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Scientific Consensus and the Discursive Dilemma

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Global ignorance about Africa continues to sustain misappropriation of foreign funding allocated for public health interventions, often with disastrous consequences. To explain why this continues to happen, I marshal the basic stochastic properties that underlie scientific consensus formation and decision making on a global scale, with the help of a result in social choice theory called 'the discursive dilemma'.

Kirk Ludwig kindly drew this to my attention last year after hearing me struggle with epistemic paradoxes generated by medical research conglomerates at the highest level of knowledge production in the service of international humanitarian aid. The discursive dilemma (spelled out by Christian List (2005) and Philip Pettit (2004)) together with List's developments of the late Kenneth Arrow's impossibility theorem (List and Goodin 2001) show that a discrepancy tends to occur between the decisions of individuals and the overall decisions attributed to the group which they comprise.

It's been proven that this discrepancy is bound to occur anytime the procedure for determining a group majority follows conditions regarded as ideally rational and democratic (i.e. whenever the procedure ensures universal inclusion, anonymity, and systematic completeness). These conditions match up with standard accounts of best practice in scientific research – namely, accommodating the maximal diversity of evidence-based hypotheses and sustaining uniformly impartial neutrality and rigour in the systematic management of all available evidence.

On Public Epistemology in Public Health

According to List (2005: 34) there are two conditions for a group's majority decision being more reliable than otherwise depending upon complete unanimity or upon the judgment of one authority. These conditions require that each fallible individual must be biased toward the truth at least slightly; and their judgments must be independent. But as I will show momentarily, there is dismally copious evidence in the global health arena, that the foreign scientists and public health experts working with this agenda are not independent from one another in forming their assessments of evidence (John Hardwig 1985, Torsten Wilholt 2003[1]) nor are they biased towards the truth about the aetiology of disease and the causes of preventable death in Africa.[2]

Applying Christian List and Philip Pettit's work in social choice theory to the empirical claims and policy advice of foreign experts, reveals why it is that the international 'scientific consensus' winds up being wrong so much of the time, and why it ends up with results contrary to its planned aims, serving foreign governments and multinational merchants rather than the purported beneficiaries of efforts to alleviate the disproportionate disease burden borne by Africans. And without being ontologically exuberant or ideologically harsh, these results show how this incongruous effect follows – ironically enough – from adhering

[1] Also Torsten Wilholt. 2013. Epistemic Trust in Science. *The British Journal for the Philosophy of Science* 64(2): 233-253.
[2] See Valesquez (2014) re. United Nations' 60th World Health Assembly's Global Plan of Action.

to the very principles of best research practice – by that I mean maximally inclusive impartiality and systematic rigour, as spelled out in the several codes of scientific conduct[3] designed to protect the integrity of empirical inquiry against the perverting pressures of capital and political interests (Keith Lehrer, Philip Kitcher).

When List (2005) argued for the epistemic promise of democratic procedures as the most optimal way of meeting Alvin Goldman's dual challenge of group rationality and group knowledge, his two conditions seemed innocuous enough. Recall those conditions: in order for individual judgments to comprise a democratic consensus that is guaranteed to be optimally rational and knowledgeable, the individual judgments must be independent and at least minimally biased towards the truth.

But applied to the real world challenge of alleviating gross imbalances in the benefits of global medical research, List's presuppositions in defence of epistemic democratization are remarkably important because they provide an objective and non-accusatory basis for *African* experts to occupy their proper place and assume the collective voice of authority in constituting the consensus in subject areas where they can provide the greatest epistemic advantage in assessing evidence and providing policy advice. Currently that voice is dominated by foreigners.

The real world applicability of these social choice results is all the more valuable because it provides a measured explanation to account for the appalling inconsistencies between the institutional planned intentions and the outcomes of foreign intervention. This egregious shortfall would be simply unsustainable without a political meltdown if it effected as badly affluent populations in the global North.[4]

A further upshot of appreciating the relevance of the impossibility theorem is that it illuminates why the transnational collective activity involved in the production of medical scientific knowledge for public service cannot be left as a function of free market forces. In other words the impossibility theorem demonstrates that there has to be some control and management of how many conflicting interests and viewpoints are represented in the scientific consensus as it interprets African health care needs, and how to respond to those needs. Further implications of these applied results of interest to social ontology theorists will be mentioned in closing.

What an Epidemic Was

But I invite you to speculate yourself on the implications as I present for you two examples of the discursive dilemma emerging in real life that follow precisely patterns introduced by List and Pettit and others in thought experiments with increasing significance beyond economics over the last 15 years.

[3] e.g. Netherlands Code 2012

[4] One example is the current legal fall out consequent upon the controversy raging over the carcinogenic effects of glycophates in weedkillers produced by Bayer pharmaceutical company's multinational subsidiary, Monsanto (Weyant 2018).

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In the first example, consider this quotation of an empirical assertion to which I will hereafter refer as E.

> E: "The 2014-2015 Ebola epidemic in western Africa was the longest and most deadly Ebola epidemic in history, resulting in 28,616 cases and 11,310 deaths in Guinea, Liberia and Sierra Leone." (NCBI 2017)

This claim was published by the National Academies of Science in June 2017 ostensibly on the basis of a scientific consensus.[5]

To appreciate the incongruity of circulating such a grossly improbable assertion as if it were an established empirical report, consider the response of individual specialists when asked independently of their judgment about the status of E. For the sake of argument I've distilled individual perspectives of 7 differently placed specialists representing the minority and side-lined sectors of the global health arena though they harbour the greatest volume of experience and expertise on the subject.

1) Suppose one such specialist was among those who worked on the team that originally delivered the Zaire report that first labelled a new filovirus in a human. This research was published in 1977 as a "preliminary communication" (Johnson et al. 1977: 570). She conceded the study involved only one case and the sample was badly handled; the published electro-photographic image did not display anything near the amount of viral material demonstrably shown to be fatal. The research finding was that, while no one disputes Ebola viruses have been found at fatal levels of concentration in green monkeys and other animals, she doubts E can be called true on the basis of evidence, since no one has isolated or purified the Ebola filo-virus in human blood or the tissue of a human fatality.

2) A second specialist is the Director of the Foundation for Innovative New Diagnostics working closely with World Health Organisation, to get research funding for an adequate method to test Ebola under poorest of emergency conditions. His portfolio is predicated upon the understanding among professionals that E is completely unreliable and in all likelihood false.

3) Another director of public health research was confident diagnosing cases of Ebola only in an emergency since he knows that symptoms of most contagious pathogens are indiscernible in their early stages.[6] He said off record cases of West African Ebola Virus

[5] These reports are going on now through the BBC with respect to medical military occupation of the DRC. They have been promulgated before and ever since the West Africa outbreak by means of prestigious high impact journals, textbooks, popularized fact sheets, health education posters and campaigns, and the major international news wires (Associated Press, Reuters), through which scientific networks communicate their findings and conclusions first to each other and then to the general public (Fleck 1981).

[6] For instance at the outset of an outbreak meningitis and measles are indistinguishable; similarly EVD's early symptoms cannot be recognised as different from malaria or typhoid.

Disease would have to be chiefly a matter of guess work, he conceded that the statement E could be true only by the wildest coincidence.[7]

4) A Medécins Sans Frontières volunteer health worker in rural Guinea confessed she had no way to tell by consulting any records of the CDC or WHO indicating how many of the cases of Ebola were under twelve years, or how many of them were men on any given day, or how many deaths over the same period and region due to malaria, or pneumonia. During October 2014, she witnessed an outbreak of acute fulminating Mingococcal Septicemia caused by the CDC using overheated vials in a meningitis inoculation campaign.[8] The CDC's accident was never publicized, so the violent symptoms and horrific deaths were attributed through rumor to Ebola. So she too does not put any credence in E.

5) A senior doctor working in Sierra Leone knew first-hand that the symptoms of Ebola Virus Disease (EVD) in patients quarantined in 2014-2015 were not those of Ebola in Zaire 40 years before, only one of those who died were bleeding from any orifice (Schiefflin 2014[9]). She knows it is five times harder to catch Ebola than it is to contract measles, and that orderlies at risk of contagion, were in no greater danger than when they managed patients coughing up blood uncontrollably and in violent fits at the very advanced stages of tuberculosis. From what she knew, there was no evidence to confirm E and she would not endorse it.

6) The sixth of our specialists was interviewed repeatedly on the BBC, a Swedish popularist of statistics appointed as Deputy Director of the UN's Ebola Crisis Emergency Mission in Sierra Leone, though he claimed no prior experience with Ebola. He distanced himself from any involvement with sourcing the data he managed in Sierra Leone, and the distribution on Freetown's street corners of free mobile phones with access to an Ebola hotline number to call for help, and posters all in English in a chiefly French speaking population. For most people this was the first time they ever saw an ambulance or had access to primary health care. The predictable spike in public call-ins determined the number of Ebola cases that day.[10] Yet off the record he also rejected E as unsubstantiated.

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[7] His use of protein segments of DNA assumed to be markers of such a virus, using PCR technique is unreliable, since there is no gold standard to back up the diagnostic tool in use, so no way to demonstrate the existence of the virus in blood or tissue of a fatality.

[8] **.** She was aware that no such disaggregated records were available at any time from the W.H.O. nor the CDC presiding over the crisis response. The symptoms of Mingococcal Septicemia, also called Waterhouse-Frederichsen syndrome, include vomiting, diarrhoea, extensive purpura, cyanosis, tonic-clinic convulsions, and circulatory collapse usually with haemorrhage into the adrenal glands. http://investmentwatchblog.com/exposed-ebola-outbreak-in-africa-coincides-with-massive-cdc-meningitis-vaccine-campaign/ Accessed May 15, 2016.

[9] The symptoms associated with the Ebola Haemorrhagic Fever (EHF) in former Zaire forty years before were not the same. Of thirty three fatal cases that she monitored in her Ebola ward in Freetown, only one was bleeding.

[10] *BBC World Service* 24 November 2014, 26 March & 29 April 2015. Still this individual warned the public of the gargantuan threat that Ebola posed "like a great octopus" and "a monster."

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7) In October 2015, shortly before the 3,000 US army troops were deployed to Liberia, the Deputy Minister of Health in Monrovia was interviewed live on the BBC Worldservice, and conceded that so far as he was aware, no one in his Ministry had invited these troops though there was plenty of need to address urgently and treat the health crises that Liberians faced but he had no idea what kinds of expertise the US soldiers had in dealing with the fatal contagions that Liberians actually were coping with together with chronic malnutrition, in the absence of hospital facilities and primary care for an impoverished population. He saw no basis for endorsing E as true.

The Discursive Dilemma

Each of these specialists had a reason sufficiently compelling on its own to warrant rejecting E off record. But examining each piece of evidence separately, there was no consensus that any particular source of evidence was sufficient to reject E.[11] For they all had different reasons for drawing their unanimous conclusion. Whereas looking at the conclusion drawn by independent experts, the rejection of E was unanimous.

So depending upon how one aggregates the majority view – either by considering the unanimous concluding verdict that each expert proffered independently and off the record, or by considering the number of experts concluding a rejection of E based on each particular piece of evidence,[12] – one arrives at completely opposite views regarding the actual 'scientific consensus' regarding E. This inconsistency is an example of what Pettit and List call *the discursive dilemma*.

A second example of gross discrepancy between what gets counted as a decision based on scientific consensus, and what the individuals constituting that consensus actually decided independently can be identified clearly as an example of this *discursive dilemma* in the determination of policy based on knowledge produced in the global health arena (List 2012, List and Pettit 2002, 2004).

Consider the public outcry that arose in Ghana over the decision in May 2015 to commence with a Phase II clinical trial of an Ebola vaccine on a mass scale involving healthy subjects, as required before a vaccine is registered as safe and effective (Kummervold et al. 2017). Subsequently GlaxoSmithKline collaborating with the US National Institutes of Health withdrew their trial program from Ghana because they had gathered the requisite 30,000 samples to complete their mass experiment from other African countries (Ghana News 2015, World Health Organization 1995).

But events could have gone differently. Ebola posed no threat in Ghana, so suppose the government assembled a committee of three experts representing various stakeholder

[11] So the consensus could be taken as finding any piece of evidence on its own as sufficient for rejecting E. As indeed the Center for Biotechnical Information, the World Bank, The World Health Organisation, and Centers for Disease control Claim.
[12] These are called by List (2005), respectively, the conclusion-based approach *versus* the premise-based approach.

groups, to make a recommendation on V. For this second example, let V by the following policy decision:

> V: The Phase II clinical trials for an Ebola vaccine should be discontinued in Ghana, because the overall expected benefits do not outweigh the known risks involved.

The committee of three experts was mandated to arrive at their verdict based on two considerations: (i) whether a greater potential benefit would be gained over the available alternatives by continuing the vaccine trial, and (ii) whether the vaccine on trial was considered sufficiently safe. Only if both these conditions were met then only the vaccine should continue.

Discursive Dilemmas Unfold in International Institutions

One member of the committee was the Principal Investigator acting as proxy agent for the US NIH, the vaccine manufacturer that contracted him, and he knew the highly publicized call of an Ebola crisis was itself part of a global military force collaboration between China, the Royal Air Force and US Army, under the aegis of the U.N.'s W.H.O. foreign allies on the UN Security Council working on a top priority defence rehearsal of public protection in preparation for an anticipated future of bio terrorist warfare.[13] So he quite justifiably ticked both conditions as satisfied for continuing the trials.

The second committee member represented the independently concerned scientists who were familiar with the technical literature and the potential dangers of the vector method used.[14] Further the personnel selected to run the trials were insufficiently experienced in filo virus pathology because the local statutory protocols for approval of mass experimentation had been bypassed. So although generally in favour of the efficacy of immunisation as a preventative public health strategy, the second juror regarded the risk as too high and voted to discontinue the trial.

The third committee member represented the nursing students and public health civil servants recruited as subjects without statutory informed consent. They regarded the trial as safe enough but regarded the benefits of foreign investment in a vaccine as negligible compared to alternative allocation strategies to improve public health advancement, so her vote made the majority of 2 to 1 for discontinuation of the trial.

Yet the authorities managing the trial results were mandated by government to accommodate foreign diplomatic pressures. So by aggregating the committee's total votes on

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[13] (Elbe 2010, 2012). The entire Ebola alert, highly visible and relentlessly publicized through international media, was predicated upon the need to generate public knowledge that a "dangerous emergency" of epidemic proportions was immanent, to warrant experimenting with healthy humans in accordance with WHO Ethics Committee stipulations.

[14] The dangerous aspect is known as the chimpanzee adenovirus type 3 (ChAd3) whose safety in previously published studies had already been challenged, known to the local independent concerned scientists of the Ghana Academy of Arts and Sciences.

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each separate consideration taken independently – what social choice theorists call a premise based procedure for determining an overall verdict – there was no consideration that the majority of the committee that regarded the two criteria as unfulfilled, so there was no majority finding of a sufficient basis for discontinuing the trial. So from this standpoint the consensus of the committee favoured continuation of the vaccine trial.

This case of the committee making a policy decision about the clinical trials in Ghana is another clear-cut example of a group's consensus yielding contradictory views based upon how the individuals' judgments comprising that group are tabulated.

The Chaos of Consensus

In sum: I propose the application of these social choice theoretical results offers several advantages in explaining why abject falsehoods about African public health problems and solutions are consistently portrayed as the global scientific consensus.[15]

Firstly, the discursive dilemma demonstrates how the divergent demands pressuring medical researchers and practitioners focussed on chronic diseases and fatal immune deficiency in Africa so often yield counterproductive effects, based on claims and policies that those same researchers and practitioners repudiate outright off the record on the basis of their individual and direct experiences and expertise.

Secondly this approach suggests ways of reconstituting the 'scientific consensus' so that the experts selected to comprise that body might be genuinely independent in their judgments and biased towards truth about their subject matter; thereby fulfilling Christian List's suggested Arrowian preconditions to ensure that the epistemic advantage of a rational democratic procedure for aggregating a group's majority view is likely to exceed the procedure of following one authority's view or relying on an absolute consensus (List and Goodin 2001, List 2005).

The same point comes out differently by reflecting on the chaotic effects that emerged in these real life examples of building a scientific consensus to produce medical knowledge and policy advice intended to alleviate the imbalance of chronic diseases and short life expectancy burdening Africans, at the same time as ensuring pharmaceutical shareholders retrieve their investments, and military alliances prepare a new defence strategy in global warfare.

The impossibility theorem applied to this aggregate plan demonstrates that there is a limit to how many diverse interests can be equally weighted in aggregating a collective decision – abiding by the principles of best scientific practice, while meeting both the challenge of maintaining consistent reliability in maximally effective policy and interventions over time, as well as the challenge of providing maximally accurate judgments that are representative of facts on the ground.

[15] Other examples of this are climate change, genetic engineering, product safety decisions.

Thirdly, I mention consequences of these applications that may matter most to this audience. The global community of medical research and practice has all the properties of an integrated collective as Philip Pettit describes it (2003, "Groups with minds of their own"). The discursive dilemma framework as he has heuristically displayed for years, illuminates stochastic features of such integrated collectivities.

But the paradoxes and dilemmas illuminated are the results of institutional aggregative *acts* or *practices* – there seems no basis here for invoking an individuated ontological category or kind in order to account for the diametric opposition that can occur between the overall group consensus as it can be aggregated, and the individual judgments that comprise the final calculation – even when those individual judgments unanimously oppose the aggregated consensus overall. If you were looking at the mean average, the mode and the median of the income of individuals constituting the global health arena – you would get wildly different values.

It would seem an absurd theoretical deflection to conclude that there must be distinct institutional persons to which the contrary results of these distinct ways of computing income belong. It would deflect attention from the fact that some of these ways of computing income are profoundly misleading. Focus on special ontological kinds would clearly constitute a theoretical deflection from a gross disparity in the distribution of working conditions and remuneration between researchers, directors, lab technicians, doctors around the world.

The details of these examples may obviate the need for postulating a scientific group subject or agency existing in a way that does not wholly translate into the power relational dynamics between its constitutive members, both individuals and sub-groups. These applications of the discursive dilemma provide a response to Philip Pettit's (2003) challenge to find a reason "why we should deny that the collective is an intentional entity in its own right." [Groups with minds of their own, 2003, p. 181].

Fourthly the relentless detail of these examples throws into relief the degree of chaotic inconsistency characteristic of the relation between coordination efforts of the various members and sub communities of large scale scientific networks and the overall aims, goals and plans attributable to large scale institutional conglomerates responsible for producing the discourse and practices endorsed by the scientific consensus.

The question arises: how is it that the information richly available from local experts 'on the ground' fails to generate upward to the large authoritative decision making bodies who generate the scientific consensus that monopolizes and directs the use of resources worldwide. For this it is useful to recognise the difference between *factive* expertise and *canonical* expertise. But that is the focus of a complementary analysis.[16]

[16] See chapter 12, "The importance of an African social epistemology to improve public health and increase life expectancy in Africa," in *Method, Substance, and the Future of African Philosophy*. Ed. Edwin Etieyibo, Palgrave|Macmillan (2018) pp. 229-250.

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