. Issuing national standards for the health-status codes eliminated the barriers to travel across provinces for low-risk individuals.[23]

Fifth, because the pandemic has had wide-ranging effects on mental health, China provided timely mental health services for those in need. Shortly after the outbreak began, the National Health Commission of China released guidelines on providing emergency psychological crisis interventions and hotlines for psychological assistance.[24,25] Mental health services were tailored to four groups of people: (a) infected patients and frontline health care workers, (b) people suspected of being infected and close contacts of infected patients who also had to stay in quarantine, (c) close contacts of people in the first two groups as well as people who were not frontline health care workers but were otherwise involved in the efforts to contain COVID-19, and (d) other vulnerable groups and the general public.[24] As part of this effort, mental health teams composed of psychiatrists, psychiatric nurses, and clinical psychologists were sent to work on-site at health facilities to provide mental health services to patients and health care workers.[26] Also, more than 600 psychological assistance hotlines were established to provide telehealth mental health services 24/7 for those in need. By reducing distress and enhancing cooperation, these mental health services have helped to improve the effectiveness of public health interventions.[27]

Conclusion

Behavioral science–based strategies have been embedded in China's centralized approach to containing the COVID-19 pandemic: making health-protective behaviors easier to implement, encouraging early treatment by providing free medical care to infected patients, setting the highest protective standard as the default for protecting health care workers, using standardized health-status codes to simplify implementation of precision infection control, and providing timely mental health services. See Table 1 for more details about these measures. Recent evidence from tracked infection and mortality rates indicates that these strategies have greatly contributed to reducing the transmission of COVID-19 in China.[22]

I have several reasons for believing that these strategies could also help other countries contain the COVID-19 pandemic. Application elsewhere seems feasible in part because, in contrast to China, which is a late adopter of behavioral science, many other countries already have experience using behavioral science interventions in public policy. Strategies based on the EAST principle and other behavioral science principles have been well developed and successfully implemented in many countries (such as the United States and England) to increase participation in health-protective behaviors, such as handwashing and influenza vaccination.[17,28–30] What is more, China's COVID strategies are consistent with the COM-B model of behavior change (which has been empirically tested across different cultures)[21] in that they aim to reduce the physical, financial, and mental barriers to engaging in health-protective behaviors; enhance people's capabilities and motivations for taking those actions; and create opportunities to engage in the actions. More generally, the strategies are used in coordination with other COVID-fighting measures rather than in isolation, which reduces the implementation costs and increases the synergistic effects of different public health interventions in a pandemic emergency.

I realize that the strategies adopted in China should be viewed in terms of the nation's cultural and socioecological context, as researchers studying the social determinants of health often advocate for increasing the context sensitivity of behavioral interventions.[9,31,32] The culture in China has features that may have contributed to its successes. For example, cultural "tightness," or restrictiveness, may have interacted with governmental efficiency to reduce infection and mortality rates in China.[33,34] People in tight cultures tend to be motivated to prevent disease,[35] which makes them more inclined than

Table 1. Behavioral insights applied in China to contain the COVID-19 pandemic

Purpose	Behavioral insights or principles	Practices in China	Conditions that can be enabling or constraining
Enhance public engagement in health-protective behaviors	Make performing the target behavior as easy as possible Use the power of social norms to increase engagement	Established online registration systems to distribute face masks to residents in need Offered hand sanitizer at the entrance of communities and supermarkets and inside elevators Highlighted engagement in health-protective behaviors as the norm	Enabling: adequate supply of face masks and hand sanitizers, a collective cultural mindset that enhances the effects of social norms Constraining: inconsistent recommendations from place to place about behaviors to adopt, discrimination against people who wear face masks to prevent infection
Increase the prompt seeking of medical treatment	Reduce the barriers to obtaining care Increase accessibility of health care services	Implemented a national emergency policy that covered all patients' COVID-19 medical expenses Released the policy early in the COVID-19 pandemic	Enabling: elimination of the financial burden for medical care Constraining: inadequate medical resources for treating patients
Protect health care workers from infection	Leverage the power of defaults Reduce barriers to the use of infection-control measures	Set the highest protective standard as the default Provided on-site training and guidance on infection control	Enabling: adequate supplies of personal protective equipment Constraining: inconsistent standards for effective infection control
Increase adherence to epidemiological investigations and contact tracing and achieve precision infection control	Make it easy to implement measures that identify individuals who should be quarantined while allowing low-risk individuals to work and attend school Make individuals' risk of being infected salient and visible	Introduced easy-to-obtain health-status codes to aid with precision infection control Applied traffic-light color coding to the health-status codes to make them easy to understand and visible Standardized health-status codes and guidelines to reduce barriers to safe travel across provinces	Enabling: widespread smartphone use and access to a health-status code app, wide recognition of the need to monitor level of risk Constraining: low smartphone use, lack of a health-status code app, inconsistent guidelines for making use of health-status codes
Alleviate the mental health impacts of COVID-19	Make mental health resources accessible Provide psychological assistance promptly	Established more than six hundred 24/7 hotlines for psychological assistance Made mental health screening, counseling, and self-help resources freely accessible both online and offline	Enabling: wide adoption of smartphones, availability of high-speed internet, enough qualified mental health professionals Constraining: underestimation of the need for psychological assistances, stigma surrounding mental illness

those in less restrictive cultures to adopt strict measures.[36] Each country should take its own situational, institutional, cultural, and socioecological factors into account when designing, tailoring, and implementing strategies for containing COVID-19 and future pandemics.[6,9,32] For example, for people in Europe and North America, framing desired behaviors for mitigating the pandemic in terms of promoting good health could be more effective than using a disease-prevention framing.

I hope my suggestions will inspire more cross-cultural empirical research into the effectiveness of applying behavioral sciences–based strategies for containing pandemics. Meanwhile, China's experience with the COVID-19 pandemic indicates that, along with making the public's health and well-being their top priority and keeping cultural sensitivity in mind, policymakers and public health officials in other countries may benefit from incorporating behavioral sciences–based strategies into their efforts to increase the adoption of health-protective behaviors. Doing so should help to both mitigate the threat posed by COVID-19 today and enhance pandemic preparedness and resiliency in the future.

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references

1. Johns Hopkins University. (2020). *COVID-19 dashboard by the Center for Systems Science and Engineering (CSSE) at John Hopkins University (JHU).* Retrieved November 15, 2020, from https://coronavirus.jhu.edu/map.html
2. Davis, M. D., Stephenson, N., Lohm, D., Waller, E., & Flowers, P. (2015). Beyond resistance: Social factors in the general public response to pandemic influenza. *BMC Public Health, 15,* Article 436. https://doi.org/10.1186/s12889-015-1756-8
3. Rubin, G. J., Potts, H. W. W., & Michie, S. (2010). The impact of communications about swine flu (influenza A HINIv) on public responses to the outbreak: Results from 36 national telephone surveys in the UK. *Health Technology Assessment, 14*(34), 183–266. https://doi.org/10.3310/hta14340-03
4. Sheeran, P., & Webb, T. L. (2016). The intention–behavior gap. *Social and Personality Psychology Compass, 10,* 503–518. https://doi.org/10.1111/spc3.12265
5. Lunn, P. D., Belton, C. A., Lavin, C., McGowan, F. P., Timmons, S., & Robertson, D. A. (2020). Using behavioral science to help fight the coronavirus. *Journal of Behavioral Public Administration, 3*(1). https://doi.org/10.30636/jbpa.31.147
6. Michie, S., Rubin, G. J., & Amlôt, R. (2020, February 28). Behavioural science must be at the heart of the public health response to COVID-19. *The BMJ Opinion.* https://blogs.bmj.com/bmj/2020/02/28/behavioural-science-must-be-at-the-heart-of-the-public-health-response-to-covid-19/
7. Michie, S., West, R., & Amlôt, R. (2020, March 3). Behavioural strategies for reducing COVID-19 transmission in the general population. *The BMJ Opinion.* https://blogs.bmj.com/bmj/2020/03/03/behavioural-strategies-for-reducing-covid-19-transmission-in-the-general-population/
8. Michie, S., West, R., Amlôt, R., & Rubin, G. J. (2020, March 11). Slowing down the COVID-19 outbreak: Changing behaviour by understanding it. *The BMJ Opinion.* https://blogs.bmj.com/bmj/2020/03/11/slowing-down-the-covid-19-outbreak-changing-behaviour-by-understanding-it/
9. Bavel, J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S A., Jetten, J., Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour, 4,* 460–471. https://doi.org/10.1038/s41562-020-0884-z
10. Webster, R. K., Brooks, S. K., Smith, L. E., Woodland, L., Wessely, S., & Rubin, G. J. (2020). How to improve adherence with quarantine: Rapid review of the evidence. *Public Health, 182,* 163–169. https://doi.org/10.1016/j.puhe.2020.03.007
11. Behavioural Insights Team. (2014). *EAST: Four simple ways to apply behavioural insights.* https://www.bi.team/publications/east-four-simple-ways-to-apply-behavioural-insights/
12. McFerran, B. (2015). Social norms, beliefs, and health. In C. A. Roberto & I. Kawachi (Eds.), *Behavioral economics and public health* (pp. 133–160). Oxford University Press. https://doi.org/10.1093/med/9780199398331.003.0005
13. Fudan University, School of Public Health. (2020). *Xīnxíng guānzhuàng bìngdú fèiyán yìqíng xià de gōngzhòng xiāngguān rèn zhī, xíngwéi hé xīnlǐ jiànkāng diàochá* [A national survey on people's attitudes, behavior, and mental health during COVID-19]. https://mp.weixin.qq.com/s/XjAdJft6UkFsmoCVJ7p8uw
14. National Healthcare Security Administration and Ministry of Finance of China. (2020). *Guānyú zuò hǎo xīnxíng guānzhuàng bìngdú gǎnrǎn de fèiyán yìqíng yīliáo bǎozhàng de tōngzhī* [Announcement on the medical security and financial support for COVID-19 infected patients]. http://www.nhsa.gov.cn/art/2020/1/23/art_37_2284.html
15. Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.
16. Johnson, E. J., & Goldstein, D. (2003, November 21). Do defaults save lives? *Science, 302,* 1338–1339. https://doi.org/10.1126/science.1091721
17. Chapman, G. B., Li, M., Leventhal, H., & Leventhal, E. A. (2016). Default clinic appointments promote influenza vaccination uptake without a displacement effect. *Behavioral Science & Policy, 2*(2), 41–50.
18. Malhotra, S., Cheriff, A. D., Gossey, J. T., Cole, C. L., Kaushal, R., & Ancker, J. S. (2016). Effects of an e-prescribing interface redesign on rates of generic drug prescribing: Exploiting default options. *Journal of the American Medical Informatics Association, 23,* 891–898.
19. World Health Organization. (2020, April 11). *Coronavirus disease 2019 (COVID-19) situation report–82*. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200411-sitrep-82-covid-19.pdf
20. People.cn. (2020, March 7). *Quánguó yuán è yīwù rényuán líng gǎnrǎn* [Zero infection among healthcare workers assisting Hubei Province during COVID-19]. http://bj.people.com.cn/n2/2020/0307/c233087-33857502.html
21. Michie, S., Atkins, L., & West, R. (2014). *The behaviour change wheel: A guide to designing interventions*. Silverback.
22. Tian, H., Liu, Y., Li, Y., Wu, C.-H., Chen, B., Kraemer, M., U. G., Li, B., Cai, J., Xu, B., Yang, Q., Wang, B., Yang, P., Cui, Y., Song, Y., Zheng, P., Wang, Q., Bjornstad, O. N., Yang, R., Grenfell, B. T. Dye, C. (2020, March 31). An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. *Science, 368,* 638–642. https://doi.org/10.1126/science.abb6105
23. Xinhua News Agency. (2020, May 23). "Guóbiāo" guīfàn gèdì "jiànkāng mǎ" jiànshè yùnxíng biāozhǔn ["National standard" standardizes the operation standards for "health code" everywhere]. http://www.xinhuanet.com/politics/2020-05/23/c_1126021895.htm
24. National Health Commission of the People's Republic of China. (2020). *Guānyú yìnfā xīnxíng guànzhuàngbìngdú gǎnrǎn de fèiyányiqíng jǐnjí xīnlǐwēijīgānyù zhǐdǎoyuánzé de tōngzhī* [The guideline of psychological crisis intervention for COVID-2019 pneumonia epidemic]. http://www.nhc.gov.cn/jkj/s3577/202001/6adc08b966594253b2b791be5c3b9467.shtml
25. National Health Commission of the People's Republic of China. (2020). *Guānyú yìnfā xīnxíng guànzhuàngbìngdúfèiyán yìqíngfángkòng qījiān xīnlǐyuánzhùrèxiàn gōngzuòzhǐnán de tōng zhī* [Guidelines for psychological assistance hotlines for COVID-2019 pneumonia epidemic]. http://www.nhc.gov.cn/jkj/s3577/202002/f389f20cc1174b21b981ea2919beb8b0.shtml
26. National Health Commission, Department of Human Resources and Social Security, & Department of Finance of the People's Republic of

China. (2020, February 12). *Guānyú gǎishàn yíxiàn yīwù rényuán gōng zuòtiáojiàn, qièshí guānxīn yīwù rényuán shēnxīn jiànkāng ruògān cuòshī de tōngzhī* [Measures to improve the working conditions and well-being of medical personnel during the COVID-19 pneumonia epidemic]. Retrieved from http://www.gov.cn/zhengce/content/2020-02/11/content_5477399.htm

27. Liu, S., Yang, L., Zhang, C., Xiang, Y.-T., Liu, Z., Hu, S., & Zhang, B. (2020, February 18). Online mental health services in China during the COVID-19 outbreak. *The Lancet: Psychiatry, 7*(4), e17–e18. https://doi.org/10.1016/S2215-0366(20)30077-8
28. Aarestrup, S. C., Moesgaard, F., & Schuldt-Jensen, J. (2016). *Nudging hospital visitors' hand hygiene compliance*. https://doi.org/10.13140/RG.2.2.25911.52641
29. Grant, A. M., & Hofmann, D. A. (2011). It's not all about me: Motivating hand hygiene among health care professionals by focusing on patients. *Psychological Science, 22,* 1494–1499. https://doi.org/10.1177/0956797611419172
30. Milkman, K. L., Beshears, J., Choi, J. J., Laibson, D., & Madrian, B. C. (2011). Using implementation intentions prompts to enhance influenza vaccination rates. *Proceedings of the National Academy of Sciences of the United States of America, 108,* 10415–10420. https://doi.org/10.1073/pnas.1103170108
31. Alcántara, C., Diaz, S. V., Cosenzo, L. G., Loucks, E. B., Penedo, F. J., & Williams, N. J. (2020). Social determinants as moderators of the effectiveness of health behavior change interventions: Scientific gaps and opportunities. *Health Psychology Review, 14,* 132–144. https://doi.org/10.1080/17437199.2020.1718527
32. Michie, S., West, R., & Spring, B. (2013). Moving from theory to practice and back in social and health psychology. *Health Psychology, 32,* 581–585. https://doi.org/10.1037/a0030205
33. Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020, March 21). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet, 395,* 931–934. https://doi.org/10.1016/S0140-6736(20)30567-5
34. Gelfand, M. J., Raver, R. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., . . . Yamaguchi, S. (2011, May 27). Differences between tight and loose cultures: A 33-nation study. *Science, 332,* 1100–1104. https://doi.org/10.1126/science.1197754
35. Kurman, J., & Hui, C. (2011). Promotion, prevention or both: Regulatory focus and culture revisited. *Online Readings in Psychology and Culture, 5*(3). https://doi.org/10.9707/2307-0919.1109
36. Higgins, E. T. (2005). Value from regulatory fit. *Current Directions in Psychological Science, 14,* 209–213. https://doi.org/10.1111/j.0963-7214.2005.00366.x

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