Why it’s so hard to be rational about Covid-19

By Gaia Vince

Attitudes towards lockdown are proving divisive in countries like the US – and those divisions are falling down familiar party lines. But why does partisanship shape our compliance with public health campaigns?

The world’s best scientists are currently deployed in a war-like effort to counter the coronavirus pandemic, devising vaccines, treatments, modelling outcomes and advising the rest of us. This is a fast-moving contagion, borne of our 21st-Century globalised society, and it calls for the very latest evidence-based science. On this, we all agree, because we’re rational 21st-Century people, right?

Only up to a point. Surveys of the American public reveal that attitudes towards the same fatal virus in the same nation are strongly influenced by partisan voting patterns. Republican voters are generally less concerned than Democrats about Covid-19, and less likely to support public lockdown measures to prevent spread of the coronavirus, which at the time of publishing had infected over a million Americans and killed more than 69,000 people there.

Since Covid-19 is an infectious disease, it depends entirely on human hosts to carry and spread it – the more people act as regular socialising humans, the more chances the virus has to replicate and spread, and the worse the epidemic. That’s the science. Only by recognising the threat of the disease, will people be mobilised to change their innate social behaviours, to actively slow its spread. However, while scientific and medical experts in the US and around the world alert the public to the risks, and reiterate the importance of social distancing, several global leaders, with no scientific training, have spent months playing down the risks.

Protective movement restrictions have nevertheless been ordered by most state governments, with resulting business shutdowns and record unemployment. In response, more than a dozen states have seen anti-lockdown protests, as thousands of conservative and far-right Americans demand the restrictions are lifted, in spite of the health costs. In Michigan and Washington, pro-Trump, gun-toting protestors called for “liberty” from the “tyranny” of state governors. In their support, President Donald Trump tweeted “LIBERATE MICHIGAN!” and “LIBERATE VIRGINIA!”, and described the protesters as people who “love our country”.

Last week, hundreds of protestors stormed the Michigan Capitol and threatened the Governor, who had extended the state’s stay-at-home order by two weeks up to 15 May. Michigan has been one of the state’s hardest hit by the virus and is still experiencing more than 100 daily deaths. On 1 May, the day after this Capitol protest, during which demonstrators called the Michigan Governor a tyrant and compared her to Hitler, Trump described those same protestors as “very good people”. Meanwhile, all over the US, anti-lockdown protests continue. These protests, which contradict health advice to reduce transmission rates of the virus, come at a time of widely circulated conspiracy theories about the virus, including that it is a hoax (believed by 13% of Americans polled), or that the virus was deliberately created in a Chinese weapons lab (a claim believed by as much as half the population), and that 5G wireless technology somehow spreads the virus. Such theories have been boosted and spread by a handful of prominent conservative politicians and far-right activists, including Republican Senator Tom Cotton. And research shows that even smart people can believe such conspiracy theories, if they’re couched in the right language.

“If you have the kind of hyper-partisanship we have in the United States, it’s like a dry forest and all it’ll take is one match to light it and cause a problem,” says Jay van Bavel, associate professor of psychology at New York University. “That’s what we’ve seen in the last few months in the US, where Trump didn’t take the virus seriously at first, and the right-wing media sphere – Fox News and talk radio – downplayed the threat of the pandemic for a long time to protect his electoral chances. So then you have the recipe for differences in beliefs.”

As polls have shown, as far back as February, Americans’ attitudes to Covid-19 risk are closely tied to voting behaviour, with Republicans showing much less concern about the outbreak.

Tribal culture affects how people see the world more than facts do. Take human-caused climate change, for which there is near-unanimous global scientific consensus. This, too, divides Americans, but in an unlikely way: the more education that Democrats and Republicans have, the more their beliefs in climate change diverge. Of Republicans with only a high school education, 23% report being very worried about climate change. But among college-educated Republicans, that figure was just 8%.

This may seem counter-intuitive, because better-educated Republicans are more likely to be aware of the scientific consensus. But in the realm of public opinion, climate change isn’t a scientific issue, it’s a political one. Climate change science is relatively new and technically complicated, and many Americans adopt the opinions of their tribal leaders: the political elites. Even though better-educated Republicans may have more exposure to information about the science around climate change, they also have more exposure to partisan messages about it, and this matters more.

“We’ve had three years of Americans arguing about different perceptions around facts: say, the size of crowds at Trump’s inauguration versus Obama’s inauguration. It’s easy to laugh that off, because it doesn’t have any consequences. But now we have a virus that imposes enormous risks to people’s health,” van Bavel says. “And the risks have non-partisan consequences because most people have a family member or work with someone who’s from a different political party. If they get exposed to the virus and contract the disease, they put you at risk. So there is a very strong reason to try to figure out a way to solve this.”

Since we have culturally evolved to acquire our knowledge and beliefs primarily through high-fidelity copying of others rather than by invention (by looking at the evidence and deciding for ourselves), we are vulnerable to this problem of copying unreliable models. Worse still, because we have culturally learned to value rational explanations over subjective ones for scientific issues, we can be manipulated into believing the opinions we copy are rational, so it is harder to change them.
Despite our culturally evolved norms for rationality and evidence-based decision making, our biological evolution has not caught up and our cognition continues to be emotionally led. The problem is not necessarily that we use the emotive part of our brain more than the rational in decision making, but that we are self-delusional. Even experts are prone to biases and these mean costly mistakes are made, and irrational prejudices are systemic in organisations where people believe themselves to be non-racist, non-sexist and to hold the positions they do through skill rather than luck.

Often, the main role of reasoning in decision making is actually not to arrive at the decision but to be able to present the decision as something that’s rational. Some psychologists believe we only use reason to retrospectively justify our decisions, and largely rely on unquestioned instincts to make choices. It may be that our unconscious instincts – despite our cognitive biases and prejudices – are more capable of rationality than our logical thought-processing minds. Few of us are able to fully separate our subjective and objective reasoning during decision making – this is one of the promises of artificial intelligence.

Our decision making is influenced by our biology and our social environment. Take the psychological and physiological influence of fear: it’s been shown that people who vote more conservatively tend to have a bigger amygdala, the brain’s fear centre. In one study, the more fear a three- or four-year-old showed during a lab study, the more conservative their political attitude was found to be 20 years later.

The impact of fear is instant: when people with liberal attitudes experienced physical threat, during a study, their political and social attitudes became more conservative, temporarily. Conservative politicians and electioneering exploit this, aiming to raise voters’ fears of immigration by comparing immigrants to germs, for example, which targets our deep, biologically evolved motivations to avoid contamination and disease. In one study, during an H1N1 flu epidemic, researchers reminded people of the dangers of the flu virus and then asked them their attitudes towards immigration, after which they were asked whether they had been vaccinated against flu yet. Those who hadn’t received their anti-flu shot were more likely to be anti-immigration than the ones who felt less threatened.

But in a follow-up study, the researchers offered people a squirt of hand sanitiser straight after the flu warning. The immigration bias went away. Making people feel safe changes their voting decision to more liberal. When researchers asked people to imagine themselves completely invulnerable to any harm, Republican voters became significantly more liberal in social attitudes to issues like abortion and immigration. Reason is suffused with emotion.

The social implications of most decisions are also important factors in decision making. In very partisan situations, people who disobey the social norm by voting against the group majority risk ostracism. In such cases, therefore, it may be more rational for the individual to go against the evidence because we are motivated more by social cohesion and maintaining support networks than being objectively right.

Whatever your political persuasion, the Covid-19 virus will not discriminate as it seeks more lungs to infect. But, because contagion is inherently social, it may well turn out that those populations who continue to socialise undeterred might end up experiencing worse epidemics. In other words, your voting record may well influence your fate.

Needless to say, these overall trends linking political leanings and attitudes towards coronavirus are not the whole story. Rand Paul, junior Senator from Kentucky, for example, has been volunteering in a hospital to help patients during the crisis, including those with coronavirus, after he had the disease himself.

And there are signs things are changing. As Republicans get exposed to people they know affected by the virus, they are taking the threat more seriously – something known as the “reality constraint”. “People’s motivations for partisanship start to get outweighed by the value of being accurate and being healthy for themselves and their family,” says van Bavel.

The most recent poll shows that over 95% of Democrats support social distancing measures, and a large majority of of Republicans do too – over 80% – so the gap is narrowing. Perhaps, then, it is unsurprising that Trump’s approval rating has declined over the same time that approval ratings have risen for state governors who have shown leadership in responding to the virus.

HEALTH

Why we should all be wearing face masks

By Richard Gray

4th May 2020

With some countries already emerging from lockdown, can wearing face masks in public help to keep coronavirus infection rates from rising again?

Face masks are a symbol of the pandemic era – a visual metaphor for the tiny, unseen viral foe that could be lurking around any corner. Some opt for a scarf wrapped around their face, others make do with a t-shirt yanked up over their mouth. The more creative hook colourful homemade varieties around their ears, while a lucky few wear distinctive surgical masks or, rarer still, N95 respirators.

While a few months ago anyone wearing a mask in public would have drawn stares in many countries unused to this behaviour, they are now a reminder of the strange times we live in. And as governments around the world start to ease their lockdowns to allow their citizens out to mingle in the wider world again, growing numbers of people are opting to wear face masks in public.

But there is still debate about whether members of the public should be encouraged to wear face masks at all.

In the early days of the pandemic, many governments warned the public against wearing face masks for fear demand would leave frontline health workers without vital supplies and that it may lull people into a false sense of security. Some – such as the US – have since reversed that advice. The state of Utah has said it will provide a free face mask to any citizen who requests it. And other countries such as the Czech Republic, Slovakia, Austria, Morocco, Turkey and Germany have all made wearing masks in public mandatory. It is likely others will follow their lead as they ease restrictions.

But can face masks really make a difference in our battle against Covid-19?
"A key point is that the countries that flattened the curve used masks in public," says Chris Kenyon, head of the sexually transmitted diseases unit at The Institute of Tropical Medicine in Antwerp, who has examined whether face masks may have played a role in limiting the spread of Covid-19 in certain countries. “These were mostly Asian countries. For some reason, until very recently European experts – Czechia (Czech Republic) excluded – were unable to learn from what worked in Asia.”

To understand why face masks might work, it is important to look at how the virus that causes Covid-19 spreads in the first place.

Once it has infected someone, the Sars-CoV-2 virus responsible for the disease hijacks their cells to replicate itself. As it multiplies, these new virus particles then burst out of the cells and become suspended in the bodily fluids in our lungs, mouth and nose. When an infected person coughs, they can send showers of tiny droplets – known as aerosols – filled with the virus into the air.

A single cough can produce up to 3,000 droplets. There are fears the virus can also be spread simply through speaking. One recent study showed that we spray thousands of droplets invisible to the naked eye into the air just by uttering the words “stay healthy”.

Once out of our mouths, many of the larger droplets will quickly settle onto nearby surfaces while smaller ones remain suspended in the air for hours, where they can be breathed in. While the behaviour of the virus-filled droplets in rooms with air conditioning and outside environments are less well understood, they are thought to settle on surfaces more quickly in disturbed air. There are also some reports that the coronavirus can spread through ventilation systems in buildings. (Read more about how long coronavirus survives on surfaces.)

The Sars-CoV-2 virus has been found to survive in these aerosol droplets for at least three hours, according to one study by virologist Neeltje van Doremalen and her colleagues at the US National Institute of Allergy and Infectious Diseases, Hamilton, Montana. But a more recent, but as yet unpublished study, has found that the Sars-CoV-2 virus is still infectious for more than 16 hours after being suspended in aerosol droplets. It found the virus was “remarkably resilient in aerosol form” compared to other similar coronaviruses they studied.

Together, they suggest that in the right conditions, the virus can linger in the air for several hours and still infect people if breathed in. And in indoor environments, they seem to be particularly prone to spreading through the air.

An unpublished analysis of 318 outbreaks of Covid-19 in China showed that it was most commonly transmitted in indoor environments, particularly in people’s homes, but also on public transport, in restaurants, cinemas and shops. They found just one example where the virus appeared to have been transmitted while people were outside.

Genetic material from Sars-CoV-2 has also been detected in the air in toilets and rooms used by people infected with Covid-19. One study of a cluster of cases that occurred in a restaurant in Guangzhou, China, suggests that in poorly ventilated spaces the virus can spread to people sitting in the immediate vicinity through airborne aerosol droplets.

“Face masks could help to reduce transmission in the community particularly if used in public transport and crowded areas,” says Ben Cowling, head of epidemiology and biostatistics at the University of Hong Kong.

He and his colleagues recently published a study looking at the effectiveness of face masks to prevent the spread of the virus from infected people. They found a standard surgical face mask was enough to considerably reduce the amount of virus escaping in the breath and coughs of people infected with different respiratory viruses, including a mild type of coronavirus, influenza and a rhinovirus that causes the common cold.

“One of the proposals for lifting lockdowns is that we use mass testing along with contact tracing and quarantine, to get ahead of infections in the community,” says Cowling. “If you are identified as an infected person, the health department can trace your family members, your social contacts and your occupational contacts, but it is very difficult to trace who you were sitting next to on the bus or train.

“If we can limit transmission in these kinds of locations, it could really be a big help.”

One of the reasons widespread, public face mask wearing is so important with Covid-19 has to do with the prevalence of asymptomatic carriers who can still spread the virus to others. It is estimated that anywhere from 6% to almost 18% of those infected can carry the virus without developing symptoms. Add to this an incubation period of around five days, but up to 14 days in some cases, before symptoms develop and even those who do go on to show signs of being contagious can spread the virus to a lot of people before they start to fall ill.

“This makes it particularly difficult to suppress transmission in the community,” says Cowling. “But if everybody is wearing face masks, that would mean infected and asymptomatic people are also wearing masks. That could help to reduce the amount of virus which gets into the environment and potentially causes infections.”

Even wearing a damp homemade mask can reduce the number of droplets each of us emit while we speak, according to a study by researchers at the US National Institutes of Health, Bethesda, Maryland.

So, while face masks might help those already carrying the virus from passing it to others, can they also protect the uninfected from breathing it in?

Certainly the ability of specialised, disposable masks like the N95 respirator and the equivalent FFP-2 respirator mask in Europe to filter out particles from the air is high. They are designed to passively filter out 95% and 94% of airborne particles respectively – down to the size of 0.3 micrometres across – as the wearer breathes.

Their performance with blocking viruses from entering, however, is more mixed. Some viruses can be as small as 0.01 micrometres, while researchers have reported the coronavirus that causes Covid-19 is 0.07-0.09 micrometres in size. Respiratory viruses, however, tend to be suspended in aerosol droplets, which can range in size from 0.1-900 micrometres, so blocking these is often more important.

Some older studies have suggested that smaller viruses than might be expected can slip through the N95 filter, but they have been found to be effective at blocking the influenza virus.

And there is some research to suggest these respirator masks are effective when it comes to protecting people against Covid-19. One analysis of health workers in China showed that those who wore N95 respirators did not become infected with the virus, despite caring for highly-contagious patients. This is one of the reasons why these masks have been deemed so important for frontline healthcare workers.
The concern is that, if the general public buy up all of the already short supplies of these masks, it will leave these crucial workers, who are the most likely to be exposed, unprotected and vulnerable. The World Health Organization has urged the general public not to wear these masks in order to secure supplies for health workers, and this has also been the rationale behind the reluctance of many governments to encourage the public to wear masks.

While there is now some evidence that respirator masks can be disinfected for reuse, it is far from a perfect solution.

“We really need to ensure we have sufficient supplies of facemasks for healthcare workers,” adds Cowling. Such is the shortage of Personal Protective Equipment (PPE) like N95 respirator masks, that some scientists have investigated building alternatives from materials that can be found lying around in hospitals.

Another potential issue with asking the public to wear these masks is that they require training to fit properly. If they are not correctly fitted, the seal around the mouth and nose can still allow viral particles to slip around the side. Facial hair can also affect their performance, as it disrupts the seal. The US Centers for Disease Control and Prevention (CDC) has published a helpful guide for anyone sporting facial hair and looking to wear face masks – a neat “soul patch”, a pencil moustache or Zappa-style trim should be fine. Those sporting designer stubble, a flamboyant Dali or full Garibaldi might need to consider a shave.

But there are simpler alternatives available too. One recent, but yet to be peer-reviewed, study found a 3M surgical mask  the kind worn by surgeons in operating theatres  could keep out almost 75% of particles down to a size of 0.02 micrometres. While far less effective than an N95 respirator, a surgical mask can still help to reduce the number of particles breathed in. But by cutting a hole in the end of a stocking and wearing that over the mask, it was possible to improve the mask’s ability to cut out particles to 90%.

“Surgical masks, unlike N95 respirators, are designed to fit loosely,” says Loretta Fernandez, an environmental chemist at Northeastern University, in Boston, Massachusetts, who was one of those involved in the study. “This allows some air to go around the mask to the breathing zone rather than through the mask material.” They found that the addition of “nylons” on the outside of the mask helped to reduce this. But with demand for surgical masks also high, many members of the public are being forced to make their own alternatives. There are already a wide range of designs available online for do-it-yourself mask makers, with most using cotton fabric to create a pocket that a filter of some kind can be placed in. Some suggest using vacuum cleaner bags, others add coffee filters between two bandanas or insert folded pillow cases.

Yang Wang, an environmental engineer at Missouri University of Science and Technology, and one of his students built a few examples of these masks and found that using fabrics with a higher thread count worked better. A cotton bandana was the least effective, followed by a woolen scarf, but a 600-thread-count pillowcase folded four times could filter out around 60% of the particles.

Masks made from allergy-reducing air conditioning filters and vacuum cleaner bags were found to work best, almost matching the performance of an N95 respirator.

“There is a lot of potential for fabric masks and particularly masks which incorporate non-woven materials like those used in some dust mops,” says Cowling. “There is no reason why surgical masks should be the ‘best’ type of masks to wear in the community, but some fabrics have too many ‘holes’ and would not perform well.”

Fernandez and her collaborator Amy Mueller, an engineer at Northeastern University, also examined the effectiveness of different homemade masks. The most effective used multiple fabric layers, although they fell some way short of N95 and surgical masks. Adding a nylon on top to clinch the mask onto the face, however, did increase the effectiveness to the point where some homemade designs were able to keep out 80% of the particles. Other researchers have found that while pulling a t-shirt up over your nose and mouth will block less than half of the aerosols coming towards it, doubling and even tripling the layers of a cotton t-shirt fabric can dramatically improve things in an emergency. Other fabrics such as silk and polyester were also found to be surprisingly effective. Cotton flannel, felted wool and quilting cotton have been found to be particularly good at blocking ultrafine particles, and one study suggested that a single sock, when flat and pressed tightly against the nose and mouth, could also serve as a good emergency mask substitute.

Much like the disposable N95 and surgical masks, homemade varieties like these are really only good for one use before they need to be disinfected if you want to maximise their potential. The US CDC recommends routinely washing homemade masks. Hot water alone may not be enough – one recent study found the Sars-CoV-2 virus can survive temperatures of at least 60C. Fortunately, the oily envelope that encases coronaviruses can be pulled part by soap and household detergent.

But Mueller warns that all these alternatives cannot be seen as replacements for an N95 mask. “There is a very important question – for health officials to interpret from the data that we are collecting – about what level of particle filtration is ‘safe enough’? It is unfortunate but true that in some cases people may be choosing between multiple imperfect options.”

But even with these imperfect options, wearing them in public could make a difference by helping to keep infection rates down as people come out of lockdown and start mingling again. For example, researchers at University College London have warned that the pavements in the UK’s busiest city, much like many others around the world, may not be wide enough to allow people to maintain a safe distance from each other. In confined spaces, such as on public transport, it is even harder. Tests on homemade masks have shown they can still significantly reduce the spread of other viral infections such as influenza. They can also help to reduce the dispersal of the virus onto nearby surfaces when people cough.

Provided enough people wear masks when venturing out in public, it could have a dramatic impact on how quickly the coronavirus starts to spread again, particularly if combined with other measures such as social distancing and handwashing. One unpublished study by scientists at Arizona State University found that if 80% of people wore only moderately effective masks, it could reduce the number of deaths in New York by 17-45% over a two month period. Even wearing masks that were just 20% effective could cut mortality by 24-65% in Washington and 2-9% in New York, if enough people wore them.

In countries where masks are in short supply, some researchers have suggested that prioritising them for the elderly could also be effective.

While face masks might bring a little discomfort, and make it harder to spot the facial expressions of those we are talking to, those things are a small price to pay for keeping the people around us safe and well.
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