THE REASONER

CONTENTS

EDITORIAL

I'm very pleased to introduce Marcello D'Agostino to the readers of *The Reasoner*. Marcello is a logician with a background in philosophy and computer science and has recently joined the Philosophy Department at the University of Milan as Professor of Logic. He was previously at the University of Ferrara, where he had been Professor in the Department of Economics and Management, and in the Department of Philosophy. Before that he was Research Fellow in Computer Science at Imperial College London.

Marcello's early contributions relate proof-theory and complexity and include "The Taming of the Cut. Classical Refutations with Analytic Cut" which he wrote in collaboration with M. Mondadori. Published in the *Journal of Logic Computation* in 1994, this paper has been—and still is–very influential in the wider field of computational logic. He then worked on a variety of topics, from the philosophy of information to the foundations of uncertain reasoning and economic theory. In addition to his research, Marcello has a passionate interest in the workings of academia, which he has put to practice in several high-profile administrative appointments, and in his service as member of the steering committee of the Italian Association for Logic and its Applications (AILA). I would like to take this opportunity to thank him warmly, not only for his time and patience during the interview, but also for agreeing to cut out some interesting aspects of his research in order to give space to his views on academic practices.

FEATURES

Interview with Marcello D'Agostino

Hykel Hosni: You started as a philosophy undergraduate in Palermo and ended up with a PhD from the Oxford Computing Laboratory. You crossed borders and academic fields well ahead of the rise of low-cost flights and interdisciplinary hype. . .

Marcello D'Agostino: Logic is, by its own nature, an interdisciplinary subject. At the time—we were in the mid 80's—it was gaining popularity in computing departments as a powerful tool for knowledge representation and problem solving in a variety of application areas. With these new developments a host of foundational questions became central, such as "what is a logical system?". Now this question is exquisitely philosophical: it doesn't lead to a precise and definitive answer, and yet, all genuine attempts to answer it

bear great heuristic value. Tackling questions like that brings about an advance in our understanding of old problems and sometimes opens up new avenues of research.

HH: I couldn't agree more! Logic hardly flourishes in academic silos.

MD: In general, crossing borders is quintessential to the game of science in its most creative stages. I tend to agree with the somewhat extreme view expressed by Karl Popper in his *Postscript to the Logic of Scientific Discovery*, where he writes that "there are no subject matters; no branches of learning—or, rather, of inquiry: there are only problems, and the urge to solve them. A science, such as botany or chemistry (or, say, physical chemistry, or electrochemistry) is, I contend, merely an administrative unit. University administrators have a difficult job anyway, and it is a great convenience to them to work on the assumption that there are some named subjects, with chairs attached to them to be filled by the experts in these subjects."

HH: I see. However many readers of The Reasoner will probably feel that this view is indeed a bit too extreme. For we can easily recognise a logic when we see one. . .

MD: What I mean is that there are different families of variously related methods for solving problems, and what we call 'logic' is one of those families. But any attempt to confine the multifarious activities that fall under this denomination into a stable definition is bound to fail. This, of course, has never been an obstacle to its development. The problem is that, while academics all over the world pay lip service to interdisciplinarity, most of them in fact believe that there are natural borders between disciplines, and are highly suspicious of 'borderline' research(ers).

HH: And yet you found your comfort zone precisely along those research borders. How about the geographical ones?

MD: The academic culture in my undergraduate studies was generally conservative and self-referential, but there were remarkable exceptions and I was lucky, towards the end of my first degree in philosophy, to meet one of them. A young and open-minded professor, Marco Mondadori, strongly encouraged me to apply for a PhD at Oxford and suggested that I try for the computing department. Marco, who died suddenly and prematurely in 1999, was extremely bright and full of charisma. He had an enormous influence on me from the scientific viewpoint and most of what I have achieved in my academic life stems from his teaching and from our long collaboration. He had realized that such a move would have contributed to widen my view of logic and, at the same time, to increase my chances of finding a good job. He was absolutely right on both points.

HH: Any recollections of your time as a PhD student?

MD: Perhaps the most vivid recollection is still my *viva* examination in which Angus MacIntyre and Wilfrid Hodges gave me a really hard time, much harder than I expected! In my thesis I was arguing against what I call the "cut-phobic" tradition, according to which a "respectable" analytic proof must be cut-free, and against the associated belief that Gentzen's cut-free sequent calculus provides an ideal proof-theoretical framework for the design of efficient automated proof procedures. Although my examiners liked the ideas I was putting forward, they really played the devil's advocates and raised a number of hard and deep questions which would provide me with a constant source of inspiration in the following years.

HH: Not quite a formality then.

MD: Far from it! The discussion was almost a fight—and an obviously uneven one! When it was all over, and the three of us went to the pub, I was more confident in my ideas than I had ever been before. But, at the same time, I also felt that I should work much harder to conform to the higher standards that my examiners had set upon me.

HH Then you moved to Imperial College London.

MD: The very day of my viva I received a phone call from Dov Gabbay who had read my thesis and decided to offer me a job in his group then at the Department of Computing at Imperial. It was 1991. I spent almost six years there.

HH: Those were exciting times for the 'logic and computation' field. . .

MD: Yes indeed! Dov was already a living legend in computer science circles. He was working on a number of projects surrounded by young and talented research assistants. Interestingly enough, however, he was also well-known in philosophical circles for his edition (with Franz Guenthner) of the *Handbook of Philosophical Logic*, a milestone for all philosophers with an interest in contemporary logic.

HH: Can you tell us more about Dov?

MD: Like the most creative scientists, Dov has always had a strong inclination for philosophy. Conversation with him was, and still is, an endless source of inspiration and, after over twenty-five years, our collaboration is still intellectually very stimulating. What I particularly like of Dov's attitude is that he never dismisses any idea, however bizarre it may seem at first sight. He always encourages people to turn it into something interesting and new. This is what happens with the most talented musicians: no sequence of notes is 'wrong' in itself, you just need to put it in the appropriate context and it will sound right. Sometimes, if your are lucky, it may even bring about important developments.

HH: Now to your current work. You and Luciano Floridi have recently started a 'Logic and Philosophy of Information' corner on the Journal of Logic and Computation. Can you tell us more about that?

MD: This brings me back to your first question. Luciano and I strongly believe that crossing borders is an essential part of the scientific game. While the existence of a fundamental relationship between logic and information seems unquestionable—with important applications in computational settings—the precise nature of this relationship has so far proved to be rather elusive, even somewhat puzzling.

HH: Relevant and elusive: again the typical ingredients of a deep philosophical question.

MD: Indeed. A philosophical investigation of the notion of information can be a goldmine of new problems for computational logic. This can shed new light on traditional topics whilst challenging well-established ideas.

HH: Can you give us an example?

MD: Sure. Take the received view on the relationship between logic and information as epitomized by the traditional tenet that logical inference is 'tautological' (literally, repetitive and trivial). In this picture a valid inference is one in which the information carried by the conclusion is (in a sense variously specified) 'contained' in the information carried by the premises. However—as remarked by a number of authors that have made the history of logic, including Frege, Dummett and Hintikka—this view clashes with the intuitive idea that deductive arguments are useful just because, by their means, we obtain information that we did not possess before.

HH: Isn't this what Hintikka referred to as the 'Scandal of deduction'?

MD: It is indeed. But the received view also clashes with the formal work showing that logic is computationally hard: most interesting logical systems are either undecidable or intractable. How can logical inference be at the same time informationally trivial and computationally hard?

HH: One can imagine that the informational view of logic has also been playing a substantial role in the development of non-classical logics. Is this right?

MD: An informational view of logic has been pivotal in non-classical logics at least since Kripke and Urquhart provided informational semantics for intuitionistic logic and relevant logics. It has been pursued by authors such as Barwise and Perry, Ono and Komori, Girard, Van Benthem, Wansing and many others. Furthermore, the connection between logic and information has been the subject of extensive research in epistemic logics. The field is vast.

HH: How do you see this JLC corner taking research on logic and information to the next stage?

MD: Essentially by building on the interdisciplinary field of philosophy of information. This area, which owes much to the seminal contributions given over the past decade by Luciano Floridi, is rapidly attracting a large community of researchers from a variety of disciplines. The number of international conferences and workshops which are being organised on this topic is quite impressive, so we thought that a high-profile publication venue would facilitate the advance of this exciting new field while promoting a fruitful interaction with the wider logical community.

HH: To conclude, much of your recent work focuses on Depth-bounded Reasoning. Can you tell us what it's all about?

MD: With great pleasure! Many artificial intelligence and applied computer science systems contain a key deductive component. However, logical deduction is inherently inefficient: standard logical systems model logically omniscient agents—able to correctly recognize all consequences of their beliefs or assumptions according to the system in use—but provide no sensible means to account for the cost of inferring them. In contrast, a single practical agent (whether human of artificial) using a given logic L cannot be expected to actually perform all the correct inferences of L, but only those that are within the reach of its limited resources.

HH: This sounds hard to capture with purely logical means.

MD: Of course it all depends on the logic you use. In the traditional framework of mathematical logic this question is very hard to formulate. And it is not yet in the repertoire of the more recent non-classical logics that now dwell in the fields of artificial intelligence and computer science. Of course there had been rather interesting suggestions and contribution in the literature. Those however tended to be rather isolated attempts which did not pin down the need for a new logical framework based on what we refer to as the Approximation Problem: can we define in a natural way a hierarchy of approximating logical systems that converge to a given logic L in such a way that these provide useful formal models of the deductive power of resource-bounded agents? In a series of papers published over the last ten years with several co-authors including Luciano Floridi, Dov Gabbay and Marcelo Finger, we gradually obtained what now looks like a robust formulation of Depth-bounded Boolean Logics.

HH: Can you tell us informally what's the main idea behind this?

MD: Think about the familiar sudoku puzzles found in newspapers (and up to a certain point, on *The Reasoner* as well). In general solving a sudoku is an NP-complete problem, hence equivalent to the satisfiability problem for propositional logic, which is most likely to be intractable. However sudokus can be ranked according to their degree of difficulty. The easiest ones can be solved by applying the 'single candidate principle': if all possible candidates for a cell, except one, are immediately excluded by the constraints of the puzzle, then fill the cell with the uniquely admissible candidate. If we are careful enough, we can exploit the single candidate principle to fill the whole sudoku straight away with an ink pen, there is no need to backtrack.

HH: OK, but honestly, aren't those sudokus terribly boring?

MD: Yes they are! Harder sudokus are exciting precisely because they cannot be solved in that way. They require us to consider the consequences of alternate hypotheses before we can safely write down the number in permanent ink. Typically,

we pencil down numbers until we reach a stage leading to a single candidate for another cell etc.. Now, the point is that in this process we make essential use of information we do not actually possess—the numbers we pencilled in. This is what we call 'virtual information'. As those who try their hand with hard sudokus know very well, the use of virtual information is cognitively, computationally and, let me add, philosophically, far from trivial. This is why we think that the depth at which the nested use of virtual information is required provides an interesting and plausible measure of the 'difficulty' of the reasoning process involved in solving a deductive problem.

HH: So the Approximation Problem is captured by fine-tuning the amount of virtual information allowed. . .

MD: I'd put it in this way: a non-ideal rational agent is a depth-bounded reasoner, and distinct agents may be characterized by distinct bounds on the depth of the deductive problems they can be assumed to solve. One key result of our theoretical framework shows that for each given fixed bound k, the class of k-depth deductive problems is tractable.

HH: So depth-bounded logics really seem to be naturally applicable in a variety of theoretical and practical fields of investigation on reasoning. What's your view on this?

MD: Part of our recent motivation in pursuing this project further is precisely our expectation that this approach may be attractive also for psychologists and cognitive scientists who tend to dismiss formal logic as inadequate when it comes to modelling real-world agents.

HH: Can you give interested readers a reference where they can learn more about this?

MD: In the forthcoming book "Feasible Deduction for Realistic Agents" that I have written with Dov Gabbay, we collect our proof-theoretical and the semantic results in the approximation problem for classical logic. We are also working on extending the framework to the most important families of non-classical logics. But, perhaps, it's better to leave this for another time. . .

NEWS

Evaluating Evidence in Medicine: Whence and Wither, 21 January

The workshop was organised by Federica Russo and took place in the Universiteitsbibliotheek of the University of Amsterdam.

Evidence evaluation is a core practice of the sciences. In medicine, specifically, the issue has been tackled by developing analytical and conceptual tools such as the evidence hierarchies. The question that lies at the heart of these methods is how to decide what is the best evidence to base our decisions for diagnosis or for treatment upon. Evidence hierarchies aim to rank evidence according to its quality. In many such hierarchies evidence obtained from randomised controlled trials (RCTs) or systematic reviews of a number of RCTs (meta-analyses) occupies top rank, while evidence obtained from expert judgment or from mechanism is relegated to the bottom of the hierarchy.

Evidence hierarchies have attracted large consensus but also criticism. One such criticism has been that these approaches leave out an important element, namely evidence of mechanisms. In this meeting, scholars affiliated to the EBM+ consortium discussed their work in progress with potential interested parties such as scientists and officers based at Academic Medical Centrum (AMC-UvA), Leiden University Medical Centrum (LUMC), and the Dutch Health Institute (ZINL). The workshop focused on how evidence of mechanism may be considered alongside statistical evidence to improve medical practice.

The workshop started with a talk by Jon Williamson (University of Kent). Jon presented the AHRC funded project "Evaluating Evidence in Medicine" and its main research questions. He argued that there is much use for evidence of mechanism in assessing causality and that, consequently, it should be considered alongside statistical evidence. Next, Michael Wilde (University of Kent) gave a talk on "Evaluating Evidence of Mechanisms in Medicine: A Handbook for Practitioners". This work in progress authored by various members of the "Evaluating Evidence in Medicine" project should help medical practitioners to assess the quality of evidence of mechanism and determine how to combine it with evidence from statistical trials in a systematic way.

After that Willem Jan Meerding from the Council for Health and Society gave a talk on "The Illusion of Evidence-based Practice". He drew attention to the fact that current Evidence-Based-Medicine has a too narrow focus. He emphasized the importance of considering different types of evidence like evidence of mechanism, correlations and other experience. Patrick Bossuyt (Academic Medical Center) presented joint work with Juanita Heymans (Health Care Institute) on "Collecting Evidence for Reimbursement Decisions". Patrick recognised the importance of evidence of mechanism in medical practice. However, he also thinks that due to complexity and interdisciplinary, it will be quite challenging to treat evidence of mechanism in a systematic way.

After lunch, Veli-Pekka Parkinnen (University of Kent) presented joint work with Federica Russo (University of Amsterdam) and myself on "Scientific Disagreement and Evidential Pluralism: Lessons from the Studies on Hypercholesterolemia". He gave an overview of the historical disagreement of cardiologist and epidemologists on whether high cholesterol causes heart disease. Sophie van Baalen (University of Twente) talked about "Evidence and Judgment: Epistemological responsibility in clinical decision-making". She also focused on the lower end of the evidence hierarchy—expertise—and considered the role of tacit knowledge in clinical decision-making.

Denny Boorsboom's (University of Amsterdam) talk on "Network Approaches to Psychopathology: Graphical Models, Explanatory Schemes and Statistical Inference" was quite challenging. Rather than considering psychological diseases, like depression, as latent variables, he considers them to be a bundle of symptoms that affect each other in a network. Mike Kelly (Cambridge University) on "Relational and individual conceptions of the causes of health inequalities" distinguished between individual-level and population-level explanation. He argued for the absolute importance of considering a population level cause as an entity on its own rather than just as an aggregation of individual level causes.

The workshop ended with a round table discussion moderated by Federica Russo about possible future cooperation between participants of the workshop.

"The Evaluating evidence in medicine: Whence and Wither"

workshop was funded by the Arts and Humanity Research Council (AHRC), the Institute for Logic, Language and Computation at the University of Amsterdam (ILLC) and the Amsterdam School for Cultural Analysis (ASCA).

Christian Wallmann
University of Kent

How to Say 'Yes' or 'No': Logical Approaches to Modes of Assertion and Denial, 21–22 January

On January 21 and 22, 2016, the University of Salento in Lecce (Italy) hosted a workshop on *How to Say 'Yes' or 'No': Logical Approaches to Modes of Assertion and Denial*, organised by Massimiliano Carrara (University of Padua), Daniele Chiffi (University of Padua and University of Salento—Lecce) and Caterina Annese (ZEI, Lecce). A book of abstracts from the workshop is available here and can be freely downloaded via Academia and Lulu.

Day 1 of the workhop started with a presentation by H. Wansing (*Negation, denial, and inference*). Following Frege, Wansing argued that the denial of a sentence *A* can be analysed as the assertion of a suitable negation of *A*, but, unlike Frege, he suggested associating the denial of *A* not with the assertion of the classical negation of *A*, but with the constructive strong negation of *A*. Wansing stated that, to make sense of the notions of assertion and denial, the concept of logical consequence may be generalized by considering, in addition to a relation of provability, a relation of dual provability. L. Tranchini (*Proof and refutations in bi-intuitionistic logic. Yet another attempt*) began by observing that the aim of bi-intuitionistic logic(s) is to bring together proofs and refutations. Several more or less successful attempts are available on the logic market. In his talk, he sketched out his proposal for considering proofs and refutations in intuitionistic and dual-intuitionistic logic. B. Jespersen in his talk (*Iterated privation*) provided an answer to the question: What is the logic of iterated privation as expressed by, for instance, 'Is a molten fake gun'? His answer is that the logic of iterated privation is a logic of contraries. G. Primiero (*Assertion by trust. Negation by untrust*) talked about the role of trust in computational domains. He observed that, from a logical viewpoint, formulating assertion operations in terms of a trust function is a great conceptual and technical challenge. M. Fontaine's and M. Beirlaen's talk (*Inconsistencies and the use of negation in an adaptive dialogical logic*) presented a new logic: IAD, or Inconsistency-Adaptive Dialogical Logic. The talk was organized as follows: they first presented a Dialogical Logic, then a Paraconsistent Dialogical Logic, and finally IAD. In his talk (*An epistemic theory of conditioned rejection*), A. Giordani modelled acceptance and rejection according to the intuition that (1) accepting can be equated with agent-dependent writing in the yes-box of an epistemic book; (2) rejecting can be equated with agent-dependent writing in the no-box of an epistemic book. F. Schang (*Epistemic disagreements*) first distinguished the information of ϕ, where ϕ is information for a state of affairs and $\neg\phi$ is information against a state of affairs. On the basis of this distinction, he made a preliminary proposal to characterize *acceptance* and *rejection*, then *ontic* and *epistemic disagreement*. N. Kürbis (*Bilateralist detours: From intuitionist to classical logic and back*) discussed, in an interesting way, Huw Price's proposal to answer Dummett's challenge of providing

a satisfactory, use-based theory of sense that justifies classical logic. P. Valtonen (*The meaning of absurdity: A comment on Murzi and Hjortland's solution to Carnap's problem*) first presented the so-called Carnap's problem and Murzi and Hjortland's solution to it; then *contra* Murzi and Hjortland, argued that Rumfitt's bilateralism can solve Carnap's problem with the help of the so-called *coordination principle*. A. Piccolomini d'Aragona (*Recognition procedures and Dag Prawitz's theory of grounds*) analysed Dag Prawitz's position on the nature of proofs; then he investigated some aspects of Prawitz's approach within his recent theory of grounds.

Day 2 of the workshop started with P. Fascolla's talk (*Wittgenstein on truth and assertibility: The role of the disquotational schema*). He showed that the disquotational schema can be inferred from Wittgenstein's principles of picture theory as formulated in the *Tractatus*. The second speaker of the day was T. Dobler (*Situated assertion*): on the basis of Travis cases, the goal of her talk was to outline a neo-Wittgensteinian alternative to the Fregean model of assertion. M. Duží (*Two kinds of negation and presuppositions*) talked about *presupposition vs. mere entailment*, with a specific focus on the Russell vs Strawson contention. A. Frigerio (*The meaning of negation in natural languages*) proposed answers to the following questions: What can negation target in natural languages? Is negation ambiguous in natural languages? C. Barés Gómez (*Negative evidential paradigm as a particular negation in natural language*) formulated a formal semantics for Ugaritic negation, an ancient Semitic language with a specific treatment of negation. F. Buekens (*Friction and harmony in the realm of personal tastes*) examined the discursive (or dialogical) role of judgements about what is funny, agreeable, or attractive, followed by an endorsement or a rejection. Judgements of taste were explored in the context of coordination games. V. Morato (*Denials of counterfactuals*) argued that the failure of Lewis's Duality Thesis DT (that is $(\phi \Diamond\!\!\rightarrow \psi)=_{\text{df.}} \neg(\psi \Box\!\!\rightarrow \neg\psi)$), in predicting our patterns of acceptance/rejection for would/might-not *cfs* (where would *cfs* are $\phi \Box\!\!\rightarrow \psi$ and might-not *cfs* $\phi \Diamond\!\!\rightarrow \psi$) is not necessarily explained by claiming that DT is false. W. Zhu (*On the correspondence between denial and assertion in belief revision context*) discussed the reasons the classical equivalence on denial cannot hold in the *belief revision context* and what other kinds of systematic correspondence assertion and denial have. C. De Florio, M. Carrara, and D. Chiffi (*Pragmatic denial*), tried to expand Dalla Pozza's and Garola's logical framework to a *Logic for Pragmatical Denial* (LPD). Finally, G. Bellin made some remarks to the workshop by shedding light on some relevant aspects of bi-intuitionistic logic.

All of the talks were original and stimulating. The discussions were very lively in a nice, quiet place.

Two last words: First, the workshop would have not have been possible without the skills, competence, and strength of Caterina Annese. Thanks Caterina! Second, this workshop is dedicated to Carlo Dalla Pozza, a *magister* and a friend.

Massimiliano Carrara
University of Padua

Daniele Chiffi
University of Salento

Ciro De Florio
Università Cattolica del Sacro Cuore

The Nature of Logic, 26 January

On the 26th January 2016, Saul Kripke (CUNY), Romina Padro (CUNY), Michael Devitt (CUNY), Rosanna Keefe (Sheffield), and Ian Rumfitt (Birmingham), visited the University of York to speak at the conference entitled *The Nature of Logic*. The conference was a great success, attracting over 150 delegates from around the world, and we anticipate that the proceedings will be published as a book, co-edited by Suki Finn and Romina Padro. But until that book is available, here is a report to briefly discuss the key ideas from the talks at the conference to give you a taster of *The Nature of Logic*.

Padro kicked off the show with her talk "What the Tortoise said to Kripke". In this talk Padro takes a close look at Lewis Carroll's note "What the Tortoise said to Achilles", and describes how it inspired Kripke to develop what she calls 'the adoption problem', articulating the similarities and differences between the two situations. Carroll describes a situation in which we embark on a regress when being forced to infer in accordance with a basic rule of inference. Kripke describes a situation in which a subject is unable to come to infer in accordance with a basic logical rule of inference. Both situations make us consider conditions that would make it impossible for someone to perform a basic inferential transition, and so they also make us reconsider the connections between the inferences and the logical principles themselves. The adoption problem, as Padro understands it, is that the practice of inferring in accordance with a basic rule of inference cannot be generated by mere acceptance of the corresponding rule. She formulates the problem as a dilemma: if a subject already infers in accordance with basic logical principles or rule, no adoption is needed, and if the subject does not infer in accordance with them, no adoption is possible.

Kripke takes the moral of Carroll's note to be that certain basic logical principles cannot be adopted and, consequently, as evidence that these logical principles have a special status. In his talk "The Adoption Problem and the Quinean conception of Logic", Kripke shows how this is problematic for the model found in Quine's "Two Dogmas of Empiricism", whereby the boundary between logic and other areas of scientific enquiry is blurred. On Quine's model, a logical principle may be revised in response to experience in the same way that a scientific theory may be revised, and so in the face of recalcitrant experience one has a choice to revise the logic or the theory to accommodate such an experience. Kripke argues against this model by attacking the idea that there is no difference between scientific hypotheses and statements of the basic logical principles. His main point is that, given the 'adoption problem', we cannot understand basic logical principles by analogy with the scientific case, that is, as hypotheses or statements that we simply assume. Were we to do so, we should conclude that the scientific fertility of such logical principles is zero, since they will not lead to a single prediction: simply accepting or assuming them will not get a subject to infer in accordance with them.

Devitt responds on behalf of the Quinean in his talk "The Adoption Problem in Logic: A Quinean Picture". Devitt takes reasoning to be a cognitive skill, and he utilizes psychological views of such skills and skill learning in order to defend a Quinean conception of logic. The upshot of Devitt's response is that it is possible for the adoption of a logical principle to lead to the adoption of its corresponding inference rule by a process called 'explicit learning'. Yet despite acknowledging this possibility, Devitt concedes that it still may be impossible for a subject that had never before inferred in accordance with a certain logical rule to adopt the rule in order to change their practice. And therefore, Devitt argues, that a Quinean will need to accept that there is a difference between logical principles and other principles or beliefs. But still, Devitt opposes the general results of the 'adoption problem' by concluding that the acceptance of a logical principle is never totally infertile, since such acceptance will always cause some change in our reasoning and our scientific commitments.

In the second half of the conference, we move on from the 'adoption problem' to more general issues in the epistemology of logic. Keefe presented her work on "Validity, Normativity, and Degrees of Belief", where she assesses the normative constraints of validity on how we should reason. Keefe looks into whether we can define validity by appealing to such normative roles, rather than the preservation of truth, especially in the case of merely partial beliefs. From such an analysis Keefe concludes that the normative situation is context sensitive and too complex to provide a satisfactory understanding of validity, and that normative considerations would not help us much in the way of choosing between alternative logics.

Rumfitt continues this debate over the desiderata of choosing between alternative logics in his talk "Against Harmony". Rumfitt explains that having harmony between the introduction rule and elimination rule for a meaningful connective does not provide a justifiable objection to a logic (like classical logic). Having such harmony is not something that should help us decide between rival logics. Rumfitt assesses the arguments from harmony and argues that they are only superficially plausible and rely upon controversial premises from epistemology and the theory of meaning. Therefore, Rumfitt concludes that the elegance of harmonious rules does not settle the philosophical question he is interested in addressing when it comes to deciding between logics.

'The Nature of Logic' was organised by Suki Finn (Associate Lecturer at the University of York) with help from Greg Currie (Head of Department at the University of York), and received generous funding from the Mind Association, The British Society for the Philosophy of Science, and the Department of Philosophy at the University of York, to whom we are very grateful.

SUKI FINN
University of York

Calls for Papers

CAUSALITY AND MODELING IN THE SCIENCES: special issue of *Disputatio*, deadline 31 March.

LOGICAL PLURALISM AND TRANSLATION: special issue of *Topoi*, deadline 30 April.

EXPERIMENTAL PHILOSOPHY: special issue of *Teorema*, deadline 30 April.

LOGIC AS TECHNOLOGY: special issue of *Philosophy and Technology*, deadline 1 May.

MEANING AND COMPUTER GAMES: Special issue of *Journal of the Philosophy of Games*, deadline 15 May.

STATISTICAL SIGNIFICANCE AND THE LOGIC OF HYPOTHESIS TESTING: special issue of *Entropy*, deadline 30 May.

THE BACKGROUND OF CONSTITUTIVE RULES: Special Issue of the philosophical journal *Argumenta*, deadline 10 November.

Uncertain Reasoning

Hard-to-quantify (aka 'severe', 'deep', 'Knightian', etc.) uncertainty is a major concern both for theorists and practitioners of decision-making. Over the past few years our urgent need to understand and manage this kind of uncertainty has been argued for mainly with reference to the disastrous consequences of the financial crisis, natural disasters, terrorism, and similarly dreadful phenomena which often make the global headlines. David Spiegelhalter in his 2015 book *Sex by Numbers: What Statistics Can Tell Us About Sexual Behaviour*, tackles the problems of reasoning, decision, and policy-making under typically unreliable statistical data from a decidedly less negative angle. Spiegelhalter is Winton Professor of the Public Understanding of Risk in the Statistical Laboratory at the University of Cambridge, and author of the Understanding Uncertainty blog. The book has been commissioned by the Wellcome Collection and is published with Profile Books. It is based on three large surveys done in 1990, 2000 and 2010 by the British National Surveys of Sexual Attitudes and Lifestyles (NATSAL), and which are believed to constitute be largest scientific study of sex in the world to date. The volume is complemented by the interactive Sex by Numbers Infographic which sums up, in style, some of the central findings of the study.
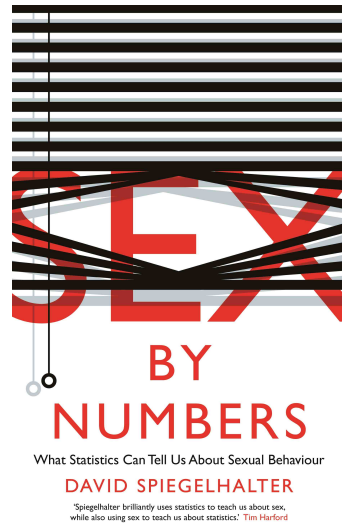
The link between this wonderfully entertaining volume and severe uncertainty is easily explained by the author.

> A strictly scientific approach might install CCTV in a randomly selected set of bedrooms. This would not only make staggeringly dull viewing for most of the time, but would also miss those sudden bursts of passion on the shower or the shed.

Spiegelhalter then adds that "head-cams" on some volunteers would not be a sensible fix, as the information gathered in this way would hardly be representative of the population. Thus the only way to obtain data in this field is through surveys. However, it turns out that sex is one topic about which people tend not to be very open. In some cases respondents are simply reluctant to speak, in other cases they tend to exaggerate (often unconsciously) their responses. All this hinders the reliability of the resulting statistics, which nonetheless provide vital input for public debate and policy-making.

The similarities between reasoning and decision-making about sexual behaviour and graver problems like climate change, are striking. And similar problems often lead to similar solutions. So Spiegelhalter puts forward a "star rating" system for probabilistic statements. Intuitively this is a way to qualify statistical statements according to the reliability of the information which supports them. The author considers five values.

Four stars are attached to "numbers that we can believe". This essentially means data obtained through methodologically accurate random sampling. This is the ranking, for instance, of the statement to the effect that for every 20 girls, 21 boys are born. (Spiegelhalter's explanation of this data is highly recommended!) "Reasonably accurate" statistics give rise to three-star statements. Most of the Nats survey falls in this category, which is less accurate than the previous one primarily as a consequence of the respondents' uneasiness about the topic. Then two-star statements are those which may be significantly unreliable. This is the class of statistical data which does not rely on random sampling. One-star is awarded to plainly unreliable numbers, which despite possibly having a rationale, are "useless" for statistical purposes. Finally zero-star statements are those which report "made up numbers". An example: 80,000 being the number of prostitutes in London in the 1850s estimated by the bishop of Exeter.

This rating system is quite reminiscent of the two-dimensional way in which the Intergovernmental Panel Climate Change (IPCC) recommends expressing uncertainties in the "Guidance Notes for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties". As I briefly recalled in the July 2015 issue of The Reasoner, one dimension is a (seven-valued) probabilistic scale, which ranges from the "virtually certain" to the "exceptionally unlikely". On the other dimension, a five-valued confidence scale ranging from "very high" to "very low".

Comparing the characterisation given by those two-dimensional scales of uncertainty, one has the impression that Spiegelhalter's is much easier to understand, and presumably to communicate. This certainly owes to the fact that the uncertainties involved there are quantified objectively. In other words probabilities need not depart from (finite) relative frequencies. This is clearly not the case in climate science, where probabilities arise from coupling unreliable data with a significant subjective—expert—component. Be it as it may, this may give climate scientists one additional reason to peep into *Sex by numbers*!

HYKEL HOSNI
Philosophy, University of Milan

Evidence-Based Medicine

Last month, there was some debate about the lack of qualitative research in medical journals. In an open letter to *The BMJ*, Trisha Greenhalgh and a large number of other senior academics invited the journal to 'reconsider their policy of rejecting qualitative research on the grounds of low priority'. Greenhalgh et al point out that the previously accepted qualitative studies are regularly endorsed by experts as among the most influential papers published by the journal over the past twenty years.

Greenhalgh et al maintain also that this endorsement is not misplaced. They argue that although some clinical and policy questions are best addressed by the results of quantitative studies, few such questions can be appropriately addressed by quantitative studies alone. Some questions are best answered by appealing also to qualitative studies. In fact, they take the quantitative versus qualitative distinction to be 'yesterday's war', and maintain that different types of study provide different but complementary perspectives. In particular, they link qualitative studies with improved *understanding* and *generalizability*:

Take patient safety, for example, in which quantitative studies have examined the effect size of interventions to improve safety and qualitative ones have examined equally important questions such as why the observed effect occurred and, in some cases, why the predicted effect did not occur.

Elsewhere, they say also that '[q]ualitative studies help us understand why promising clinical interventions do not always work in the real world'.

In conclusion, Greenhalgh et al propose that *The BMJ* publish one landmark qualitative paper each month with an accompanying expert methodological commentary. However, they acknowledge that evaluating qualitative papers for acceptance may be more difficult than evaluating quantitative research. Reviewers have some received training in statistics in order to evaluate quantitative papers, but there is rarely comparable training to help reviewers evaluate qualitative papers. Therefore, they suggest also that '*The BMJ* should develop and publish a formal policy on qualitative and mixed method research and that this should include appropriate and explicit criteria for judging the relevance of submissions'.

In an editorial response to the letter, the editors agree that qualitative studies 'can be valuable, and recognise that some research questions can only be answered by using qualitative methods'. However, they say also that they are not persuaded that they should make any changes to their practice in these respects. In particular, they do not want to establish quotas for specific types of research. Rather, they say:

> In general, our aim is to publish studies with more definitive—not exploratory—research questions that are relevant to an international audience and that are most likely to change clinical practice and help doctors make better decisions.

The suggestion seems to be that qualitative studies unlike quantitative studies are exploratory rather than definitive. Indeed, they also say that 'qualitative studies are usually exploratory by their very nature and do not provide generalisable answers'. This editorial response to the open letter has sparked a good deal of discussion in both the responses to the open letter and the responses to the editorial.

MICHAEL WILDE
Philosophy, Kent

23

Events

ECA: The Trinity of Policy-Making: Evidence, Causation and Argumentation, ArgLab, New University of Lisbon, Portugal, 3–4 March.

PoD: The Philosophy of Disagreement, University of Hamburg, 15–16 March.

EN&UEM: Explanation, Normativity, and Uncertainty in Economic Modelling, London School of Economics, 16–17 March.

CHE: Causalism & Anti-Causalism in Historical Explanation, Hagen, Germany, 16–18 March.

SE: Graduate Conference in Social Epistemology, University of Tartu, 26–27 March.

April

FE: Workshop in Mathematical Philosophy: Formal Epistemology, Munich Center for Mathematical Philosophy, 7–9 April.

RoD: The Roots of Deduction, University of Groningen, 7–9 April.

CI: Causal Inference Meeting, London, 13–15 April.

HL: Conference on Hegel's Logic, University of Valencia, Spain, 20–22 April.

PoKR&R: Conference on Principles of Knowledge Representation and Reasoning, Cape Town, 25–29 April.

KDW: Knowledge in a Digital World, University of Lund, Sweden, 27–29 April.

Courses and Programmes

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.

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 & 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.

Jobs and Studentships

Jobs

Postdoctoral fellowship: in Philosophy of Physics, Ludwig Maximilian University of Munich, deadline 14 March.

Assistant Professorship: in Statistics, Charles III University of Madrid, deadline 15 March.

Assistant Professorship: in Artificial Intelligence & Machine Learning, University of California, Irvine, deadline 15 March.

Lecturer: in Practical Philosophy, University of Kent, deadline 21 March.

Associate Professorship: in Probability, University of Oxford, deadline 30 March.

Studentships

PhD position: in Intellectual History/Philosophy, Manchester Metropolitan University, deadline 21 March.
PhD position: in Philosophy of Science, University of Exeter, deadline 29 March.
PhD position: in epistemology of computer simulation, Clermont University, deadline 15 May.
PhD position: in philosophy of mathematics, Clermont University, deadline 15 May.