Campaign for Social Science Annual SAGE Lecture 2020

"Give me back my fact": How can social science help us survive a post-truth pandemic?

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Let me start with some thank-yous. To you the **audience**, without whom there would be no lecture. To **Bobby Duffy** for chairing it and **SAGE** for sponsoring it. To **Milly Zimeta** who kindly agreed to respond to my talk today. To the **Campaign for Social Science** for your support. And to my **research funders**, which currently include the Health Foundation, Wellcome Trust, ESRC, NIHR and MRC.

I'll start by **taking the words of my title** and exploring some definitions.

The dictionary definition of a **fact** is "A thing that is **known or proved to be true**", or "The truth about events *as opposed to* interpretation". Later, I'll challenge the idea that truth can be separated from its interpretation.

Social science is "The scientific study of **human society and social relationships**". But that doesn't tell us what we should understand by scientific study.

Science is defined as "The systematic study of the **structure and behaviour of the physical and natural world** through observation and experiment" (that obviously isn't about social science), or "A systematically organized body of knowledge on a particular subject".

Post-truth, "relating to or denoting circumstances in which **objective facts are less influential** in shaping public opinion than appeals to emotion and personal belief".

Now let's get to the fun part: some real examples of facts, science, social science and post-truth in relation to the pandemic. A few days ago, someone reported on Twitter that President Trump had made the claim **"I came up with vaccines"**. I responded with "And I'm

on the front cover of Vogue". Four hours later, this appeared, courtesy of graphic designer Craig Yamey. As fake news goes, Craig's effort wasn't bad!

In this lecture, I want to consider not merely social science and science, but the *social science of science*. You may know about what is called the **'narrative turn'** or the 'interpretive turn' – the idea that social scientists rely not only on the tools of objective measurement but also on **interpretation, storytelling, persuasion and enactment**.[1-4] We have to construct, through language, **plausible explanations for what we observe and experience in the world**. I'm going to argue that natural scientists do this too. Even a **physics paper is a mere story**, told to an audience, with the purpose of persuasion.

Back in the 1940s, sociologist Robert Merton proposed four **social norms for science**, with the acronym CUDOS: *Communality* (that is, science is a collective international endeavour whose progress depends on open communication and sharing), *Universality* (that is, every scientific discipline follows a set of agreed quality criteria), *Disinterestedness* (science should be done for the sake of scientific progress, not for personal interest) and *Organised Scepticism* (scientists should scrutinize and challenge each other's work – for example through peer review and attempts at replication).[5]

I recently set up, with colleagues, a new Master of Science course at the University of Oxford. One exercise we set our students was to **go and find a fact**. Carefully note the context in which the fact was generated. Bring it back to class and **defend it to your classmates**. No fact brought in by a student survived the scrutiny of the classmates unscathed. It was interesting to see that **many of our students shared a lot of assumptions**, which other students didn't share, about what counted as a fact and what didn't. This go and find a fact exercise came from sociologist Steve Woolgar…

… who published a book with philosopher Bruno Latour, one of the authors of actor-network theory.[6] It's subtitled **"the *construction* of scientific facts"**. It's about how social relations and norms in the laboratory mean that certain facts come to be "discovered" while other facts never are. Latour and Woolgar took an **anthropological approach** in which they saw the scientists as a **kind of tribe whose myths and rituals could be studied**. As they said, *"some statements [made by scientists] appeared [to fellow scientists] more fact-like than others"*. The scientific tribe develops what's known as **"inscriptions" – that is, visual representations** of agreed facts which then become stabilised as "the way things are".

Let's get back to social media and look at a few more claims that have been circulating. Here's one, on face mask safety. **"Your health, your life, your choice"**, it says. "KNOW THE FACTS before you wear one". Masks **decrease** oxygen uptake, **increase** toxin inhalation, **shut down** the immune system, **increase your virus risk** by triggering dormant infections, are **scientifically inaccurate** because the virus can penetrate the holes in the fabric, and have **not been studied** in rigorous, peer-reviewed research.

Dan Hall from The Sun [17th July 2020] took this one apart nicely. He infiltrated an anti-mask movement and found **conspiracy theorists and libertarians cherry-picking** their scientific evidence to align with what they wished was the case. Peak post-truth.

Meanwhile, I was busy **copying the style and symbolism** of the anti-mask pamphlet, constructing my own set of statements. I too headlined my pamphlet "Your health, your life, your choice, KNOW THE FACTS before you wear one". Masks have *no impact* on your oxygen intake, *no increase* in toxic inhalation, *no damage* to your immune system. They *decrease virus transmission*; the mesh size is *scientifically accurat*e since viruses don't travel naked; and there is **strong evidence of effectiveness** when wearing masks to protect others. Unlike the original author, I could substantiate my statements, and I'd searched for what scientists call **disconfirming evidence** which would have prompted me to alter my interpretation.

Someone pointed out that the first pamphlet had originated from the **University of Twitter and Facebook**, from a source with an **unknown name** and **unknown qualifications**; these so-called facts were **likely to make you sick** (as evidenced by the red cross and the yellow emoji face with the thermometer). The second pamphlet, in contrast, had come from a **real Oxford professor with lots of letters after her name**; she gets a **green tick and a mask emoji**. This is of course an **exercise in rhetoric**. As Aristotle taught us, rhetoric – the art of persuasion – consists of three things: *logos* (the facts, or what you're presenting as facts), *ethos* (the credibility of the speaker) and *pathos* (the appeal to emotions). The implication is that **a fact backed by an Oxford professor** can be trusted and won't hurt you.

But actually, it wasn't that simple. On the left is the **'non-facts' mask pamphlet**. And on the right is a **tweet from Scott Atlas, President Trump's erstwhile adviser on Covid-19**. Dr Atlas isn't too keen on masks. He cites three well-respected sources: the **World Health Organisation**, the **US Centers for Disease Control**, and **Professor Carl Heneghan from the Oxford Centre for Evidence-Based Medicine**. I am sure none of those sources would fully endorse all the statements in the left-hand graphic. But as Dr Atlas says, all of them have expressed reservations about **the limited evidence for the efficacy of masks** in the context of protecting the public. As the title of this lecture implies, once you've put a scientific claim into the public domain, **you can't control who deploys it or for what purpose**.

I want to introduce you to **two very different "tribes" of scientists**. I'm drawing a little on this book by Tony Becher and Paul Trowler called *Academic Tribes and Territories*.[7] I've shown the two tribes here with their **traditional totems and war-paint**. The first tribe is called **evidence-based medicine**, and its totem is the **hierarchy of evidence** which I'll explain on the next slide. The second tribe is one I've called **pragmatic public health**, and its totem is the **multifaceted real-world case study** (illustrated here with this wonderful graphic from a Health Foundation report on domestic violence).

The **evidence-based medicine tribe** adheres to a *hierarchy* of evidence – actually a hierarchy of **methods** – with randomised controlled trials at the top. Good science is defined by the

use of *correct methods*. Some methods are accepted as **better than others** (indeed, a poor example of a higher-up method may be seen as better than a good example of a lower-down method). It is a **deeply-held myth** among most members of this tribe that if participants are randomised in an experiment, that is good science, and if they're not, it is less good science.

Here's an **example of science** produced by the evidence-based medicine tribe. Jefferson and Heneghan identified **randomised trials of masks** for preventing respiratory infections. They used a **checklist called a 'risk of bias tool'**– you can see it on the right of this slide: each research study got a score according to how biased they judged it to be. Using quality standards that were culturally agreed among their tribe, Jefferson and Heneghan concluded that there was *no good evidence for the efficacy of masks*. They placed non-randomised trial evidence – everything below the red in their hierarchy of evidence – in a **metaphorical trash can**. Because this tribe ranks by method, they **didn't even have to look** at any other kinds of research. **Thus was born the "fact" that there was no evidence that masks work**.

Looking again at Dr Atlas's tweet, you can see what's happened here. It wasn't, perhaps, that the evidence-based medicine tribe was **deliberately trying to mislead**. But, for reasons I'm going on to explain, I do believe that **their assumptions didn't serve them well** in this particular example of constructing a fact.

And that's why their "fact" [in inverted commas] found its way into **a tweet that was subsequently removed by Twitter as "fake news"**. An extraordinary piece of social drama to befall a supposedly world-leading centre of evidence-based medicine.

The ways of doing science that I've depicted, rather provocatively, as tribal totems and rituals were described by philosopher Thomas Kuhn in his book *The Structure of Scientific Revolutions*.[8] Kuhn called them **paradigms, meaning a set of assumptions and beliefs** shared by a group of scientists about what the important questions are and how they should be tackled. When you're working within those assumptions, said Kuhn, you're doing the **"systematic puzzle-solving" of normal science**. Kuhn in turn drew on Wittgenstein who had referred to the **"railway-tracks of science"**: the discourses and belief-systems along which you drive your train.

As Kuhn observed, **paradigms don't merely constrain our thinking – they *enable* us to think**. It is only when we have a **shared model of reality**, shared **assumptions** about what is and isn't good science, that we can have the kind of discussion that advances the field. Or as Susan Leigh Star said, **the very definition of an academic discipline is *"a commitment to engage in disagreements".*[9]** You'll note that the evidence-based medicine tribe rarely enter into dialogue with other tribes – they largely consider them irrelevant. But they spend a *lot* of time **arguing about, and refining**, their own hierarchy of evidence and risk of bias tools.

Now let's look at a different tribe. It too has its totems and rituals. Since I myself identify with this tribe, I'll find it more difficult to be critical of it. This tribe holds passionately to the belief

that *there is no universally applicable hierarchy of evidence* – though some methods may be more or less fit for purpose. Good science is defined as the *use of multiple methods, adaptively and pragmatically*, and also *ethically and democratically,* to build a nuanced narrative of what has happened in a particular real-world case and why. *Theory* is assumed to be at least as important as method – as Ken Judge put it: **"strong theory, flexible methods"**[10]. The narrative, say the pragmatic public health scientists, needs to *make sense* and be plausible to the 'natives'.

In pragmatic public health, a lot of **additional evidence gets brought to the table**. Studies ignored by the evidence-based medicine tribe become salient. For example, **sneeze videos** – in which the unmasked person is shown to emit huge turbulent clouds of respiratory droplets and airborne particles. Or **choir stories** in which most people attending a choir practice developed Covid-19 even when they didn't get within 6 feet of the index case, nor touch any common surface. These pieces of evidence, taken in isolation, are not proof that masks work. But they **demand a scientific explanation** and they add to the overall picture.

The same goes for natural experiments around the world. Christian Leffler's study of Covid mortality country by country in the days after the first documented case showed that the **countries which introduced mandated or widespread voluntary masking by 30 days** – the blue and orange lines in this graph – had **orders of magnitude fewer deaths** than countries which delayed introducing masks beyond 100 days.[11] Again, not in itself proof that masks work, but pretty good evidence that they don't kill you.

Let's get back to social media. In 280 characters, the evidence-based medicine narrative is summed up by Professor Paul Glasziou. In **his interpretation of the facts**, based on a sparse literature from randomised controlled trials, the evidence that masks protect anyone is weak, and he is **minded to speculate about multiple possible harms**, including the question of **risk compensation** (for example, if you wear a mask you'll think you're protected so you won't bother washing your hands). The **pragmatic public health narrative** is summed up by Professor KK Cheng, who brings a much **wider menu of facts** to the table and concludes that there is strong evidence of benefit and even stronger evidence of *no serious harm*.

Incidentally, Professor Glasziou's comments about harms of masks were not borne out. A review by Teresa Marteau's team showed that **risk compensation doesn't occur** – indeed wearing masks is associated with *increased* compliance with other preventive measures.[12] Furthermore, video analysis of thousands of people walking past subway cameras shows that the ones wearing masks *touch their faces less* than the ones not wearing masks.[13]

Back in March 2020, I got together with other members of the pragmatic public health tribe and wrote this article for the British Medical Journal.[14] We argued, as pragmatists do, for the **precautionary principle**. We said we don't have 100% proof that masks work *yet*, but let's act pragmatically on the basis of the numerous facts which point *in the direction of* a **positive benefit-harm balance**. Our paper did not initially have much impact. It was another three

months before Public Health England introduced a recommendation to wear a face covering in crowded public places.

What did happen was a **massive social media backlash** against me. These screen shots are taken from websites set up for the purpose of attacking both my academic papers and also my character. The first one depicts me as a **bull in a china shop**, leading a "charge" to make face masks mandatory (incidentally, I've never said they should be mandatory), and "decimating" other people's arguments. The criticism in the top quote is that I am *too sure that I'm right*. The author of second quote, which relates to the same publication, calls me the "milk curdler" and **his problem is that *I'm too circumspect*.** He thinks I'm not sure enough that I'm right. Neither of these critics, note, engages with the substance of my arguments.

The anti-mask lobby managed to **gate-crash a Zoom lecture** I was giving recently at Green Templeton College in Oxford. Just as I'd loaded my opening slide, and before I had even said anything, an audience member presenting as a white male posted this friendly message in the chat. I am a **piece of excrement**. I am a **sheep**. I am **seeking to introduce a new world order**. Be assured, I am using this material as data and writing academic papers about it.

I actually got off lightly. One of my PhD students, **Helene-Mari van der Westhuizen**, also published a paper on masks in the British Medical Journal.[15] She put out a tweet to tell people about it. Within minutes, ad hominem responses appeared saying things like "what a worrying person Helene is." Soon there were **hundreds of abusive responses** in this thread, depicting masks as "**muzzles**" and accusing her of waging "**psychological warfare** to force conformism". Helene-Mari was **tough enough to go on national television** the next day and talk about her mask research. A lady to watch.

You may have heard of the **Great Barrington Declaration**, led by these three professors – from Harvard, Stanford and Oxford – which was signed in September. It states (if I may summarise) that Covid-19 **isn't as bad as claimed**, especially for the healthy under 60s; that the **evidence base for interfering with people's lives is weak**; and that the **economy** should be prioritized over further lockdown. One argument made by this group centres on the **lack of rigorous randomised controlled trial evidence**. Another declaration, the John Snow Memorandum (to which I am a signatory), brings in **mechanistic and case study evidence, and also evidence from ethics and political philosophy,** to argue the opposite: that Covid-19 is **serious and sometimes deadly**; that **all citizens count**; that the best way to save the economy is to **address public health**; and that we all need to **make compromises** for the good of society.

These public declarations led to a **new, meta-story in the media** that opinion is polarised, and there is really nothing we can be certain of. As you are probably aware, this kind of "both-sides" journalism can **create false dichotomies and erode public trust**. We scientists have to make judgements about when it's best to keep quiet and let a narrative run its course. We

published the John Snow Memorandum only when we saw the professors who'd put out the Great Barrington arguments **entering Number 10**.

Talking of the link between science and politics, I'd like to flag up two papers. Martin McKee and colleagues offer an **analysis from political science** that the libertarian right is **anti-masks, anti-lockdown and pro-segmentation** (that is, the old and vulnerable should stay at home in order that the young and less vulnerable can enjoy their freedoms), and that this basically mild disease should be allowed to wash over the population to achieve **herd immunity**.[16] Jaysen Harsin, in a paper entitled 'Toxic White Masculinity', has argued that proponents of this view **tend to be** – **although they are not necessarily** – white and male, aggressively confident and hierarchical, and dismissive of traditionally female traits such as emotionality, power-sharing, and admission of uncertainty.

As Roy Shulman said, in a conference back in June, *"The COVID-19 pandemic is … a unique phenomenon constituting the **most blatant expression of dangers of the post-truth age**: the period of the pandemic has been characterized by **less confidence in institutions**, a **lack of agreement on facts**, and a **blurring of the line between opinion and fact**. The pandemic intensified the **need of citizens to find certainty**, but they have tended to find it in **comfortable 'facts' from institutions and entities they regard as trustworthy**, and that are consistent with opinions they already espouse."*

This time last year, we scientists liked to cite the **apocryphal facts** that **half of all scientific papers are never read and 90% are never cited**, and that it takes on average **17 years** to bridge the research-practice gap. But in 2020 things **flipped the other way**. As soon as we'd uploaded a **preliminary version of our paper on a preprint server**, it would immediately be grabbed by journalists (some of whom were very reputable and some of whom weren't), **circulated on platforms we didn't even know existed**, and used in ways we had never imagined.

COVID-19 has **already changed, fundamentally and perhaps forever**, how academic findings are **generated, reported, disseminated, and shared with the public**. This goes far beyond what **Helga Nowotny** and colleagues were talking about two decades ago when they introduced the concept of Mode 2 science – that is, where **facts are less certain**, and with a **composition more heterogeneous, methods more diverse and boundaries more ragged**.[17] No, this I think is **Mode 3 science: a politicised and sinister engagement** with <u>non-science</u> by a poisoned and partisan society.

We are no longer in **Thomas Kuhn's relatively apolitical world**, in which those who wished to break with an old paradigm could simply take their football and go and play in a new field. We are in the **world described by Michel Foucault back in 1966**: a world in which **knowledge – that is, particular versions of the "facts" – and power are intimately intertwined**. Powerful people – and powerful institutions – can define *what knowledge is* and *whose knowledge counts*. As he put it, *"In any given culture and at any given moment, there is always only one*

épistémè that defines the conditions of possibility of all knowledge, whether expressed in a theory or silently invested in a practice.*" [18]* What Foucault didn't predict is how **social media trolls would come to weaponise that dominant discourse**.

I want to highlight four approaches that I and my team (including my incredible PhD students) have been using to cope with the way our science has been caught up in these entanglements. **The first is reflexivity**. This is a picture of the river Thames near my house. Every morning I go there, often before it gets light. Sometimes I go for a swim, but I *always* take an hour away from my work to think. And one thing I often reflect on is my ethical duties as a scientist working for the public good – and how I might best discharge those duties in the current context. **Secondly, and not nearly so pleasant, is painful engagement.** The only way that we can respond to what people are saying about us is to read it. We don't need to read every word, but we do need to know the ad hominems and the way our facts – and also our uncertainties about facts – are being twisted. **Thirdly, epistemological labour** – the work we scientists have to do to expose particular paradigmatic assumptions and systematically challenge them (which is partly what I've been up to in this lecture). **And finally, deconstruction**. To overcome attempts to distort our findings, we need to identify and then circumvent the constraints of particular discourses and linguistic conventions. It is interesting to note that **the most effective rebuttals to the Great Barrington Declaration** came from ordinary users who signed the online petition with names like "Dr. Johnny Fartpants" and "Professor Notaf Uckingclue", thereby reducing the exercise to comedy and farce.

If we **deconstruct the "science" of masks**, we can see that they *can* be framed as personal protective equipment and tested in randomised controlled trials – but they can also be framed in **more political terms**, linked to controversial choices about who gets the supply contracts and hidden vested interests.

Let me summarise.
- **COVID-19 hit the world** back in January 2020;
- by March there was a **full-blown pandemic**.
- Research progressed at **unprecedented pace and scale**.
- Too little knowledge quickly became **too much**.
- "Facts", especially in relation to preventive behaviour and public health, were **contested and became saturated with ideology**.
- Uncertainty became a **weapon** to be **used tactically by interest groups**.
- And we scientists – our flawed assumptions, our political allegiances, our interpersonal rivalries and even our private lives – **became the story**.
- Science communication is now a **bare-knuckle fight** with the trolls: we scientists must reflect, engage, do epistemological work, and deconstruct.

I thank you all for your attention and I'm looking forward to hearing Milly's commentary.

1. Czarniawska B. Narratives in social science research. London: Sage 2004.
2. Gabriel Y. Storytelling in organizations: Facts, fictions, and fantasies: Facts, fictions, and fantasies: OUP Oxford 2000.
3. Alleyne B. Narrative networks: Storied approaches in a digital age: Sage 2014.
4. Gergen MM, Gergen KJ. Playing with purpose: Adventures in performative social science: Routledge 2016.
5. Merton RK. The sociology of science: Theoretical and empirical investigations. Chicago: University of Chicago press 1973.
6. Latour B, Woolgar S. Laboratory life: The construction of scientific facts: Princeton University Press 2013.
7. Becher T, Trowler P. Academic tribes and territories. 2nd edn Buckingham: The Society for Research into Higher Education 2001.
8. Kuhn TS. The Structure of Scientific Revolutions. Chicago: University of Chicago Press 1970.
9. Star SL. Infrastructure and ethnographic practice: Working on the fringes. *Scandinavian Journal of Information Systems* 2002;14(2):6.
10. Judge K, Bauld L. Strong theory, flexible methods: evaluating complex community-based initiatives. *Critical public health* 2001;11(1):19-38.
11. Leffler C, Ing E, Lykins J, et al. Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks(*Am J Trop Med Hyg* 2020;103:2400-11. doi: 10.1101/2020.05.22.20109231
12. Mantzari E, Rubin GJ, Marteau TM. Is risk compensation threatening public health in the covid-19 pandemic? *bmj* 2020;370:m2913.
13. Chen Y-J, Qin G, Chen J, et al. Comparison of Face-Touching Behaviors Before and During the Coronavirus Disease 2019 Pandemic. *JAMA network open* 2020;3(7):e2016924-e24.
14. Greenhalgh T, Schmid MB, Czypionka T, et al. Face masks for the public during the covid-19 crisis. *Bmj* 2020;369:m1435. doi: 10.1136/bmj.m1435 [published Online First: 2020/04/11]
15. Van Der Westhuizen H-M, Kotze J, Tonkin-Crine S, et al. Face coverings for COVID-19: from medical intervention to social practice. *BMJ* 2020;370:e3020.
16. McKee M, Gugushvili A, Koltai J, et al. Are Populist Leaders Creating the Conditions for the Spread of COVID-19?; Comment on "A Scoping Review of Populist Radical Right Parties' Influence on Welfare Policy and its Implications for Population Health in Europe". *International journal of health policy and management* 2020
17. Nowotny H, Scott PB, Gibbons MT. Re-thinking science: Knowledge and the public in an age of uncertainty: John Wiley & Sons 2013.
18. Foucault M. The order of things: Routledge 2005.