

Embedded Social Science and the British Government COVID-19 Response

An ethnographic study

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Abstract: The complex and evolving nature of the SARS-CoV-2 pandemic poses significant challenges to national and international emergency preparedness and response. Governments must navigate streams of emerging data in real time, synthesising knowledge from diverse sources to inform policy. The UK government drew on experiences from earlier pandemics to bridge perceived gaps between social science research and policy through the secondment of early-career academics as embedded scientists. In this article, we present comparative ethnographic data describing embedded social scientists' contributions to UK COVID-19 preparedness and response. We find that the liminal position, loose identities, and high degree of autonomy of embedded scientists allowed these individuals to navigate multiple networks to strengthen and legitimise the role of social science within policy debates.

Keywords: COVID-19, embedded scientist, pandemic, policy, social science, UK government

'Science is a set of social practices. As such, what it is at any time is a product of how it is conducted, the norms and beliefs and value systems that sustain it'.

— Boden et al. (2004: 186)

There remains a lack of robust examination of the diverse and complex relationships at the heart of policy engagement with scientific evidence. Recent ethnographic research on education policy has demonstrated the importance of formal and informal networks and relationships within and outside central government for the generation of new policy ideas (Allen and Bull 2018). The current SARS-CoV-2 (COVID-19) pandemic has stimulated unprecedented levels of research across multiple fields, yet there remains a significant lack of knowledge around how social relationships and cultural systems shape policymakers' engagement with emerging scientific work. Conceptualising science and policymaking as social practices operating within constellations

of relationships allows us to suggest the presence of formal and informal pathways connecting research and policy. What remains unclear is how social and cultural differences within and between academic and government communities promote or inhibit exchanges, and the role that individuals within these networks can play in bridging and brokering exchanges between groups. To address this core question, we offer a detailed ethnographic analysis of two social scientists embedded in the British government's COVID-19 response. Our analyses of these liminal roles, which bridge academia and the civil service, provide unique positions from which to reflect on the complex relationships between policy and research. We specifically intend this article to provide an empirical counterpoint to more theoretical explorations offered by other articles in this special issue, and our conclusions seek to add depth and evidence to these wider discussions.



Science and policy

The COVID-19 pandemic offers a unique case study to explore large-scale government engagement with emerging research across multiple disciplines. In the early days of the pandemic, many scholars advocated for those in power to ‘follow the science’ (Kreps and Kriner 2020: 2). These calls prompted swift responses from academics who cautioned against ideas of absolute truth and ideas of a ‘single science’, including from the President of the Royal Society, who urged politicians to ‘recognise both the potential and the limits of science’ (Ramakrishnan 2020). The progress of scientific enquiry into the great unknowns of the pandemic were exacerbated by existing tensions between policymakers, the public and scientific communities; the last decade had seen a dramatic increase in occasions where evidence and expertise ‘can seemingly be marshalled as besuits the interests of the moment – or to discredit others’ causes’ (Leach 2018: 7). The weaponisation of evidence for specific agendas is not new, but rarely are the impacts felt as keenly, or seen as clearly, as around public health; from tensions around MMR vaccinations in the United Kingdom, to disagreements about the role of international health organisations and ‘expert advisors’ in the 2014–2016 Ebola response.

Social science and the pandemic response

We can trace these tensions across a wide variety of research topics and within multiple disciplines. In many cases, engagements around the legitimacy of research and evidence centre on the use of specific technical processes, and are typified in the heated exchanges occurring around the use and value of modelling in the current pandemic. Amongst these technical debates, it is possible to identify the persistence of wider and long-established biases such as the tension between qualitative and quantitative, empirical and theoretical, and social and ‘natural’ science research. It is not the aim of our article to explore fully all of these tensions, but they are relevant to gain a more complete understanding of how policymaking engages, or fails to engage, with specific outcomes of research. Given our anthropological backgrounds, we found the use of social science to be particularly illuminating. The nature and reach of the COVID-19 pandemic underlined the importance of including social and behavioural science to inform policy and response (Van Bavel et al. 2020).

These debates are by no means new; social scientists have provided input into infectious disease outbreaks and pandemics since the early twentieth century (Barrett and Armelagos 2013). Since the 1990s, social research has made notable contributions to disease research on HIV/AIDS, SARS, Ebola, Zika, and SARS-CoV-2 (Davies et al. 2015; Hahn and Inhorn 2009; Janes et al. 2012). Despite the significant policy implications of their findings, the majority of these studies were authored for academic audiences, which creates barriers to inclusion in policy (Bardosh et al. 2020). To facilitate the use of social science evidence in public policy, many international institutions formed departments or groups to ‘operationalise’ social science for public health, including notable collectives such as the Centres d’Analyses des Sciences Sociales (CASS), the global epidemic social science network (SONAR-Global), and working groups including the GOARN-Research Social Science Working Group and technical advisory groups within the World Health Organization (WHO). At the national level, countries have pursued a variety of new schemes and initiatives, including investment in internal civil service social science capacity, and outreach and engagement activities.

As the COVID-19 pandemic began to generate huge quantities of novel data, the British government identified the need to bring quickly additional scientific capacity and skills in-house to engage with a rapidly changing research landscape, as well as the need to strengthen existing capacities and structures. This led to the recruitment of early- and mid-career researchers from academia into various existing and emerging teams as *embedded scientists* (ES). These loosely defined roles were designed specifically to bring in academically literate individuals working in relevant areas to help support and expand the scientific capacity of existing and recently established civil service teams. Our study provides a critical ethnographic evaluation of the role of social scientists embedded in one established government office, Lucy Irvine within the Government Office for Science (also known as GO Science, or within this article as GOS), and in one new government office, Alex Tasker within the Cabinet Office arm of the COVID-19 Task Force.

Methods

Research approach

Data was collected during the authors’ employment as ES. Lucy was recruited to work part-time by GOS in May 2020 and left in September 2020, and Alex

took up his 50 per cent role as an ES in the Cabinet Office in April 2020, with his appointment ongoing at the time of writing. During data collection, both authors remained active in their university roles – the Institute for Global Health (Lucy) and Department of Anthropology (Alex). Because of the nature of pandemic working, we completed our work as ES online, working from home. Like much ethnographic research conducted during the past two years, this simultaneously created and lowered barriers to connecting with new colleagues – all meetings were held online, but at the same time we encountered people within their own homes, glimpsing aspects of personal life that we otherwise would not have.

Given the importance of personal experience to the research, we followed an analytical auto-ethnographic approach informed by the work of Leon Anderson (2006). Anderson's suggestion was that an analytical auto-ethnographical approach is particularly suitable when the researchers are (a) full members of the research group or setting; (b) visible as members; and (c) committed to developing theoretical understandings of broader social phenomena contained within. We believe these considerations make auto-ethnography an appropriate tool for our enquiries. We complemented Anderson's auto-ethnographic framework with ethnographic analyses between our experiences (Simmons and Smith 2019) developed through iterative reflective discussions. This approach enabled clearer identification of divisions between shared and localised cultural and social practices within departments and groups. The events and circumstances detailed in these analyses are in many ways dissimilar to the 'epiphanies' that are the subject of many auto-ethnographic studies (Ellis et al. 2011: 275); in order to aid recall and test understandings of specific events, both of us consulted with colleagues where value could be added. These analytical processes were combined to identify key local, meso-level, and global themes (Attride-Stirling 2001), which were used to structure the results presented below.

A note on auto-ethnography and positionality

We are aware that auto-ethnographic research provides a way of knowing and a means through which to make sense of one's own experiences. Exercises in sense-making draw deeply on personal understandings of the world we inhabit, shaping both action and interpretation. In conducting our research, we have chosen to acknowledge explicitly our positionality as early-career researchers employed in academia. We believe that this position provides

a unique insight into the complexities of academic-policy relationships; the following analyses speak directly to issues we feel to be most important to understanding social relationships in policy engagements with academia.

Case studies

Government Office for Science

GO Science is responsible for giving scientific advice to the Prime Minister and Members of Cabinet through various structures and programmes. The Scientific Advisory Group for Emergencies (SAGE) is organised through GOS, with the latter providing logistical and technical support for the former.

Lucy was seconded part-time to the international team at GOS for three months in the summer of 2020 as an ES, after responding to a job advert circulated via a university e-mail network. Lucy provided science advice based on her experience and training in global health and anthropology. In particular, she was initially asked to comment on different health system contexts and capacity globally, and to offer a social science perspective on the COVID-19 response in the United Kingdom and internationally.

Lucy's tasks ranged from analysing epidemiological data from national and international COVID-19 data sets, working with external and internal stakeholders to co-ordinate different groups working on similar issues in order to avoid overlap and streamline work, giving feedback on statements that would later be communicated to the public, and drafting reports on various country health systems to improve understanding of national-level efforts to control the pandemic.

Cabinet Office COVID-19 Task Force

The Cabinet Office holds a central role in the UK government, with key co-ordination and oversight responsibilities for a diverse range of policy issues. Following the start of the pandemic, the Cabinet Office was instrumental in developing and leading the UK COVID-19 Task Force, including building capacity and structures for comparative analysis of international and domestic policymaking around COVID-19. In the early stages of the pandemic, it became clear that countries had to make rapid decisions on foreign and domestic policy, using often-imperfect information and evidence.

International networks of Foreign Office posts provided key information on international political trends and approaches, and this data was then

processed by Cabinet Office analysts to inform policy at the heart of government. This approach required all-source assessment, including emerging and pre-print academic literature. Alex was seconded to provide analytical critique by drawing on his background in academia, and this included a ‘challenge function’ whereby conflicting ideas and perspectives could be rigorously discussed and evaluated before being developed further.

Results

Following the iterative analytical process described above, we have chosen to present our findings as three interconnected themes, starting with the empirical day-to-day and moving towards more conceptual engagements with wider debates. Firstly, we discuss our observations of the mechanistic aspects of our positions, considering how team capabilities and ways of working shape engagements with social research. Secondly, we consider how this work drives the creation and evolution of external relationships and impacts upon social exchanges. And lastly, we reflect on how our experiences within government intersect with debates on the wider use of social research, in particular the inclusion of this data as evidence for analysis and in decision-making.

Ways of Working and Capacities

Researchers have gone to considerable lengths to establish the importance of individual and community-level relationships in knowledge creation and transfer (Bell and Zaheer 2007; Berger and Luckmann 1991; Bhupatiraju et al. 2012; Laubengaier et al. 2019). These relationships are interwoven with cultural and social practices within communities, varying widely within and between disciplines and institutions. Despite the centrality of knowledge work in academic settings, there remains a wide variety of cultures and practices (Fullwood and Rowley 2017), including persistent barriers to knowledge-sharing driven by modes of working that often favour individualism (Tippins 2003). Government departments are equally diverse in their approaches (Hislop 2013), often driven by established working practices that differ significantly from those found in the private sector (Boyne 2002). The case studies selected as the topics of our article represent two distinct positions within the spectrum of government organisational cultures; GOS is a well-established organisation within existing government architecture; the Cabinet Office contribution to the COVID-19 Task Force represents a newly formed

group specifically conceived and developed as a response to the emergence of COVID-19.

In both cases, the majority of tasks were completed by small teams of analysts working on specific project briefs; these tasks could range in scope and duration, and teams were formed and reformed with new membership dictated by capacities and availability. Lucy noted that within GOS there was a clear desire to form working teams whose members could draw on a diverse range of operational experience and disciplinary expertise. Once formed, teams were often complemented by the inclusion of temporarily seconded scientists from relevant areas, including from environmental science, geography, behavioural science and mathematical modelling. Despite the fact that infectious disease outbreaks are traditionally seen as public health issues, Lucy encountered relatively few medics or public health experts across the GOS teams, a trend observed (and criticised) throughout the United Kingdom’s COVID response (Armitage 2020; Scally et al. 2020). Lucy suggests one explanation for this may come from the perception that these areas of knowledge were ‘covered’ by GOS collaboration with Public Health England and the Department of Health and Social Care (DHSC). This collaboration had in the past led to high-profile appointments such as the Chief Scientific Advisor (CSA) for the DHSC, Professor Chris Whitty, who played a key role in providing scientific advice to the government and the public throughout the pandemic.

The Cabinet Office teams followed a broadly similar approach, with analysts drawn in from multiple other government departments working together in smaller teams on a wide range of projects, with commissions of varying length of time from days to weeks. Experienced analysts conducted the majority of the analytical work; individuals often had extensive experience within and outside of government, enabling them to draw on economic, mathematical, geopolitical and security specialists. During our analyses, we noted that the Cabinet Office differed notably from GOS in the different uses of ES. In GOS, ES were often included on generalist analytical teams to provide broad critiques based on academic knowledge; GOS members perceived ES as having expert knowledge and skills required to engage with emerging academic debates, but also the ability to locate and develop independent briefing products for direct use by teams. By contrast, the Cabinet Office primarily employed ES in a more centralised manner; Cabinet Office management made teams aware of the presence and relevant expertise of ES and briefed them to contact ES to help explore

specific areas of difficulty, or test complex questions before developing commissions further.

Reflecting on these differences, it became clear that many of these differences arose from the established nature of GOS versus the emergent nature of the Cabinet Office role within the Task Force. Whereas GOS by nature was used to working with external expertise, the Cabinet Office was in the process of consciously building capacities, cultures and practices around science engagement, driven by the need to navigate effectively the large quantities of data and analyses arising from the pandemic. One of the most remarkable aspects of this cultural evolution was the open and dialogical manner in which steps were made; for example, rather than dictating the role of ES, Cabinet Office Task Force management met regularly with ES to identify areas where they felt they could add most value. This process involved reflecting on completed tasks and mapping potential future areas of work. One notable success of this process was the development of enhanced external outreach capacity, including developing relationships with cross-disciplinary research groups and organisations whose views and expertise were vital for engaging with the inherent complexity of many of the unseen challenges that emerged as the pandemic progressed.

Expertise and External Engagement

Government departments purposively recruited ES for their ability to act as intellectual bridges between academia and government. In this role, ES provided a supportive function to analysts navigating academic products, and helping evaluate and sift data for inclusion in policy decision-making. We found that in many situations, rather than working to incrementally extend the limits of knowledge from the established foundation of a body of evidence, new and untested research was being produced at a furious pace. For example, the volume of material placed on pre-print servers during the pandemic has far exceeded the capacity of conventional peer-review processes to quality-assure and publish, leading to profound implications for science communication (Fraser et al. 2021). The complex combination of large volumes of unchecked, highly specialised publications posed particular difficulties for those members of the COVID response tasked with auditing and screening data for inclusion, including ES in their pseudo-‘expert’ roles.

Groups across government responded to this challenge in different ways, including the recruitment of subject matter experts (SMEs), outsourcing specific tasks and evaluations to specialist groups within

government, and identifying research communities that were mandated to link research and policy. These processes met with various degrees of success, often closely linked to the specificity of the task and focus of the originator. Due to the international comparative scope of the Cabinet Office roles, it was difficult to find specific SMEs who were able to speak to the full range of tasks and subjects as they evolved. In response, Alex and other ES explored alternative models for engaging with emerging specialist literature. One particularly successful approach centred on ES’ liminal position between government and academia – specifically, the ability to rapidly contact and engage small, specialist research communities and groups as they were disseminating their work. For example, during the establishment of test, trace, and isolate (TTI) systems around the globe, the British government sought to learn from international experiences. The combination of rapidly evolving national systems and limited experience and expertise existing at the international level made the study of possible scenarios complex.

The University of Sussex, however, had recently established the Optimising Coronavirus Testing Systems (OCTS)¹ international research group within the Science Policy Research Unit, which produced an early working paper on international responses. The Cabinet Office Task Force team examining TTI used this paper as the basis for a discussion with Alex, and the decision was made for Alex to approach the group and explore the team’s questions further. Alex’s dual insider–outsider identity enabled the establishment and growth of this relationship, including ongoing dialogues. These longer-term discussions have been particularly valuable when considering future directions. Given the rapid pace of tasks, there is often little capacity to consider what may have been and what may come in specific fields. Ongoing relationships with specialist research groups such as OCTS have provided unique opportunities to canvas expert opinion where there may have been limited capacity to consider these aspects. Fundamentally, relationships with expert groups have improved ES’ abilities to locate sources of evidence in a rapidly changing landscape, and judge their suitability for inclusion – a key challenge in the COVID response.

Evidence and Uncertainty

Community ways of working and engagements with external groups primarily served to provide alternative sources of data and a means to evaluate and integrate these forms of evidence into decision-making processes. The need for ongoing conversations about

what was known and, arguably more importantly, what was unknown were typified by the continuing emergence and transmission of variants of concern (VoCs). Data and evaluation of VoCs underlined the rapidly changing nature of the pandemic, with emerging and evolving understandings of infection dynamics and impacts leading to a constantly expanding landscape of evidence available to analysts and policymakers. Just as lags between the ‘translation of policy into action’ (Barrett 2004: 251) are well recorded, so too are disconnections between research and policy (echoing commonly observed lags between research and commercial implementation [Mansfield 1998]).

Both Alex and Lucy noted that the time scales in which analysts are required to make decisions around assessment and inclusion of social science evidence are at distinct odds with conventional academic practice. Social science researchers may take months or years to evaluate and synthesise data, whereas in such a rapidly moving landscape as a pandemic response this must happen over days or weeks. The relative immediacy of evidence collection and evaluation posed significant operational challenges, but also prompted the scrutiny of orthodox ideas of scientific legitimacy. Throughout the analytical process conducted to develop this article, we often noted how our anthropological perspective on data legitimacy was either at odds with, or in tension with, the views of analysts. Lucy noted differing expectations of evidence typologies and commentaries that analysts expected anthropologists to provide, which closely linked to the focus on the dialogue and hierarchical position within GOS. Lucy characterised this relationship as a ‘push-and-pull’, and as determined by the nature and immediacy of the evidence required.

This tension often resulted in ES being asked to complete tasks which fell within the normal operational remit of analysts and that did not require ES to draw on the specialised criticality acquired through academia. For example, Lucy attempted to use her time effectively at GO Science by producing work driven by her existing expertise, such as in the creation of two-page summative reports on specific country health systems with analysis of their COVID-19 response to date, including a critical reflection of relevant research or interventions. Lucy found senior team members appreciated this work, yet these tasks were deprioritised, as it was believed that a more efficient use of time would be to produce summaries of communications sent from UK embassies overseas to the UK government. These

provided a useful update of the current situation regarding COVID-19 in each country, but contained no academic analysis or critical reflection. Deeper critical analysis was certainly valued by GOS teams, but in the emergent situation certain types of evidence were prioritised – namely surface-level snapshots of what was taking place in different nations and quantitative data that enabled swift comparisons between countries (such as weekly increases in COVID-19 cases and deaths).

This echoes much broader trends in evidence use and valuation in global health, where quantitative data allows for rapid and straightforward analysis and evaluation of health interventions and policies. Interestingly, some of Lucy’s contributions consisted of identifying issues with how quantitative measures that were central to international COVID-19 response comparisons were defined or collected. For example, different country health systems recorded COVID-19 mortality data and intensive care bed use in different ways. Thus, international comparisons using these supposedly equal data points were arguably inaccurate.

Lucy’s experience contrasted with Alex’s work within the Cabinet Office. Rather than focussing on data-handling, Alex and other ESs were specifically sought out by analytical teams for their critical skills. After beginning a commission, teams of analysts would often contact Cabinet Office ES to ‘talk around the subject’; these conversations included the opportunity to challenge definitions and scope. ES were free to flag the problematic use of specific terms or conceptualisations, or to prompt analysts to consider where clarifications could be necessary. In addition to this so-called ‘challenge function’, ES would locate and signpost relevant emerging research and connect analysts with other academics if helpful. For example, when considering a commission on the prioritisation and protection of elderly populations, Alex was able to prompt analysts to consider how and why age could, or should, be considered a vulnerability – including suggesting suitable biosocial and medical anthropological research to help frame the question, and contacting researchers involved in the field.

These cases illustrate a key tension in the prioritisation and use of particular kinds of evidence. Misunderstandings leading to perceived tensions between quantitative and qualitative data in health are well documented in anthropological research (Adams 2016; Adams et al. 2014; Ecks 2008). Many of our encounters echo these observations, including tacit beliefs that quantitative data

produced from randomised controlled trials (RCTs) was to be considered the ‘gold standard’ and that qualitative evidence was often undermined through characterisations as anecdotal. This runs contrary to growing bodies of public health and infectious disease research that demonstrate the utility and efficacy of behavioural interventions, yet research on the mechanics of how these effects occur has not been prioritised to date. COVID-19 provides a useful example: quantitative epidemiological data identified noticeably worse health outcomes for specific population groups from the outset of the pandemic. Many hypotheses of these effects centred on potential biomedical drivers such as diabetes prevalence in South Asian populations, yet these conceptualisations overlooked well-established work that shows the complex relationships between various social determinants of health (SDoH) and poor health outcomes.

Exploring these ideas further with analysis teams, many of our colleagues cited the rapidly evolving nature of the pandemic driving a prioritisation of statistical data and epidemiological analysis. Quantitative measures such as infection rates, hospitalisations and the R-number provided a comfortingly simple scale allowing comparability in a rapidly changing landscape. There was no resistance to ideas of complexity, but the requirement for rapid and ongoing updates to the Government Chief Scientific Advisor (GCSA) and senior team members led to the perceived need for a consistent ‘through line’ tying updates together. This was particularly true when analyses were being used to position the United Kingdom in an international setting, particularly when benchmarking against selected countries on the grounds of political affiliation, GDP and health systems.

Discussion

The role of ES provides multiple opportunities for reflection on the relationships between academia and government, including around the inclusion of social science research in pandemic planning and response. Both Alex and Lucy have anthropological backgrounds, informing their understandings and approaches when evaluating these types of data in policy processes. From a specifically anthropological perspective, Lucy noted that there was excitement exhibited by some members of government around having anthropologists contribute to outputs. Lucy attributes this to the growing recognition and even

‘trendiness’ of anthropologists, particularly those that work inside organisations, contributing both to projects and workflow/working-relationship improvements. Interest in what has been termed ‘corporate’ or ‘business anthropology’ has been on the increase (Jordan 2013). Microsoft and Google are reported to have had a number of anthropologists on staff for years, and anthropologists themselves have been pushing for others to make sure that businesses are aware that ethnography and studying (workplace) culture are the domain of this discipline (Vogel and Gamwell 2020).

Despite this, both of our experiences in government showed fairly limited knowledge of what anthropological work and thinking involves. There was a tendency for us to be seen as the ‘socio-cultural’ or behavioural experts, and asked to contribute to a range of outputs where the pandemic was perceived as overlapping with ‘cultural’ issues or public behaviour, such as work on understanding why specific ethnic minority communities were being affected more severely by COVID-19. In developing these lines of work, we were able to reflect on how anthropological thinking was able to break down these preconceptions, and how ES were able to provide a platform to champion the inclusion of social science research.

Addressing Uncertainty

As mentioned at the outset, in the early days of the pandemic the British government often framed policy announcements as ‘following the science’, a narrative which fails to account for the uncertainties and incomplete knowledge found at the frontiers of all scientific enquiry. Disconnections between academics and policymakers’ treatments of uncertainty have been the subject of extensive research (see, for example, Stirling 2010). Government understandings of uncertainty are often highly reductionist, a position which runs counter to many anthropological engagements with the topic (Samimian-Darash et al. 2013). In our experience, social science researchers have a huge amount to offer in developing more robust and nuanced engagements with uncertainty, but should be cautious of attempting to undermine the more mechanistic (often probability-based) language used in many parts of government. We did encounter many areas where the inclusion of social science was both fruitful and well received, but these were most commonly at the problem-setting and bounding stages of the tasks. Social science was seen to be able to demonstrate the granularity and complexity of real-world scenarios,

underpinning ideas of the uncertainty around and limits of command-and-control thinking.

Conclusion

In this auto-ethnographic account, we detail our experiences of working as ES in the British COVID-19 response. We found limited experience of social science research amongst analyst teams, but a willingness to engage with emerging research moderated by time and task constraints. In many cases, we found the fluid identity and liminal nature of ES between academia and policy roles to be a powerful tool to advocate for greater inclusion of social science research in policy processes, especially around issues of uncertainty.

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References

- Adams, V. (2016), 'What Is Critical Global Health?', *Medicine Anthropology Theory* 3, no. 2, doi:10.17157/mat.3.2.429.
- Adams, V., N. J. Burke and I. Whitmarsh (2014), 'Slow Research: Thoughts for a Movement in Global Health', *Medical Anthropology* 33, no. 3: 179–197, doi:10.1080/01459740.2013.858335.
- Allen, K. and A. Bull (2018), 'Following Policy: A Network Ethnography of the UK Character Education Policy Community', *Sociological Research Online* 23, no. 3: 438–458, doi:10.1177/1360780418769678.
- Anderson, L. (2006), 'Analytic Autoethnography', *Journal of Contemporary Ethnography* 35, no. 4: 373–395, doi:10.1177/0891241605280449.
- Armitage, M. (2020), 'COVID-19: Public Health Expertise Is Being Sidelined', *BMJ* 369: m2454, doi:10.1136/bmj.m2454.
- Attridge-Stirling, J. (2001), 'Thematic Networks: An Analytic Tool for Qualitative Research', *Qualitative Research* 1, no. 3: 385–405, doi:10.1177/146879410100100307.
- Bardosh, K. L., D. H. De Vries, S. Abramowitz, A. Thorlie, L. Cremers, J. Kinsman and D. Stellmach (2020), 'Integrating the Social Sciences in Epidemic Preparedness and Response: A Strategic Framework to Strengthen Capacities and Improve Global Health Security', *Globalization and Health* 16: 1–18, doi:10.1186/s12992-020-00652-6.
- Barrett, S.M., (2004). Implementation studies: time for a revival? Personal reflections on 20 years of implementation studies. *Public administration*, 82(2), 249–262.
- Barrett, R. and G. Armelagos (2013), *An Unnatural History of Emerging Infections* (Oxford: Oxford University Press).
- Bell, G. G. and A. Zaheer (2007), 'Geography, Networks, and Knowledge Flow', *Organization Science* 18, no. 6: 955–972, doi:10.1287/orsc.1070.0308.
- Berger, P. L. and T. Luckmann (1991), *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* (London: Penguin).
- Bhupatiraju, S., Ö. Nomaler, G. Triulzi and B. Verspagen (2012), 'Knowledge Flows – Analyzing the Core Literature of Innovation, Entrepreneurship and Science and Technology Studies', *Research Policy* 41, no. 7: 1205–1218, doi:10.1016/j.respol.2012.03.011.
- Boden, R., D. Cox, M. Nedeva and K. Barker (2004), *Scrutinising Science: The Changing UK Government of Science* (Basingstoke, UK: Palgrave Macmillan).
- Boyne, G. A. (2002), 'Public and Private Management: What's the Difference?', *Journal of Management Studies* 39, no. 1: 97–122, doi:10.1111/1467-6486.00284.
- Davies, S. E., A. Kamradt-Scott and S. Rushton (2015), *Disease Diplomacy: International Norms and Global*

- Health Security* (Baltimore: Johns Hopkins University Press).
- Ecks, S. (2008), 'Three Propositions for an Evidence-Based Medical Anthropology', *Journal of the Royal Anthropological Institute* 14, no. 1: S77–S92, doi:10.1111/j.1467-9655.2008.00494.x.
- Ellis, C., T. E. Adams and A. P. Bochner (2011), 'Autoethnography: An Overview', *Historical Social Research/Historische Sozialforschung* 12, no. 4: 273–290, doi:10.2307/23032294.
- Fraser, N., L. Brierley, G. Dey, J. K. Polka, M. Pálffy, F. Nanni and J. A. Coates (2021), 'The Evolving Role of Preprints in the Dissemination of COVID-19 Research and Their Impact on the Science Communication Landscape', *PLOS Biology* 19, no. 4: e3000959, doi:10.1371/journal.pbio.3000959.
- Fullwood, R. and J. Rowley (2017), 'An Investigation of Factors Affecting Knowledge Sharing amongst UK Academics', *Journal of Knowledge Management* 21, no. 5: 1254–1271, doi:10.1108/JKM-07-2016-0274.
- Hahn, R. A. and M. C. Inhorn (2009), *Anthropology and Public Health: Bridging Differences in Culture and Society* (New York: Oxford University Press).
- Hislop, D. (2013), *Knowledge Management in Organizations: A Critical Introduction* (Oxford: Oxford University Press).
- Janes, C. R., K. K. Corbett, J. H. Jones and J. Trostle (2012), 'Emerging Infectious Diseases: The Role of Social Sciences', *The Lancet* 380, no. 9857: 1884–1886, doi:10.1016/S0140-6736(12)61725-5.
- Jordan, A. T. (2013), *Business Anthropology*, 2nd ed. (Long Grove, IL: Waveland Press).
- Kreps, S. and D. Kriner (2020), 'Model Uncertainty, Political Contestation, and Public Trust in Science: Evidence from the COVID-19 Pandemic', *Science Advances* 6, no. 43: eabd4563, doi:10.1126/sciadv.abd4563.
- Laubengaier, D., G. Hahn and H.-T. Wagner (2019), 'Organizational Culture and Knowledge Exchange and Combination: A Systematic Literature Review', Paper presented at the Proceedings of the 52nd Hawaii International Conference on System Sciences, 8–11 January.
- Leach, M. (2018), 'Alternative Narratives and Alternative Facts: Reflecting on Science-Policy Predicaments through Environmental and Health Lenses in West Africa and the UK', *The Joys of Truth: Science Policy in the Public Interest*, (ed.) B. Martin (Sussex, UK: University of Sussex Press), 7–10.
- Mansfield, E., 1998. Academic research and industrial innovation: An update of empirical findings. *Research policy*, 26 (7-8), 773-776.
- Ramakrishnan, V. (2020), 'Following the Science', *The Royal Society Blog*, 18 May, <https://royalsociety.org/blog/2020/05/following-the-science/>.
- Samimian-Darash, L., J. Arnoldi, D. M. Goldstein, F. Keck, A. S. Mathews, P. Redfield, . . . and L. Samimian-Darash (2013), 'Governing Future Potential Biothreats: Toward an Anthropology of Uncertainty', *Current Anthropology* 54, no. 1: 1–22, doi:10.1086/669114.
- Sally, G., B. Jacobson and K. Abbasi (2020), 'The UK's Public Health Response to COVID-19', *BMJ* 269: m1932, doi:10.1136/bmj.m1932.
- Simmons, E. S. and N. R. Smith (2019), 'The Case for Comparative Ethnography', *Comparative Politics* 51, no. 3: 341–359, doi:10.5129/001041519X15647434969920.
- Stirling, A., (2010). Keep it complex. *Nature*, 468 (7327), 1029-1031.
- Tippins, M. J. (2003), 'Implementing Knowledge Management in Academia: Teaching the Teachers', *International Journal of Educational Management* 1, no. 7: 339–345, doi:10.1108/09513540310501021.
- Van Bavel, J. J., K. Baicker, P. S. Boggio, V. Capraro, A. Cichocka, M. Cikara, . . . and J. N. Druckman (2020), 'Using Social and Behavioural Science to Support COVID-19 Pandemic Response', *Nature Human Behaviour* 4, no. 5: 460–471, doi:10.1038/s41562-020-0884-z.
- Vogel, M. and A. Gamwell (2020), 'Articulating Anthropology's Value to Business', *Anthropology News*, 15 July, doi:10.14506/AN.1459.

Note

- 1 · <https://www.octs.info/>.