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Contents

Guest Editorial

Having enjoyed some years of reading The Reasoner, I am excited to have the honour of editing this issue. The topic of this month is "reasoning on data". Using data in science is, of course, a very old practice, but recent scientific debates on big data and data-centric research have invigorated interest in the use of data in specific scientific disciplines. As part of this wider debate, philosophical discussions are now focused on what counts as data, what we mean with the expression 'data-intensive science' and what the ethical dimensions of this approach are.

In order to better understand the philosophical significance of this debate, I have interviewed Sabina Leonelli, one of the prominent philosophers working on the philosophy, history and sociology of data-intensive science. This is not the first time Sabina has been interviewed for the Reasoner. In 2013, she discussed her views about the active engagement of philosophy with scientific practice, and the need for diverse approaches in philosophy of science. Over the last five years, she has continued to put her views into practice by successfully conducting several interesting research projects on Open Data and Data-Intensive Science. I will now move on to let Sabina say something more about her work in her own way.

Virginia Ghiara
University of Kent

Features

Interview with Sabina Leonelli

Virginia Ghiara First of all, thanks for accepting to be interviewed again for the Reasoner! Five years ago, when you were interviewed for the first time for the Reasoner, you were about to start your ERC project on the Epistemology of Data-Intensive Science. On that occasion, you expressed an optimistic view about the relationship between philosophers and scientists. Now that the project is in its fourth year, would you like to tell us if you are still of the same opinion?

Sabina Leonelli Certainly, my experience within the project has been so far very positive. I have collaborated with several different research groups, actually more than what I had initially thought. The aim of the project is to document how the same datasets can be disseminated and used by a variety of different groups, as a consequence, we have ended up intersecting with very complex data infrastructure, a lot of data users and many data producers. We have developed collaborative relationships with most of the research groups: researchers are often very interested in our philosophical investigation, and as a result we have often had further collaborations. Typically, the comments tend to be that is very useful to have philosophers and social scientists involved from the very beginning, so that they can problematize and think through the assumptions and the design underpinning a project.

VG The ERC project on the Epistemology of Data-Intensive Science is just one of the projects you have worked on over the last few years. We could also mention the GYA Project 'Open Science/Global Access to Research Software', the Leverhulme Trust Project 'Beyond the Digital Divide', and the MEDMI project 'Tracing Data Journeys Across Climate, Environment and Human Health: A Qualitative Study of the Medical and Environmental Data Mash-Up Infrastructure'. How are they interrelated?

SL While conducting the ERC project on the Epistemology of Data-Intensive Science we began to get more and more involved in specific projects that, within the ERC project, are used as case studies. Very often these projects have taken on a life of their own and have resulted in further direct collaborations with the scientists involved in them. For instance, in the MEDMI project we worked directly with a group of scientists who were trying to assemble environmental, biomedical and biological data: we helped them to track how data travel across infrastructures, how they are eventually used, and how exactly their solutions worked. Other projects used as case studies within the ERC project led me to be part of some new projects concerning the social and ethical conditions under which data can be reused. Our focus was not only on situations characterized by very high-resourced research environments, but also on research conditions in low-resourced settings. In this case, I ended up arguing that there are very good reasons why researchers who are in diverse research environments may find difficult to share their data or to participate in an open science research culture. This is partly because working with big data often requires very substantial access to infrastructures, financial resources and skills that are not always available to everybody. Overall, what all these projects share is a common approach based on the combination of philosophical tools of analysis with very detailed historical and social scientific studies of the conditions under which data get to travel, and people start to trust that their data provide knowledge.

VG In your paper "Sticks and carrots: encouraging open science at its source", you recognized that a widespread uptake of open science would require a change in research culture. What do you think is the current situation?

SL I have done a lot of work on open science as a result of being interested in data. One assumption often made when dealing with big data is that, in big data collections, you have access to all sorts of data. In fact, however, what I kept finding is that the collections of data available to research infrastructures, at least in biology and biomedicine, are very partial and limited compared to the mass of data that researchers are generating. This is due to many causes, but one important reason has to do with how data are valued within a research enterprise and what the functions of data are meant to be. For a long time, data have been considered purely functional to the production of acceptable evidence-based claims. In this sense, the claim is considered the most important thing, and the huge amount of data generated to underpin such a claim is considered secondary to that. Furthermore, it has turned out that making data accessible, sharable and reusable by people who have not necessarily generated them requires an enormous amount of labour. How to do this, is everything but obvious: it requires a lot of curations, a lot of infrastructures, as well as a lot of thinking about the potential reuses of data. As a consequence, we are in a situation where very few data are actually shared openly, and typically these data are generated in very high-resourced environments. These considerations are also relevant to the philosophy of science. Not only we could discuss the fact that many philosophers are interested in making their written works widely available, but my impression is that there are also several philosophers of biology who use a lot of information taken out of interactions with scientists and scientific publications as evidence for some of their arguments. I think it would be very interesting to answer questions such as "what would it mean to have an open science culture in philosophy around this particular use of evidence?", and "what would it mean for philosophers to think about the data they are using?".

VG Thank you Sabina, these are very interesting questions! What we have discussed so far seems to be relevant not only inside "the ivory tower", but also in relation to science policy and governance. What contribution could philosophy make in these terms?

SL On the theoretical sides, the argument I keep making is that the idea that certain parts of the world are to be seen as a model of scientific research is very wrong. Scientific research is conducted for multiple purposes, in a lot of different settings, in many different ways. While for certain kinds of genomics and molecular analysis, for instance, it is very important to have access to the latest tools that allow researchers to do sequencing; for other types of research, whether it is in plant science or in physiology, what is relevant is to have reliable information about the environment, or to have exposure to particular locations. On the one hand philosophers can help to understand what it means to do good science, on the other hand, they can point out that such a plurality of research cultures should be more valued. As for the practical side, I think philosophers can have an important impact. Actually, I myself have been more and more involved in policy, and this year I ended up drafting two reports for the European Commission on the incentives and rewards to engage in open science activities. A case that struck me is the role that research metrics, such as impact factors, play in the dissemination of data within the research system. As a philosopher of science, I was well-placed to contribute to the discussion on how to shift the assessment system in order to take into account the factors such as the efforts made by individuals or groups towards data collection, and international networking or public engagement. Furthermore, I got also involved increasingly in the ethics and fairness of sharing data. This kind of investigation came out from a collaboration with colleagues in the biomedical sciences, where we have investigated several situations in which researchers tried to bring together data from the social sphere, data generated by contributors who are not professional scientists (such as data from social media) and information coming from biological and environmental research. Understanding the epistemic structure of these integration efforts requires taking account of some problems about data privacy: for instance, it is particularly problematic that many companies involved in gathering big data reside in the United States, where there is almost no protection for personal data. Even more problematic is the role of communities in this framework. A lot of time we are not just talking about one individual whose data are unfairly shared: the very reuse of big data, which may be partial and contain bias, could adversely affect local communities or specific groups in society, that might be hence unfairly represented. This is of course not a new problem, but since many big data algorithms are private, it is now very difficult to detect a bias in data dissemination and reuse. This policy and ethical aspects might sound quite far from thinking about the epistemology of data reuse, but I see them as absolutely interrelated. For instance, if a person has to interpret a legal framework such as the General Data Protection Regulation (GDPR), one of the first questions she has to answer is what constitutes data reuse. At which point, in other words, should someone admit that data are used for a new purpose? I am convinced that part of the job of philosophers of science interested in data is to use the knowledge we have about the research process and the conditions under which data become evidence to inform decisions that have huge ethical, legal and political implications.

News

Calls for Papers

Probabilistic Logic Programming: special issue of *International Journal of Approximate Reasoning*, deadline 7 March.
Decision Theory and the Future of Artificial Intelligence: special issue of *Synthese*, deadline 31 March.
E. W. Beth Dissertation Prize, 2018: awarded by the Association for Logic, Language, and Information to the best dissertation which resulted in a Ph.D. degree awarded in 2017, deadline 23 April.
Non-Classical Modal and Predicate Logics: special issue of *Logic Journal of the IGPL*, deadline 30 April.
Pluralistic Perspectives on Logic: special issue of *Synthese*, deadline 1 June.

What's Hot in . . .

(Formal) Argumentation Theory

I was, as one does, surfing youtube the other day, and alighted on an interview with the venerable Noam Chomsky. He was bemoaning the use of rhetoric and persuasion in discourse and debate. And he does of course have a point: in an ideal world, where the 'ideal' is to get to the truth of the matter or to arrive at the best decision, the use of persuasive strategies may lead us astray. Indeed, it strikes me that the emphasis on formalising computational models of persuasion dialogues is misplaced, and that far greater effort should be devoted to the study and formalisation of what is referred to as 'information seeking' or 'enquiry' dialogues.

You may recall that previous columns have described how computational models of argumentation have been developed for formalising distributed reasoning amongst multiple agents engaging in dialogue. The essential idea is that the outcome of a dialogue identifies decision options or beliefs that are entailed from the contents of the locutions that agents exchange. However, a primary focus of research on computational models of dialogue has been in developing models of persuasion, which eschew the normative goal of ensuring that a dialogue yields the rationally best belief or decision option that is entailed by the information at hand (i.e., the participating agents' beliefs). Hence, for example, agents in such dialogues are referred to as 'proponent' and 'opponent', and a dialogue may be considered to have terminated in favour of a proponent, if an opponent concedes the proposition put forth by the proponent, irrespective of whether the information exchanged does not in fact entail the proposition. It is of course useful to have formal *descriptive* models of dialogue, but I would suggest redressing the balance in favour of *normative* models that serve the rationally best outcome, rather than the intentions of agents to persuade and resist being persuaded. This would then have implications on the kinds of locutions licensed by protocols developed for such dialogues. For example, persuasion dialogues typically prohibit an agent from explicitly contradicting a proposition they may have earlier asserted, whereas a truly disinterested agent seeking only to get to the truth of the matter may of course subsequently revise their previous assertions.

Another implication would be to differentiate the uses of what is tellingly referred to by researchers in argumentation as 'opponent modelling'; that is, an agent's modelling of an interlocutor's beliefs and the strategic use of this model in deciding what locutions to put forward in a dialogue. In persuasion contexts, such strategic uses may indeed affect the outcome of a dialogue. For example, an agent may favour submitting one from amongst a choice of two distinct arguments in support of a claim, given that she anticipates (based on her opponent model) that her interlocutor can use the supporting reasons in the dis-preferred argument to construct an argument that is then used to challenge her. However, this would be an issue only in persuasion dialogues, in which the agent wishes to avoid being challenged, irrespective of whether the combined beliefs of the interlocutors do indeed rationally warrant such a challenge. In what one might generically refer to as 'truth seeking' dialogues, one would want all the information to be brought to bear, and withholding information based on one's modelling of an interlocutor's belief state would be contrary to the truth seeking goal of the dialogue.

Sanjay Modgil
Informatics, King's College London

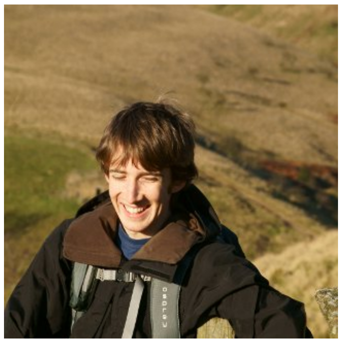
Medieval Reasoning

From the 2nd to the 4th of March, the University of California Los Angeles will be hosting the yearly Moody Workshop in Medieval Philosophy. This meeting is named after Earnest Addison Moody, a former member of the Philosophy Department and a founding member of the UCLA Centre for Medieval and Renaissance Studies – which are jointly sponsoring the event.

Professor Moody was one of the the pioneers of Medieval Philosophy in North America and one of the first scholars to approach the study of medieval philosophical theories in their own right, without subordinating them to theological views. But for those who have even a passing interest in the history of logic, E. A. Moody is first and foremost the author of *Truth and Consequence in Medieval Logic* (19531), one of the most influential volumes in the historiography of medieval logic and of medieval philosophy as a whole. A Williams College graduate (class 1924), E. A. Moody obtained his PhD from Columbia in 1936, with a thesis on William of Auvergne's *Treatise De anima*. While teaching at Columbia, he developed an interest in the history of medieval logic and science. Having retired for a few years to a ranch in Texas, in 1958 he joined the Department of Philosophy at UCLA; there he found a department not only already traditionally strong in logic and language but that was undergoing further changes toward that direction as well – in other words, the perfect fit for Moody's own research interests. Above all, those research interest left a significant imprint on the way we look at medieval philosophy in general and at the history of medieval logic in particular, especially in North America. Since the 19th century, the history of the study of medieval philosophy had been almost entirely shaped by quasi-nationalistic and quasi-theological concerns. Leo XIII's *Aeterni Patris* encyclical (1879), by restoring ”Christian Philosophy in Catholic Schools in the spirit of the Angelic Doctor, St. Thomas Aquinas”, was pivotal in determining a dominant picture of medieval philosophy that had both the kind of uniformity that scholars like Maurice De Wulf ascribed to terms like ”scholasticism” and Aquinas as the central figure. True enough, this picture of medieval philosophy as fundamentally homogenous began to break down when Étienne Gilson and others started to realise that it couldn't manage to account for roughly a thousand years of philosophical speculations. But even so, after *Aeterni Patris* typically there was still an idea that medieval philosophy had seemingly emerged out of the wreckage of the Roman Empire, grown slowly to a peak with Aquinas, and then began to decay – Gilson, for example, thought that the decay culminated in Descartes. Various people had slightly different pictures, but it was always as a curve and Aquinas was typically at its peak. Now, Moody had a different agenda and a different set of thoughts: he pursued his interests in medieval logic, language and science in connection to the contemporary discussions in logic and language – an whatever Aquinas was up to, an emphasis on logic and language wasn't really that. This pushed Moody's interests later, well into the 14th century, and had the consequence that the people who where interested in what Moody was interested in started to look more closely and seriously at the later middle ages, finding in 14th century philosophy a veritable goldmine, while it simultaneously became a common practice to develop those interests in the history of science, logic and language in connection with analogous contemporary endeavours. That ultimately set the tone for Medieval Philosophy on this side of the Pond. E. A. Moody remained at UCLA until his retirement in 1969 and in 1972 was succeeded by Marilyn McCord Adams. Even if McCord Adams later on became much more interested in philosophical theology, when she was at UCLA her major work was on Ockham – and it wasn't really a theological work at all, rather it focused on Ockham's logic. Overall, what Moody's influence in North America amounted to was creating a climate in which Medieval Philosophy could be moved out of theology and toward philosophical issues relevant for contemporary discussions; from that kind of point of view, the 14th century was one of the most interesting things one could study, and in many ways, still is. Nobody else among the major figures who were doing medieval philosophy in Moody's generation had anything like that on their agenda or achieved similar results. The Moody Workshop was instituted by Calvin Normore, when he took over the mantle of Medieval Philosophy at UCLA in 1998. The first speaker in the first Moody Workshop was Martin Tweedale, Moody's last student at UCLA. Since then a small group of scholars meets every year to discuss a particular topic in medieval philosophy, usually among those that would have met Moody's interest. This year's meeting, on *William of Ockham and his Milieu*, is dedicated to the memory of Marilyn McCord Adams. If you happen to be around, come and join us!

Graziana Ciola
UCLA

Uncertain Reasoning



The successful applicants to the 2017 call of the ERC's Marie Skłodowska-Curie Individual Fellowship scheme were announced recently, and I was among them. I don't want to write today about my success or how wonderful my project is, but rather more generally about the unacknowledged incidental benefits of grant writing.

The core of my grant proposal was one I wrote about four years ago for a different (unsuccessful) grant application (it has been rewritten and retooled for different grant schemes a number of times...). I knew I wanted to write something on imprecise probabilities as a model of uncertain reasoning, but that was about it. I actually really enjoyed the initial stages of the grant writing process: working out the overarching themes that would tie together several years of work. Finding a logical way to compartmentalise this grand project into easily digestible “work packages” and “deliverables”. (OK, the grant proposal newspeak annoyed me, but the actual process of carving an intellectual endeavour at its joints was fun).

As part of this grant writing process, I developed a sort of taxonomy of kinds of projects one could do under the umbrella of “uncertain reasoning”. I guess most of this will be obvious to most people, but I think it's sometimes worth being explicit about this implicit knowledge. One important distinction is between “purely epistemic” projects and those that relate to decision making. Another distinction that crosscuts this is that between projects that focus on what's happening at a time, and those where we consider the same agent at different times. (Some people think that there are no rational constraints on agents over time; see Hedden “Time-slice Rationality”, Mind 2015) We can call these “synchronic” and “diachronic”, respectively. Some projects focus on an agent whose epistemic state stays the same, while others are particularly interested in change in epistemic state. It might seem that this goes hand in hand with diachronic examples, but not always: some diachronic decision scenarios don’t involve change in belief, and some synchronic projects are interested in change (for example, consider topics like supposing or counterfactual reasoning). Change in belief often involves change in evidence, but not always: consider framing effects, or forgetting. (On the latter, see Titelbaum “Quitting Certainties”, OUP 2013). This, then, is a rough sketch of the terrain of what one might study in “uncertain reasoning”, and it’s one informed by my own interests and disciplinary biases. I’d be interested to hear what others think about this.

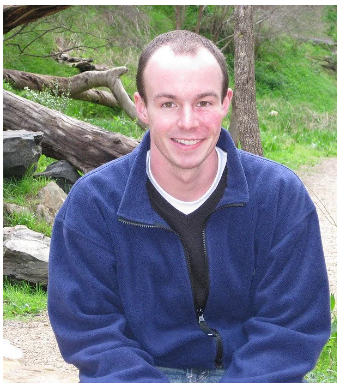
(I’ll be moving jobs soon, so rather than give an email address that might be defunct in six months, get in touch on twitter: @scmbradley).

It’s not something I would have otherwise done, and so I think that even unsuccessful grant applications have benefits: they give you an opportunity to think in a “big picture” way that you perhaps don’t often get to do when you’re at the coalface of research. Writing the grant proposal also prompted an idea that has grown into a completely new paper that I wouldn’t otherwise have written, but that’s a topic for another column.

Seamus Bradley
Philosophy, University of Tilburg

Mathematical Philosophy

Bertrand Russell’s *Introduction to Mathematical Philosophy*, written in 1919, was an informal text on some central ideas in the philosophy of mathematics. Nearly a century later, mathematical philosophy is now a leading methodological approach used to explore problems in every branch of philosophy. There are, of course, some areas where these two conceptions of mathematical philosophy overlap.



One particular area of the philosophy of mathematics that deploys mathematical methods is in the structuralist approach to mathematics. Structuralism in the philosophy of mathematics is the view that mathematical theories describe abstract structures and the structural properties of their objects. According to structuralists, mathematics isn’t interested in individual mathematical objects, like numbers, points, vertices, or sets, considered in isolation. Mathematics is primarily concerned with the structures that mathematical objects exhibit, like the field of real numbers, the Euclidean plane, the Petersen graph, and the cumulative hierarchy of sets. From the structuralist perspective, mathematical objects are simply empty positions in these larger structures.

Some approaches to mathematical structuralism appeal to the idea that structures are given to us by way of abstraction on ‘concrete’ mathematical systems. For example, from any omega-sequence, one can abstract the natural number structure. From any complete ordered field, one can abstract the real number structure. And so on.

The abstractionist approach has a long history in modern mathematics and is expressed in the work of some pioneers of the structuralist perspective (see in particular Richard Dedekind’s *Was sind und was sollen die Zahlen?*). Contemporary approaches to abstraction-based structuralism apply more formal, mathematical methods to understand the notions of structure, abstraction, and structural property (see Linnebo, Ø. and Pettigrew, R. 2014. ‘Two types of abstraction for structuralism’, *The Philosophical Quarterly*, 64: 267-283; Schiemer, G. and Wigglesworth, J. 2018. ‘The Structuralist Thesis Reconsidered’, *The British Journal for the Philosophy of Science*, Advance Access, DOI: 10.1093/bjps/axy004).

The basic idea is to apply Fregean abstraction principles to systems of objects in order to obtain the pure abstract structures of those systems. Fregean abstraction principles introduce identity conditions for certain types of objects by appealing to equivalence relations on other types of objects. For example, Frege uses an abstraction principle to give identity conditions for the directions of lines: the direction of line a is identical to the direction of line b if and only if a is parallel to b (Frege, G. 1968. *The Foundations of Arithmetic*, trans. by J. L. Austin, Basil Blackwell).

Applying this idea to systems of objects, one can formally represent a system $S = \langle D_S, R_1, ..., R_n \rangle$ as an ordered tuple comprising a domain of objects and distinguished or primitive relations on the domain. One then introduces a Fregean abstraction principle to deliver identity conditions for the abstract structure $[S]$ of S in terms of the familiar notion of isomorphism:

$$[S] = [S'] \iff S \cong S'$$

Isomorphic systems exhibit the same pure abstract structure. So far, we have a straightforward, familiar, mathematical representation of systems as ordered tuples. One would also like to capture the idea of structural abstraction in a formal representation as well. A natural way to do this is to embed the abstraction apparatus in the formal framework of Kripke models, familiar from the semantics for modal logic.

A Kripke model is a quadruple $\mathcal{M} = \langle D, W, \sim, v \rangle$, where D is a domain of quantification, W is a set of worlds, $\sim$ is a binary accessibility relation on W, and v is an interpretation function. Given a particular Kripke model $\mathcal{M}$, each $w \in W$ can represent a relational system $S = \langle D_S, R_1, ..., R_n \rangle$, and the accessibility relation $\sim$ holds between two systems if and only if the systems are isomorphic.

The formal framework provided by representing systems as worlds in a Kripke model provides insight into the nature of mathematical abstraction. The abstraction process takes one from a single system S to the system’s pure structure $[S]$. The process can be generalized to apply to a collection of systems $S_1, S_2, ...$, by which we arrive at the collection of pure structures $[S_1], [S_2], ...$. One way to understand abstraction is as a ‘dynamic’ process that begins with a collection of systems and extends this collection by adding all of the pure structures of the original systems (see, e.g., Linnebo, Ø. 2018. *Thin Objects: An Abstractionist Account*, Oxford University Press). According to this dynamic process, one moves from an initial collection of systems to a new, extended collection that also includes a pure structure for each system in the original collection.

One of the benefits of the Kripke model framework is that it can easily capture dynamic structural abstraction through the standard operation of Kripke model extension. A structural abstraction principle, if understood as a dynamic abstraction principle, induces the extension of a Kripke model $\mathcal{M}$ to a model $\mathcal{M}' = \langle D', W', \sim', v' \rangle$, with $D \subseteq D', W \subseteq W', \sim \subseteq \sim'$, and $v \subseteq v'$. Intuitively, extending a Kripke model involves extending W to include a pure structure for each system in the original domain of worlds, and extending the universal domain of quantification D to include the pure positions of those structures.

The framework also offers clarification into the particular kind of properties that structuralists are interested in, the so-called structural properties of mathematical objects. A natural account of structural properties takes them to be those properties that are invariant under isomorphic transformations (see Korbmacher, J. and Schiemer, G. 2017. 'What are structural properties?', *Philosophia Mathematica*, Advance Access, DOI: 10.1093/philmat/nkx011). The Kripke model framework allows properties to be understood intensionally, as maps from relational systems to local extensions. Intensional properties are well-suited to the structuralist approach, as they can be instantiated by matching objects in different, isomorphic systems. This intensional account of properties essentially agrees with David Lewis's possible worlds approach, where possible worlds are replaced with mathematical systems (Lewis, D. 1986. *On the Plurality of Worlds*, Basil Blackwell).

Formal and mathematical tools, therefore, provide insight into a range of ideas that arise in the structuralist approach to the philosophy of mathematics. They allow for a well-defined notion of a mathematical system, which can be embedded into the formal framework of Kripke models in order to precisely capture the informal idea of mathematical abstraction. With this framework in hand, one can intuitively capture the notion of a structural property, a notion that is arguably at the heart of the structuralist approach.

Acknowledgements: This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 715222).

JOHN WIGGLESWORTH
University of Vienna

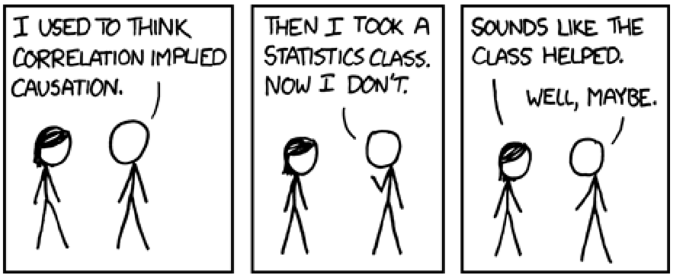
Evidence-Based Medicine

Flu season in the Northern Hemisphere is coming to an end, and this year's has been a particularly challenging one. Known as "Aussie Flu" (the strain causing the worse cases of this outbreak wreaked havoc in Australia last year), the season has seen a four-fold increase in visits to GPs in the UK. We cannot start to blame an entire country just yet for our misfortune, as it is not quite clear why the outbreak is so severe. Could we have curtailed the outbreak? One easy target for critics of public health responses to flu epidemics is the flu vaccine. One meta-analysis of studies that investigated the effectiveness of Flu vaccines over a 44 year period found that vaccines provide only moderate protection, with evidence lacking for efficacy in populations over 65-years old. Evidence was lacking because the reviewers only took randomised controlled trial (RCT) evidence as of sufficient quality to draw conclusions from, an approach that reduced the size of the population included in the review. Results such as these have been taken to show that the flu vaccine is not effective enough to warrant the widespread implentation of vaccination programmes every year, but this conclusion would be hastily drawn on the basis of such evidence, as it ignores the particularities of year-by-year production of vaccines. The same study found that in some years the effectiveness could be as high as 90%. Anyone with a little knowledge of virology would know why this is the case.

Vaccines work by readying the host's own immune system to recognise proteins called antigens on the surface of a virus so as to enable a quicker response to invasion than if left up to the host natural responses. Each different strain of a virus will have different antigens and so the vaccine must be made to be specific to that strain. Each Flu strain is identified by the version of Haemagluttinin (H) or Neuroaminidase (N) protein it has on it's surface, hence the familiar description of a yearly flu virus as H1N1, H2N2, H3N2 etc. Each year, the World Health Organisation's (WHO) Global Influenza Surveillance and Response System (GISRS) monitors what strains are prevalent in outbreaks around the world, before advising industry on what it predicts the dominant strain will be in a particular region. Due to the time constraints, no RCT could possibly be carried out to test whether the strain put into mass production will work, and so the WHO has to rely on a synthesis of many forms of evidence to come to its prediction, combining a variety of epidemiological data and laboratory research. Making accurate predictions on the basis of such heterogenous evidence is difficult and on top of this, viruses are well known to rapidly mutate; unexpected mutations in the H & N antigens causing increases in virulence may occur year to year. Both of these reasons may go some way to explaining the ineffectiveness of the vaccine in certain years. This year chicken eggs have been suggested as the problem. Vaccines are incubated in chicken eggs during the production process, but the H3N2 strain that is "Aussie Flu" is difficult to grow in chicken eggs compared to other strains. Considering these difficulties, should we get rid of widespread vaccination programs? Given the effectiveness in years in which strains are predicted well, it seems like an improvement in evidence synthesis and prediction practices, as well is in production could be more reasonable suggestions.

With all that said, even with year round monitoring, perfect predictions and incubation methods, viruses still mutate so rapidly that sometimes large enough jumps in evolution occur that pandemics are hard to avoid. It is 100 years since Spanish Flu killed an estimated 50 million people globally. Convential wisdom says that the Spanish Flu was devastating because of poor living conditions during and following WW1. However, sequencing of the Spanish Flu genome has shown how its antigenic configuration (H1N1) was actually an evolution of a new type of H, and so a new strain of virus entirely. H is the protein that allows the virus to get into the host's cells in the first place, and so it is hypothesised that humans just did not have a chance against a strain of the virus that had unprecedented ability to invade us. Interestingly, each subsequent major pandemic of the 20th Century was a genetic descendent of H1N1 and involved the development of a new strain of *H*, e.g. H2 in 1957, and H3 in 1968. There are 16 strains of H known, but not all have the ability to cross over into humans and remain a problem mainly for bird or pig populations. However, the recent concern over "Bird Flu" is because of the new type of *H* antigen (H5) that this viral strain has. H5N1 is not easily transmissible between humans yet, but the way in which the major pandemics of the 20th Century proceeded gives those in charge of stopping a new pandemic cause of concern. It is not all dystopian vision however, as the WHO is constantly monitoring the spread of the H5N1 virus, sequencing the mutations that happen year by year, checking for ability to cross into and be transferred between humans. This concerted effort to bring together vast quantities of data from around the world and synthesise it to make accuate predictions is hopefullly keeping the centenary of Spanish Flu a remembrance rather than a warning of times to come.

Daniel Auker-Howlett
Philosophy, University of Kent



Events

March

QPiPaL: Questioning Propositionalism in Philosophy and Linguistics, Birkbeck, University of London, 12 March.
PoML: Philosophy of Machine Learning: Knowledge and Causality, University of California, Irvine, 17–18 March.
RUaR: Relations, Unity, and Regress, University of Birmingham, 26–27 March.
BaCo: BAYESCOMP, Barcelona, Spain, 26–28 March.

April

JT: Just Theorising: Working Towards Responsible Methodologies, University of Sheffield, 9–10 April.
MotM: Models of the Mind: Reasoning About Oneself and About Others, University of Edinburgh, 19 April.

May

PMII: Perception, Mental Imagery and Inference, Ruhr University, Bochum, 14–15 May.
KBE: Knowledge, Belief, Evidence, University of Oxford, 21–23 May.
E&U: Explanation and Understanding, Ghent University, 23–25 May.

Courses and Programmes

Courses

LUCG: Logic, uncertainty and games, Como, 9–13 July.
SIPTA: 8th School on Imprecise Probabilities, Oviedo, 24–28 July.

Programmes

APhil: MA/PhD in Analytic Philosophy, University of Barcelona.
Master Programme: MA in Pure and Applied Logic, University of Barcelona.
Doctoral Programme in Philosophy: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.
Doctoral Programme in Philosophy: Department of Philosophy, University of Milan, Italy.
LogiCS: Joint doctoral program on Logical Methods in Computer Science, TU Wien, TU Graz, and JKU Linz, Austria.
HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.
Master Programme: in Statistics, University College Dublin.
LoPhiSC: Master in Logic, Philosophy of Science and Epistemology, Pantheon-Sorbonne University (Paris 1) and Paris-Sorbonne University (Paris 4).
Master Programme: in Artificial Intelligence, Radboud University Nijmegen, the Netherlands.
Master Programme: Philosophy and Economics, Institute of Philosophy, University of Bayreuth.
MA in Cognitive Science: School of Politics, International Studies and Philosophy, Queen's University Belfast.
MA in Logic and the Philosophy of Mathematics: Department of Philosophy, University of Bristol.
MA Programmes: in Philosophy of Science, University of Leeds.
MA in Logic and Philosophy of Science: Faculty of Philosophy, Philosophy of Science and Study of Religion, LMU Munich.
MA in Logic and Theory of Science: Department of Logic of the Eotvos Lorand University, Budapest, Hungary.
MA in Metaphysics, Language, and Mind: Department of Philosophy, University of Liverpool.
MA in Mind, Brain and Learning: Westminster Institute of Education, Oxford Brookes University.
MA in Philosophy: by research, Tilburg University.
MA in Philosophy, Science and Society: TiLPS, Tilburg University.
MA in Philosophy of Biological and Cognitive Sciences: Department of Philosophy, University of Bristol.
MA in Rhetoric: School of Journalism, Media and Communication, University of Central Lancashire.
MA programmes: in Philosophy of Language and Linguistics, and Philosophy of Mind and Psychology, University of Birmingham.
MRes in Methods and Practices of Philosophical Research: Northern Institute of Philosophy, University of Aberdeen.
MSc in Applied Statistics: Department of Economics, Mathematics and Statistics, Birkbeck, University of London.
MSc in Applied Statistics and Datamining: School of Mathematics and Statistics, University of St Andrews.

MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

MA in Reasoning
A programme at the University of Kent, Canterbury, UK. Gain the philosophical background required for a PhD in this area. Optional modules available from Psychology, Computing, Statistics, Social Policy, Law, Biosciences and History.

MSc in Cognitive & Decision Sciences: Psychology, University College London.
MSc in Cognitive Systems: Language, Learning, and Reasoning, University of Potsdam.
MSc in Cognitive Science: University of Osnabrück, Germany.
MSc in Cognitive Psychology/Neuropsychology: School of Psychology, University of Kent.
MSc in Logic: Institute for Logic, Language and Computation, University of Amsterdam.
MSc in Mind, Language & Embodied Cognition: School of Philosophy, Psychology and Language Sciences, University of Edinburgh.
MSc in Philosophy of Science, Technology and Society: University of Twente, The Netherlands.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country (Donostia San Sebastián).
Open Mind: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.
Research Master in Philosophy and Economics: Erasmus University Rotterdam, The Netherlands.

Jobs and Studentships

Jobs

Lecturer: in Statistics, University of Wollongong, deadline 12 March.
Research Fellow: in Evidence Synthesis, University of Bristol, deadline 15 March.
Tenure Track position for women: in Logic and Computation, University of Amsterdam, deadline 19 March.
Post-doc: in Data Science, University of Bristol, deadline 25 March.
Post-doc: in Philosophy of Science, Ludwig Maximilian University of Munich, deadline 15 April.

Studentships

PhD position: in Computational Statistics, Delft University of Technology, deadline 1 May.
PhD position: in philosophy of science/ epistemology / philosophy of mind/cognitive science, Tilburg University, deadline 15 May.
3 PhD positions: in ethics of science/philosophy of science, two at Leibniz Universität Hannover, one at Bielefeld University, deadline 20 May.