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The Blind Spots of Sociotechnical Imaginaries: COVID-19 Scepticism in Brazil, the United Kingdom and the United States

RENAN GONÇALVES LEONEL DA SILVA and LARRY AU

During the first wave of the coronavirus pandemic in 2020, experts and policymakers mobilised various slogans to compel the public to help defeat COVID-19. By comparing Brazil, the United Kingdom and the United States, this study shows how dominant sociotechnical imaginaries tied to the slogans were mobilised. We argue that the blind spots of these dominant sociotechnical imaginaries contributed to subversive sociotechnical imaginaries and made room for COVID-19 scepticism. In Brazil, calls to 'take care of yourself' contributed to a sceptical stance that individualised responsibility. In the United Kingdom, calls to 'protect the NHS' contributed to sceptical accusations of whataboutism and the neglect of other vital social institutions during the lockdown. In the United States, calls to 'flatten the curve' contributed to scepticism that challenged public health interventions through discourses of individual choice and freedom. By paying attention to the blind spots of dominant sociotechnical imaginaries, we argue that experts and policymakers should be sensitive to how public health messaging may have feedback effects that detract from the initial aims of interventions.

Keywords: Sociotechnical imaginaries, scepticism, COVID-19, Brazil, United Kingdom, United States

Introduction

During the early days of the COVID-19 pandemic, experts and policymakers mobilised various slogans to persuade the public to follow public health guidelines. The World Health Organization (WHO) and governments worldwide played a critical role in communicating to the public regarding the severity of the crisis. These key stakeholders mobilised various slogans to make their case to the public. In this exploratory study, we argue that these slogans also reveal how experts and policymakers imagine *who* is responsible for helping to end the disease outbreak

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and *what* can be done to stop the pandemic. As Lakoff and Johnson (1980) write of metaphors: ‘Our concepts structure what we perceive, how we get around the world, and how we relate to other people’ (p. 3).

But societal responses can make public health measures viable or hinder the implementation of interventions. This study documents the feedback loops between these slogans and criticism of public health. We follow the slogans in the early months of the pandemic (from January to June 2020) or the ‘first wave’: tracing the origins, diffusion and uptake of these ways of speaking of and imagining the COVID-19 pandemic. We draw from the experiences of three particularly hard-hit countries and identify the use of slogans: Brazil, the United Kingdom and the United States. In Brazil, where regional authorities implemented flexible quarantines, the message to the public was to ‘take care of yourself’; in the United Kingdom, the rallying cry was to ‘protect the National Health Service (NHS)’; and in the United States, the message from experts was to help national authorities to ‘flatten the curve’.

Building on the concept of sociotechnical imaginaries (Jasanoff & Kim, 2009), we examine how slogans reflect what we call dominant sociotechnical imaginaries. But because of cultural blind spots (Cerulo, 2008) in these dominant sociotechnical imaginaries, subversive sociotechnical imaginaries were given space to emerge, which contributed to the rise of COVID-19 scepticism. In calling attention to the relationship between dominant and subversive sociotechnical imaginaries, we highlight the feedback loops between expert and policy advice and the sceptical publics they encounter. We begin by elaborating on our theoretical approach and then detailing the data and methods we used to trace these slogans. This is followed by a look at three sets of slogans mobilised in our three countries. We end with a discussion of how our approach to studying sociotechnical imaginaries can be used in cross-national comparisons of responses to COVID-19.

The Blind Spots of Sociotechnical Imaginaries

Jasanoff and Kim (2009) define sociotechnical imaginaries as both the ‘visions of what is good, desirable and worth attaining for a political community’ and the ‘[warnings] against risks or hazards that might accompany innovation’ that ‘create the political will or public resolve to attain them’ (p. 123). These imaginaries are linked to complex networks of technologies, human values, beliefs and cultural practices which shape the use of science and technology (Jasanoff, 2007). Crucially, these imaginaries are linked to practice, policies and interventions of the State. However, it would be a mistake to see sociotechnical imaginaries as ‘static or tightly bounded belief systems’, as there are likely ‘multiple contending sociotechnical imaginations at play in any society’ (Jasanoff & Kim 2009, 123). It should be noted here that there has been a proliferation of how scholars have used the concept. In this spirit, we offer another schematic way of applying the concept and placing sociotechnical imaginaries in context (Jasanoff, 2015; Sismondo, 2020).

Because sociotechnical imaginaries are multiple and plural, sociotechnical imaginaries compete with one another for the public's attention (Hilgartner & Bosk, 1988). These imaginaries resonate differently with the public depending on its framing while diagnosing what is wrong and providing solutions to these problems (Benford & Snow, 2000). At a time of radical uncertainty, as was the case during the initial months of the pandemic, credible claims to expertise were somewhat uncoupled from credentialed forms of expertise (Au & Eyal, 2022). It is thus possible to speak of *dominant sociotechnical imaginaries* backed by the state and *subversive sociotechnical imaginaries* backed by social actors aimed at disrupting state-backed health interventions. These sociotechnical imaginaries compete with one another to shape the public's perception of risk and uncertainty at the onset of the pandemic. This is similar to the distinction that Hagen (2019) makes with institutional and the populist risk imaginaries: whereas the institutional risk imaginary is 'the elite belief that future disasters can in a meaningful way be controlled and the populist belief that elites control disastrous events' (1238). Sociotechnical imaginaries are typically used to describe long-term ways of thinking about the future. We understand the dominant sociotechnical imaginaries that emerged at the onset of the pandemic to be somewhat rooted in previous pathogenic imaginaries in global health security (Lakoff, 2015). Additionally, while we term expert and policymaker-backed imaginaries as 'dominant', because of the political polarisation in the countries we study and discontent from political leaders over stringent public health interventions, this dominance is more tenuous unstable than what the term may convey. By using the term 'dominant', we refer to the position-taking by 'subversive' actors against what they perceive field 'elites' to be endorsing (Fligstein & McAdam, 2012).

We focus on what is omitted from sociotechnical imaginaries that can contribute to scepticism in the form of subversive sociotechnical imaginaries. These are the *blind spots* of sociotechnical imaginaries, or the mostly unintended but also sometimes intended omissions of dominant sociotechnical imaginaries. This draws on Cerulo's (2008) sociological analysis of blind spots, revealing the cultural and cognitive factors pushing individuals towards positive asymmetry that inhibits them from imagining the worst-case scenario. In rare cases, individuals veer towards negative asymmetry and predicted disaster and acted appropriately to avert it, such as with the timely containment of the SARS outbreak in 2003. These blind spots are thus a product of both the *content* of sociotechnical imaginaries and the *context* or the interaction of sociotechnical imaginaries with other actors. Other examples of blind spots, include how when confronting the HIV/AIDS epidemic, policymakers in India defaulted to a 'generic' understanding of what an epidemic looks like, ignoring local knowledge that would have helped stop the spread of the disease (Mahajan, 2008). The pathogenic imaginary of global health security is criticised for its centring of the interests of Global North countries, at the expense of the Global South, despite imaginaries that rely on the rhetoric of global cooperation (Au, 2021; Lakoff, 2015). These blind spots, we argue, contribute to COVID-19 scepticism as seen in subversive sociotechnical

imaginaries. An analysis of blind spots presents allow experts and policymakers to practise a more reflexive form of communication that considers the feedback loops of their interventions.

Our approach is not dissimilar to how ignorance is conceptualised by the study of strategic ignorance (McGoey, 2012) and agnotology or the study of the cultural production of ignorance (Proctor, 2008). While the active role of ‘merchants of doubt’ such as the role of the fossil fuel industry in sowing doubt on climate science has been documented (Oreskes & Conway, 2008), Proctor (2008) argues that ‘we need to think about conscious, unconscious, and structural production of ignorance’ (p. 3). In other words, while scepticism can emerge from purposive production of ignorance by interested actors, scepticism can also emerge from unintentional and less insidious reasons. Misinformation studies have looked at the active role of misinformation campaigns on social media, but misinformation can also be emergent from the design of social media platforms (Donovan & Boyd, 2019; Stalcup, 2020). As Prasad (2021) points out, COVID-19 misinformation, conspiracies theories and anti-science discourse are ‘given different meaning among different social groups’ (1). This broader crisis of expertise reflects the vortex represented by the ‘scientisation of politics’ and the ‘politicisation of science’, where expertise has been brought in to resolve political problems (Eyal, 2019). This is particularly true in public health, a form of expertise that has come to shape everyday life during the COVID-19 pandemic. This growing unease over expertise is seen in the rhetoric of innovation in technology-based solutions and promises of personalised medicine that have a tenuous relationship to public health goals (da Silva et al., 2021; Zhou et al., 2021). Building on these perspectives, we trace the blind spots of dominant sociotechnical imaginaries and the feedback loops that helped give rise to subversive sociotechnical imaginaries and COVID-19 scepticism.

Data and Methods

We selected three cases—Brazil, the United Kingdom and the United States—for a ‘most similar’ comparison study (Seawright & Gerring, 2008). In Jasanoff et al.’s (2021) report on the COVID-19 responses, these countries were classified as ‘chaos countries’, characterised by deep mistrust in expertise and political polarisation. These factors provided the backdrop that enabled dominant sociotechnical imaginaries to be challenged by subversive sociotechnical imaginaries. The former President Donald Trump repeatedly undermined his scientific advisors in the United States, and in Brazil, President Jair Bolsonaro publicly disavowed quarantine recommendations. In the United Kingdom, the former Prime Minister Boris Johnson initially opted for a ‘herd immunity’ before being confronted with catastrophic projections. These three countries also ranked highly regarding the number of COVID-19 cases. It is important to note that there is an overlap: while we highlight the different emphasis of

imaginaries in each country, opponents of mitigation measures in these three countries learn from each other. Strains of scepticism we highlight therefore exist, with varying degrees, across all cases.

We draw from news articles and editorials of three leading newspapers in each country based on circulation and readership to capture the sociotechnical imaginaries during the first wave of the COVID-19 outbreak in 2020: *O Estado de São Paulo*, *Folha de São Paulo* and *O Globo* from Brazil; *Daily Mail*, *Metro* and *The Sun* from the United Kingdom; and *USA Today*, *Wall Street Journal* and *The New York Times* from the United States. Using databases such as Factiva and Nexis Uni, we downloaded all articles from 1 January to 30 June 2020 with the keywords *COVID-19*, *coronavirus*, *pandemic* and *SARS-CoV-2*. This yielded 12,400 articles for Brazil, 15,325 articles for the United Kingdom and 12,487 articles for the United States. There are, of course, limitations to a reliance on media reports, such as the bias of editorial boards. We were also limited by the difficulties of conducting qualitative fieldwork during the pandemic (Tremblay et al., 2021).

Due to the large number of articles, we relied on the assisted coding function of Atlas.ti, qualitative data analysis software, to index and identify relevant passages for further analysis (Deterding & Waters, 2018). A coding scheme around hospitals (e.g., ‘ICU’), particularly on variations of the slogans (e.g., ‘flatten the curve’), was used to excerpt paragraphs from texts. By looking at how different actors invoked the slogans over time, we trace how dominant sociotechnical imaginaries and subversive sociotechnical imaginaries were constructed. The authors met virtually over a year to discuss patterns identified, exchanged memos and debated alternative interpretations of the data in the spirit of abductive analysis (Tavory & Timmermans, 2014). The data analysis was improved by the participation in interviews on various media in Brazil (e.g., Radio CBN Nacional, Podcast *Mamilos*, Podcast *Quarentena*, articles in *O Estado de São Paulo* and *Revista Pesquisa FAPESP*) as well as virtual events with journalists and social scientists internationally.

Brazil: ‘Take Care of Yourself’ and the Individualisation of Responsibility

The slogans from the dominant sociotechnical imaginary that guided Brazil’s initial response to COVID-19 were: ‘Stay at home, but if you have to go out wear a mask’ and ‘take care of yourself’. The primary actors that pushed these slogans included actors in civil society, such as TTV News shows, philanthropic initiative ‘Todos Pela Saude’, public health experts, and state and local governments. These slogans nod to the impossibility of keeping the population under prolonged lockdown or too restricted quarantines. This is partly due to the reality that 41% of the economically active population in Brazil, around 39 million people, make up an informal labour market (Campos, 2020). The phrase became a compromise between a radical denialist position of the federal government and the rising awareness about the spread of COVID-19. In a context where you have to ‘take

care of yourself’, and where there are limits to the healthcare coverage, mask wearing became ‘price to pay’ to keep the Brazilian economy working even through the informal and temporary jobs.

This inequality is reflected in Brazil’s universal healthcare system that covers a population of more than 210 million inhabitants. The Unified Health System (*Sistema Único de Saúde*, SUS) under the Brazilian Ministry of Health (MoH) is the national authority responsible for designing national public health initiatives in Brazil. The system is publicly funded and responsible for a broader healthcare assistance and coverage worldwide (Fraga et al., 2020). However, it has strong regional asymmetries, it has been undergoing managerial reforms and decentralisation since the 2000s, and it has undergone fiscal constraints more recently (Marten et al., 2014). Approval ratings of the SUS vary regionally because of these asymmetries (Massuda et al., 2018). The idea of ‘taking care of yourself’ applied specifically to low-income communities more exposed to infection and reinforced scepticism regarding the availability of adequate healthcare infrastructure guaranteed by SUS. The outcome was a prolonged curve of infections.

Brazil’s openly denialist president directly interfered with implementing public health interventions during the pandemic. The prioritisation of economic activity was seen in Bolsonaro’s denial of the severity of the COVID-19 crisis. On 20 March 2020, after calling the pandemic as a global hysteria, Bolsonaro gave a public speech, sharing disinformation and calling COVID-19 a ‘little flu’:

[The media] spread the feeling of dread, having as their flagship the announcement of a large number of victims in Italy, a country with a large number of elderly people and with a climate different from ours The virus has arrived, is being faced by us and will soon pass. Our life has to go on. Jobs must be maintained. The livelihood of families must be preserved. We must, yes, return to normality. A few state and local authorities must abandon the concept of scorched land, such as a transport ban, trade closures and mass confinement ... if the virus infected me, I would not have to worry, I would feel nothing or would, at most, be affected by little flu.

The lack of mitigation measures in Brazil has been associated with constant political disputes at different levels of the government. The dominant sociotechnical imaginary of ‘take care of yourself’ could thus be interpreted as a product of the constant crisis in the MoH—a strategy that shifted responsibilities from the central government to states and local governments, and onto individuals. At the end of March 2020, a critical turning point became the centre of Brazilian news coverage: the conflict between the MoH’s Luiz Henrique Mandetta and Bolsonaro. The MoH began to recognise the severity of the problem and to promote public advice given by the WHO. Its minister was attacked by Bolsonaro for jeopardising the country’s economic situation.

1. On 28 March, Mandetta affirmed for the first time the ‘importance of stopping’ or the use of social-distancing measures nationwide, quoted by *O Estado de São Paulo*: ‘When we stop, accidents decrease, traumas decrease, and ICU beds increase when we need them ... for those hospitalised for viruses. In other words, [it is] another benefit when we stop, in addition to reducing transmission.’
2. On 30 March, he reaffirms the necessity to respect the measures against the rise of the COVID-19 infections, speaking directly with governors and the population: ‘So far, keep the state recommendations ... because we have so many fragilities in our Healthcare System.’ His speech opposes the stance federal government’s stance rallied behind the idea of ‘Brazil cannot stop’ supported by the President Bolsonaro.
3. On 8 April, just a week later, the media covered the dramatic increase in the tension between Bolsonaro and Mandetta, when the MoH was publicly reprimanded by the president who was quoted by *O Globo*: ‘Just be careful with one thing. You will save people to get a flu, but you will starve the people.’
4. On 12 April, Mandetta showed himself profoundly uncomfortable with the lack of strategy against the pandemic. *Folha de São Paulo* quoted: ‘Brazilians don’t know if they should listen to the MoH, the President who else they should listen I hope that ... we can have just one voice, an unique voice. Because it is pushing Brazilians to a dubious situation.’
5. *Estado de São Paulo* published in 16 April that Mr Mandetta announced in his Twitter account that he was fired by the President Bolsonaro, who the Oncologist Nelson Teich would replace.

These moments shaped the dominant sociotechnical imaginary, expanding the blind spots that shifted responsibilities to actors other than the federal government and raising concerns about the economic health of Brazil amidst the socioeconomic inequality. Relatedly, with less than a month at MoH, Teich left office citing political interference of the President and the Ministry of Economy. Four days earlier, the media covered with surprise Teich’s speech when he discovered in public that Bolsonaro authorised gyms, beauty salons and barber shops among essential services. Therefore, those business could keep working during the pandemic. Contesting the information from a journalist, Teich asked, ‘was this decision published by the President today?’. *Folha de São Paulo* quoted Teich on 15 May:

This is not [MoH’s] attribution, it is a Presidential decision ... any decision involving definition as essential [services] or not, it involves the ability to do so in a way that protects people. But just to make it clear: it is a decision of the Ministry of Economy, it is not [from the MoH].

These events did much to fragment the response from Brazilian federal authorities in the first weeks of the pandemic. This inaction from the federal government contrasted with the public's growing perception of the seriousness of the pandemic. Brazil faced a rapid escalation of cases, hospitalisations and deaths throughout April and May. Only few states could provide a satisfactory response regarding ICU provision, mechanical ventilators and emergency beds. This was covered extensively by all sources of media. While a vacuum existed at the federal level in terms of a unified national strategy to combat COVID-19, movements in civil society began to help to reduce the health and economic vulnerability of marginal populations with local measures, that is, sound and visual information through streets, solidarity networks through social media, etc. These actors latched on to the phrases of 'Stay at home, but if you have to go out wear a mask all the time' and 'take care of yourself' to urge individuals to protect themselves from the virus.

Aside from civil society, academic public health experts and provincial governments began to promote social distancing that became widely used abroad. This is seen particularly in the collaboration between academia and provincial governments in developing test diagnostics and capacity for detecting COVID-19 infections in patients (da Silva et al., 2020), outreach projects in the urban peripheries and Favelas (Fernandes et al., 2020), and advocacy for attention to the national collapse in hospitals and lack of ICU nationwide.

1. *Folha de São Paulo*, on 23 April, warned against the lack of ICU and testing, calling attention to the peak of the infections in May and, surprisingly, the end of provincial flexible quarantines at the same time. The press showed how some states had over 90% of hospital ventilators and ICUs occupied by patients and the strong asymmetries in the testing capacities between regions and federative states.
2. On 1 May, an editorial in the *O Estado de São Paulo* shown that at least 70% of all ICU in six states of the country were occupied by COVID-19 patients, and there was a national preview that by the end of June 'more than half of the country would have no ICU available in both public and private system'.

There were also some indications that the dominant sociotechnical imaginary of 'take care of yourself' was taken up by broader society. Take these examples from media coverage:

1. Reported in *Folha de São Paulo* on 16 March:

We went to the school to get the correct information, because some said it was 15 days without classes, others 20 days. They didn't even open the door, they answered through the gate, he says. The grandmother stays with her grandson during the week because her daughter works, even though she is

in the age group at risk for the disease. ‘But we are *taking care of ourselves*, washing our hands and passing hand sanitizer all the time.’

2. Reported in *Folha de São Paulo* on 20 March:

Actress Taís Araujo, 41, used her social media to comment a little about her routine during the isolation she has been doing with her family to prevent the spread of the new coronavirus. Some netizens, however, criticized her messages. ‘For a mega-privileged person who has never had to do housework ...’ But the actress didn’t let it go and replied: ‘I’m privileged, I know. Being able to quarantine shouldn’t be a privilege, but it is. *Try to protect yourself, take care of yourself and take care of the other.*’

3. Reported in the *O Estado de São Paulo* on 1 April:

Attentive to the recommendations of the MoH on social isolation against the coronavirus, São Paulo lawyer Dario Orlandelli, 81, chose to combine the necessary with the pleasant ... he left the capital ten days ago, in the company of his wife, and spends his hours doing what he loves most. ‘I fish in the Mogi-Guaçu River, without being influenced by the news *We have to take care of ourselves, but we can’t die. of boredom.*’

These anecdotes conveyed by the media reporting highlight how public health interventions were relegated to individuals, organisations and state governments, and how inequality shaped the ability to adhere to mitigation measures. Bowing to pressure from anti-lockdown COVID-19 sceptics, the governor of São Paulo João Doria announced in May the ‘flexibilisation plan’, when business and other public spaces could be reopened. Newspaper reports documented the organised pressure from bars and restaurant owners and trucking industries that pushed for reopening. Brazil never implemented lockdowns during the pandemic and quarantines were never enforced.

The focus on individuals protecting themselves in the dominant sociotechnical imaginary produced a blind spot that contributed to the subversive sociotechnical imaginary that emphasised the *individualization of responsibility*. The persistent lack of coordinated national health policies, political conflicts between the president and health authorities, high level of regional fragmentation, and asymmetries in the SUS and private healthcare systems have shaped the dominant sociotechnical imaginary. Due to the lack of adequate measures in vulnerable communities (Rodrigues et al., 2020), collective mitigation measures became difficult. While the imaginaries described in the Brazilian case can also be seen somewhat in the United Kingdom and the United States, we found that the idea of ‘living with the virus’ and the attribution of responsibility to the individual was most pronounced in Brazil early on in the pandemic.

The United Kingdom: ‘Protect the NHS’ and Whataboutism

The UK response to COVID-19 can be characterised as reluctant, with the government flirting with ‘herd immunity’ approaches and the ‘Swedish model’. Decisive action to lock down the country and impose strong social-distancing measures did not occur until projections showed the high cost of inaction. Central to the sociotechnical imaginary guiding the United Kingdom’s response was the place of the NHS. The phrase ‘protect the NHS’ or ‘stay home, protect the NHS, save lives’ became a rallying cry in the United Kingdom’s fight against COVID-19 and represents the dominant sociotechnical imaginary at work during its ‘first wave’. This guided response in two ways: linking the actions of individuals to the capacity of the NHS to deal with the influx of patients and ensuring that the government would underwrite the budgetary shortfalls that COVID-19 would impose on the NHS.

The phrase originated from policymakers, who made the case for people to take the government’s warnings seriously, after it became clear that a surge of COVID-19 cases was imminent. Some examples of policymakers invoking the slogan include:

1. On 23 March, Education Secretary Gavin Williamson was quoted in *The Sun* as saying ‘If your work is not critical in the response to coronavirus, then please keep your child at home. This will help halt the spread of the virus, *protect the NHS*, and save lives’.
2. Health Secretary Matt Hancock was quoted in *The Metro* on 25 March, saying ‘These measures are not advice, they are rules We are engaged in a great national effort to beat this virus, everybody now has it in their power to save lives and *protect the NHS*. Home is now the front line.’
3. On 29 March, Boris Johnson’s letter to NHS was quoted by *The Sun*:

It has been truly inspirational to see our doctors, nurses and other carers rise magnificently to the needs of the hour It is with that great British spirit that we will beat coronavirus and we will beat it together. That is why, at this moment of national emergency, I urge you, please to stay at home, *protect the NHS* and save lives.

4. On 6 April, after Boris Johnson was hospitalised, a statement from the Prime Minister’s office stated, ‘The prime minister thanks NHS staff for all of their incredible hard work and encourages the public to continue to follow the government’s advice to stay at home, *protect the NHS*, and save lives.’

The slogan linked individual actions to the capacity of the NHS to handle the influx of patients and save lives. Crucially different from the United States and Brazilian cases, the United Kingdom police were empowered to issue fixed penalty fines for individuals who flouted lockdown rules.

The place of the NHS in the British imaginary is significant here. Established and continually improved throughout the early twentieth-century and post-World War II era, the NHS has been hailed by many as a source of national pride across the political spectrum (Klein, 2010; Webster, 2002). Public health experts consider the NHS as a universal healthcare model that offers ‘relevant lessons for health reform’ for countries like the United States (Light, 2003). As a US-based public health expert, Jha (2020) describes it:

This love for the NHS will sound unlikely to most people in the U.S. But I learned that this patient’s love for the NHS is far from unusual, and most patients I have spoken with generally profess a similar kind of affection. This affection is supported by data. In a 2014 survey of the British people, more people cited the NHS as what makes them proud to be British than anything else, well above their pride in the British royal family.

In more recent years, the NHS has attempted to ‘decentralise’ and ‘democratise’ by creating NHS foundation trusts, which aimed to make health care more responsive to local needs (Klein, 2004). As imported COVID-19 cases were reported in the media in February and early March, the NHS led efforts to quarantine and contact trace.

In part due to the revered status of the NHS, the phrase ‘Stay Home, Protect the NHS, Save Lives’, seemed to resonate with the broader public. Polling done by YouGov in early May also found that 92% of the public considered the slogan to be clear and effective (Smith, 2020). The British press moved on to write stories from the perspectives of frontline NHS workers and from patients who had received care from the NHS.

1. A 17 April article in *The Sun*, titled ‘Medics Saved My Life after Sepsis Hell ... We Are Lucky to Have NHS’, detailed the conditions that staff at London’s Lewisham Hospital faced. Quoting a doctor, the article described the lack of personal protection equipment (PPE), long hours and mental strain of workers:

We’ve never had a situation where we can’t use or haven’t had PPE, which is hugely important There will be an amount of NHS workers who are going to need therapy after this We can’t allow the NHS to be abused, misused or underfunded. We need to look after its staff and the hospitals. We need to *protect the NHS*, nurture it, give it everything it needs.

2. A 20 April article in *The Sun* reported high profile celebrity endorsement of this slogan:

Last night more cash flooded in when BBC1 broadcast highlights along with emotional new performances from Little Mix, Tom Jones and Rag’n’Bone Man.

Little Mix performed an acoustic version of 2016 hit Touch and paid tribute to key workers across the U.K. Perrie Edwards, 26, said: ‘You all deserve such a huge thank-you and we appreciate you so, so much. Everybody please take care of yourselves, take care of your loved ones, *stay home, save lives, protect the NHS.*’

3. The former Labour Party leader Jeremy Corbyn diagnosed the struggle of the United Kingdom to cope with COVID-19 in an interview with *The Daily Mail* on 28 March as a result of ‘ten years of austerity, of underfunding the NHS’. The solution under this framing was to *support and fund the NHS* to contain the spread of COVID-19. When it became apparent that the NHS would face a budget crisis due to the pandemic, the Chancellor of the Exchequer Rishi Sunak quickly authorised a ‘blank check’ to help cover the funding gaps in the NHS.

The dominant sociotechnical imaginary was thus able to capture this popular support for the NHS to urge the public to help mitigate the spread of COVID-19.

But as the pandemic raged on, a backlash against the slogan and the government’s lockdown efforts percolated. These were articulated along the lines of the unintended consequences of lockdowns and the damage that it does to other social institutions like small businesses and schools:

1. An 11 April editorial in *The Sun* put this sentiment forcefully:

Yes, the Government has called for a nationwide lockdown. But NOT for a nationwide economic shutdown Thousands of Brits have been plunged into poverty by coronavirus and won’t be able to afford basics for their families—let alone luxuries. Our heartfelt sympathy goes out to them. But those who are fortunate enough still to have a little spare money shouldn’t be shamed [to go shopping] for brightening up their homes. ... Brits have made a tremendous effort to *protect the NHS* and save lives.

2. An article published on 22 April in *The Daily Mail* quoted Sarah Woolnough of Cancer Research UK, who was worried about patients afraid of seeing their doctors:

People are really worried about going into a health setting. In a way, it’s a measure of the effectiveness of the message, ‘*Stay Home, Protect the NHS, Save Lives*’. You begin to see the unintended consequences You’ve got people not seeking help and screening has been paused. So you’re not detecting cancers early in the way you would like to.

3. An editorial by Max Pemberton in *The Daily Mail* on 23 May questioned whether the slogan was too simplistic and argued that the risks of COVID-19 should be placed in context:

Yes, it was the perfect slogan: ‘*Stay Home, Protect the NHS, Save Lives*’. Too perfect, perhaps? ... Many, however, are simply terrified of getting infected. It’s no longer coronavirus that’s at risk of sweeping the nation, leaving death and economic destruction in its wake, but what’s being dubbed ‘coronachondria’ They blithely ignore the disruption caused to the education of youngsters I’ve had numerous patients ... including one in the throes of a heart attack who refused to be taken to hospital.

4. An editorial from Iain Duncan Smith in *The Sun* on 17 May emphasised the financial costs of the government’s lockdown:

On March 23, the Prime Minister ordered a full lockdown of the U.K. economy *to protect the NHS* and build up its capacity—which it has now done. Yet eight weeks later and with about two-thirds of activity totally shut down, the financial cost to the country has become eye-wateringly large. Our economy is set to shrink by 12.78 percent this year.

5. The cost of simply staying at home, as these critics point out, should be placed in context of other risks, as well as other costs. While the NHS should be protected, they argued, other social institutions should also be protected.

As such, COVID-19 sceptics took advantage of the blind spot in the dominant socio-technical imaginary to contribute to a subversive sociotechnical imaginary of whataboutism, in which ‘an accusation is met with a counter-accusation, pivoting away from the original criticism’ (Zimmer, 2017). Sceptics critiqued the absolutism of government advice, which neglected the varying levels of risk of different types of activities and settings, contributed to the rise of subversive sociotechnical imaginaries. Public health experts here could have imagined the feedback loops that such an emphasis placed on the NHS would provoke from potential detractors. The individualisation of responsibility and the emphasis on individual freedoms came later in the United Kingdom compared with the other two cases.

The United States: ‘Flatten the Curve’ and Individual Choice and Freedom

The phrase ‘flatten the curve’ appeared first in mid-March from experts in public health who saw how the influx of COVID-19 cases in Italy overwhelmed the hospitals. Experts explained why it was necessary to spread new COVID-19 cases over time by adopting social-distancing measures to buy time for hospitals to prepare and deal with the slower increase in cases. The first mention of the phrase in the *New York Times* was on 13 March on an article titled ‘In Italy’s ‘War’, Triage Decides Life or Death’:

In less than three weeks, the coronavirus has overloaded the health care system all over northern Italy. It has turned the hard-hit Lombardy region into a grim glimpse of what awaits countries if they cannot slow the spread of the virus and ‘*flatten the curve*’ of new cases—allowing the sick to be treated without swamping the capacity of hospitals. If not, even hospitals in developed countries with the world’s best health care risk becoming triage wards.

This cautionary tale from Italy convinced experts in the United States that COVID-19 was an impending disaster. The earliest article in *USA Today* published on 17 March titled ‘100 Things to Do while You’re in Quarantine’. An article in the newspaper the next day quoted Cynthia Mohr, a professor of psychology at Portland State University:

Government officials hope that social distancing allows America to slow the spread and ‘*flatten the curve*’, a term being used to explain how the country wants to stretch out confirmed cases Mohr is optimistic this crisis could actually serve as a reminder to people that being individual-focused doesn’t lead to success for society at large ‘This is a situation where we need to change our behavior according not to what’s good for us, but what’s good for our region and the whole population. That’s not the way we’re raised in America. But I’m hopeful this can remind us that we are all, in fact, connected.’

Alarmed by the fast-paced developments in Europe, experts saw the phrase as a helpful tool to convince the public of the aggregate effects of their individual actions. This dominant sociotechnical imaginary used the spectre of unchecked spread to convince the public and policymakers to act. Unlike the United Kingdom, however, the phrase ‘flatten the curve’ did not explicitly link the consequences of individual action to medical institutions. Other slogans included ‘stay home, save lives’ and ‘stop the spread’.

Nonetheless, the phrase ‘flatten the curve’ was picked up by policymakers as social-distancing guidelines were reluctantly issued by the White House and the Coronavirus Task Force. Motivated by similar projections seen by the UK government that predicted catastrophic consequences of unchecked spread, federal and state governments began to take piecemeal steps to mitigate the spread of COVID-19.

1. A *Wall Street Journal* editorial on 13 March urged the Trump administration to explain the phrase ‘flatten the curve’ to the public:

Useful primers are available online, such as a recent article in the *Lancet* But Americans shouldn’t have to poke through medical journals or watch C-Span to see NIH’s Anthony Fauci testify before House committees. Mr. Trump should assemble his specialists prominently to describe the realities and goals of all these voluntary closures. They ought to explain the math behind minimising

person-to-person transmission of the virus They should explain how mitigation will *'flatten the curve'* of the virus's course by spreading it over 12 to 18 months.

2. As Fauci notes in *USA Today* on 13 March:

It's all in the numbers and how quickly they grow. Health officials are trying to avoid a rapid spike of cases that could overwhelm the health care system by *'flattening the curve'* or spreading out the number of coronavirus cases over a longer period. In many respects, it's not whether the situation is going to get worse but how quickly.

In parts of the US government, flattening the curve became the goal for hospitals to prepare capacity and for researchers to figure out therapeutics.

Like the Brazilian case, the US-dominant sociotechnical imaginary had to reckon with political leaders who overtly undermined public health interventions and doubted the severity of COVID-19. This is best captured by reporting on 24 March in the *New York Times*:

On Monday, Mr. Trump echoed those concerns, saying that things like the flu or car accidents posed as much of a threat to Americans as the coronavirus and that the response to those was far less draconian. 'We have a very active flu season, more active than most. It's looking like it's heading to 50,000 or more deaths,' he said, adding: 'That's a lot. And you look at automobile accidents, which are far greater than any numbers we're talking about. That doesn't mean we're going to tell everybody no more driving of cars. So we have to do things to get our country open.'

This signal from political leaders such as Trump helped fuel scepticism later on, organised along partisan lines.

In addition to this, the slogan of 'flatten the curve' and dominant sociotechnical imaginary carries certain assumptions and blind spots, which helped contribute to backlash similar to Brazil and the United Kingdom. First, 'flattening the curve' implies that there *will* be an increase in cases. As the goal is mitigation rather than containment. While cases of COVID-19 were still low, public health experts in the United States pursued a strategy of quarantine and contact tracing. But once cases outgrew the capacity of contact tracing, the United States pivoted to mitigation. Second, to sceptics, the phrase 'flatten the curve' raised questions about how long stay-at-home orders had to be enforced before the curve begins to 'bend'. Orders to 'stay at home' continually shifted estimations of how long residents should stay home for.

This blind spot of this dominant pathogenic imaginary became central to COVID-19 sceptics that mobilised a subversive pathogenic imaginary centred on

the impracticality of indefinite lockdowns and the prioritisation of *individual choice and freedoms*.

1. Writing about the NFL's plans for the football season, Mike Jones pointed to the uncertainty of these orders in *USA Today* on 31 March:

We don't have any way of knowing *whether the curve that medical experts and government officials speak of will have flattened* by late April, mid-May, June or July. We have no way of knowing if the spread of COVID-19 will come to a halt, bringing with it a return to normalcy any more than we know if cases will abruptly spike weeks or months from now.

2. As an 8 April article in *USA Today* noted:

'I feel a lot more optimistic because I'm seeing mitigation work', said Surgeon General Jerome Adams, who on Sunday warned that this week would be the outbreak's 'Pearl Harbor moment'. He lauded public health officials in California and Washington state, *where the confirmed cases curves have flattened, with providing a blueprint for the rest of the nation*.

3. Quoting Vice President Mike Pence on why a campaign rally was allowed to be held during the pandemic, a 17 June *New York Times* article reports: 'The freedom of speech, the right to peacefully assemble, is enshrined in the First Amendment of the Constitution' Mr Pence said Monday that cases of the virus there had dropped 'precipitously' and that the state had 'flattened *the curve*', a reference to the desired shape of a graph of new cases. But data compiled by the *New York Times* shows an obvious and steep rise following the state's reopening.

The basis of modelling also provoked public debate on epidemiological projections' parameters, specifications and accuracy (see also, Au et al., 2022). Furthermore, stay-at-home orders led to the flattening of the curve, and the decrease in case counts complicated public expectations. Instead of providing certainty, quantification led to scepticism. Doubts about the severity of COVID-19 further undermined the need to flatten the curve.

While the blind spots of the dominant sociotechnical imaginary helped contribute to a subversive sociotechnical imaginary centred on individual choice and freedoms, the other subversive sociotechnical imaginaries that we observed in the Brazil and UK cases were also present. Critics in the United States also made arguments based on the need to reopen the economy and the ability of individuals to take responsibility for their own. Nonetheless, the language of freedom has distinct US roots.

Discussion

In this study, we showed that dominant sociotechnical imaginaries and slogans mobilised by experts and policymakers to understand COVID-19 were useful in commanding the attention and directing the public to act during the initial stages of the pandemic. But we document, each of these dominant sociotechnical imaginaries came with blind spots that helped contribute to the rise of COVID-19 scepticism and subversive sociotechnical imaginaries. A summary of our findings can be seen in Table 1. In Brazil, the slogan of ‘take care of yourself’ led to the individualisation of responsibility. In the United Kingdom, the slogan ‘protect the NHS’ contributed to a subversive sociotechnical imaginary of whataboutism. In the United States, the slogan ‘flatten the curve’ eventually gave way to a subversive sociotechnical imaginary that emphasised individual choice and freedoms. These blind spots, while different across our three cases, are a matter of emphasis. Subversive sociotechnical imaginaries are also a product of conflicts between politicians, health authorities and experts.

Our preliminary study has limitations, such as our reliance on media sources for reconstructing the early months of the pandemic. Our analysis also trades intra-case differences and detail for broad cross-national comparisons. Furthermore, the transnational linkages, particularly amongst experts and sceptics, and mimicry across these three countries have ensured that aspects of these different sociotechnical imaginaries can be detected in each society. Future work should examine these transnational connections between COVID-19 scepticism and take a deeper dive into subversive sociotechnical imaginaries in alternative media sources.

Seen through this lens, the production of ignorance is the consequence of intentional misinformation and disinformation campaigns and the unintended feedback effects of public health messaging. While social scientists should defend institutions from unwarranted attacks from disingenuous actors, experts should not be immune to challenges and criticisms. Experts should practise a form of reflexivity sensitive to the social effects of their scientific pronouncements. Our study attempts to make use of tools from science and technology studies and studies on agnotology to provoke new ways of thinking about the early days of the COVID-19 pandemic. Like our colleagues (Lynch, 2020; Prasad, 2021), we found the debate on symmetry and relativism useful to study how systems of ignorance emerge. In sum, future studies of knowledge must also look at how ignorance can emerge out of concerted strategic action from interested and sceptical actors as well as the unintentional actions of experts and well-intentioned policymakers.

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