ETHICS AND EXPLANATION CONFERENCE: EXPLANATION IN MATHEMATICS AND ETHICS
University of Nottingham, 18-19 January 2013

Friday, 18 January, 2013

	Time		Trent Building A21 (Council Room)
	10-11		Registration and Coffee
1	11-12:15	Paper	**David Liggins** (Manchester) "Multiple Realization and Expressive Power in Mathematics and Ethics"
		Comments	**Robert Knowles** (Manchester)
		Chair	**Christopher Woodard** (Nottingham) Head of Department of Philosophy
	12:15 - 13:00		**Lunch**
2	13:00 - 14:15	Paper	**Juha Saatsi** (Leeds) "On Mathematics' 'Indispensable Explanatory Role'"
		Comments	**Stephen Mumford** (Nottingham)
		Chair	**Jules Holroyd** (Nottingham)
3	14:15 - 15:30	Paper	**Mary Leng** (York) "Taking Morality Mathematically"
		Comments	**Geoffrey Ferrari** (Oxford)
		Chair	**Dan Baras** (Ben-Gurion University)
	15:30 - 15:45		Coffee Break
4	15:45 -17	Paper	**Andrew Aberdein & Alison Pease** (Edinburgh) "An Empirical Investigation into Explanation in Mathematical Conversations"
		Comments	**James Andow** (Nottingham)
		Chair	**Olexiy Bilyk** (Karazin Kharkiv National University)
5	17:10 - 18:25	Paper	**Mark Colyvan** (Sydney) "The Ins and Outs of Mathematical Explanation"
		Comments	**Michaela M. McSweeney** (Princeton)
		Chair	**Mark Jago** (Nottingham)

Saturday 19 January, 2013

	Time		Trent Building A21 (Council Room)
	9:45-10		Coffee & Refreshments
6	10-11:15	Paper	**Justin Clarke-Doane** (Monash/Birmingham) "What is the Benacerraf Problem?"
		Comments	**Folke Tersman** (Uppsala University)
		Chair	**Nalini Ramlakhan** (Carleton)
7	11:15-12:30	Paper	**Helen de Cruz** (Leuven/Oxford) "What can animal numerical cognition tell us about mathematical realism?"
		Comments	**Sorin Costreie** (Bucharest/Romanian Academy Iasi Branch)
		Chair	**Jon Robson** (Nottingham)
	12:30 – 13:30		**Lunch**
8	13:30-14:45	Paper	**Alan Baker** (Swarthmore) "Non-Optional Projects: Mathematical and Ethical"
		Comments	**Debbie Roberts** (York)
		Chair	**David Ingram** (Nottingham)
	14:45-15:00		Coffee Break
9	15:00-16:15	Paper	**Hallvard Lillehammer** (Cambridge) "An Assumption of Extreme Significance: Ross and Moore on Ethics and the Moral Sciences''
		Comments	**Katerina Deligiorgi** (Sussex)
		Chair	**Penelope Mackie** (Nottingham)
*	16:15-16:20		Concluding Remarks: Neil Sinclair and Uri Leibowitz (Nottingham)

Conference Dinner: Friday 18/1/13 7 pm at Aubergine Cuisine, 23-25 Heathcoat Street, Nottingham, NG1 3AG Tel: 0115 955 5560 (http://www.aubergine-cuisine.co.uk/)

Abstracts

Andrew Aberdein & Alison Pease: "An Empirical Investigation into Explanation in Mathematical Conversations"

Analysis of online mathematics forums can help reveal how explanation is used by mathematicians. We searched four discussions (Gowers and Tao's Mini-Polymath projects 2009-2012) for question indicators, premise indicators, and conclusion indicators. We thereby developed typologies of questions and explanations. One type of questions ask for an object, mathematical or otherwise, such as an example, a classification, categorisation, argument, technique, justification, conjecture, or explanation. We found explanations about flaws in reasoning; meta-level reasoning about proof strategies; reasons why the truth of a mathematical statement cannot be known; and clarifications. We investigated the structure of these explanations and the understanding shown by other participants before and after an explanation. Novelties of our approach include an emphasis on mathematics in progress rather than as finished product, a data-led rather than philosophy-led approach, and a focus on the collaborative work characteristic of much mathematical research.

Alan Baker: "Non-Optional Projects: Mathematical and Ethical"

Indispensability arguments in the philosophy of mathematics argue for ontological commitment to abstract mathematical objects because of their indispensability for science. Recent versions have focused more narrowly on indispensability for scientific explanation. One way to resist such arguments is to refuse to take seriously the purpose for which mathematics is claimed to be indispensable. This may be difficult to do at a global level, but if we move from the overall project of scientific explanation to specific requests for explanation then there seems to be more scope for opting out. In this paper, I consider what distinguishes optional from non-optional explanatory projects in science, especially those that have a mathematical component. I then link this discussion to recent work by David Enoch, who has argued for a form of moral realism on the basis that various kinds of ethical project are non-optional.

Justin Clarke-Doane: "What is the Benacerraf Problem?"

In "Mathematical Truth", Paul Benacerraf articulated an epistemological problem for mathematical realism. His formulation of the problem relied on a causal theory of knowledge that is now widely rejected. But it is generally agreed that Benacerraf was onto a genuine problem for mathematical realism nevertheless. Hartry Field describes it as the problem of explaining the reliability of our mathematical beliefs, realistically construed. In this paper, I argue that, unless the Benacerraf Problem is a problem with which it has traditionally been contrasted, it cannot be made out. There simply is no intelligible problem that satisfies all of the constraints that have been placed on the Benacerraf Problem. The broader relevance of this conclusion, especially for so-called "genealogical debunking arguments", will be discussed.

Mark Colyvan: "The Ins and Outs of Mathematical Explanation"

Proofs of mathematical theorems tell us that the theorem is true, but some proofs go further and tell us why the theorem is true. That is, some, but not all, proofs are explanatory. Call this intra-mathematical explanation. It has been argued that whenever there are physical applications of the theorems in question, we also have mathematical explanations of physical phenomena. Call this extra-mathematical explanation. In this paper I will consider both intra- and extra-mathematical explanations and discuss why they are of philosophical interest. I will also make some speculative remarks about two promising accounts for a theory of intra-mathematical explanation.

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Helen de Cruz: "What can animal numerical cognition tell us about mathematical realism?"

Is a naturalistic, evolutionary picture of numerical cognition compatible with mathematical realism? I flesh out two complementary strategies to combine an evolved numerical cognition with realism: an appeal to the indispensability of numbers in explaining numer- ical cognition, and an account of how numerical cognition represents structural aspects of the physical world. Both strategies can successfully counter evolutionary challenges to mathematical realism, but they do not establish conclusively that realism is a better position than nominalism in the light of evolved numerical cognition.

Mary Leng: "Taking Morality Mathematically"

In David Enoch's recent book, 'Taking Morality Seriously', he presents arguments for a view he calls 'robust moral realism' that mirror arguments in the debate over mathematical Platonism. In particular, Enoch presents an indispensability argument for the existence of normative facts, and argues for moral facts on the basis of an inference to the best explanation. This paper will consider the parallels between Enoch's arguments for moral realism and analogous arguments for Platonism.

David Liggins: "Multiple Realization and Expressive Power in Mathematics and Ethics"

In this talk I compare two parallel debates – one in ethics and one in the philosophy of mathematics – and show how the comparison advances both of them. I start off by presenting some edited highlights of these debates. Then I show how they illuminate each other. Both debates concern an inference to the best explanation. The indispensability argument in the philosophy of mathematics aims to establish mathematical realism by appeal to the role of mathematics in science. The parallel argument in ethics aims to establish moral realism through inference to the best explanation. Owing to their form, each argument can be challenged by providing a serious rival – non-moral or non-mathematical – explanation. I discuss an attempt to do so in the mathematical case, and consider its implications for the moral case; and I discuss an attempt to do so in the moral case, and consider its implications for the mathematical case.

Hallvard Lillehammer: "An Assumption of Extreme Significance': Ross and Moore on Ethics and the Moral Sciences''

For most of the Twentieth Century mainstream moral philosophy largely ignored the study of ethics as an empirical enterprise. Why? One answer is that the empirical study of morality was shown to be philosophically irrelevant by the alleged exposure of the so-called 'naturalistic fallacy' by G.E. Moore in his Principia Ethica. A closer look at what was written during the relevant period shows that this is a truth with modifications. In fact, some moral philosophers of this period, including Moore and Ross, were acutely aware of the challenges raised for moral philosophy by the emerging human sciences. Moreover, their response to these challenges was importantly epistemological, rather than primarily semantic or ontological. Reflection on this fact is shown to be relevant for contemporary arguments about evolutionary debunking and the ethics/mathematics analogy in metaethics.

Juha Saatsi: "On Mathematics' 'Indispensable Explanatory Role'"

Several people have argued that mathematics plays an 'indispensable explanatory role' in science, but little has been said about the notion of 'explanatory role' in general. I look at these arguments and the notion of 'explanatory role' in relation to philosophical accounts of explanation, focusing especially on Jackson and Pettit's account of programme explanation, and Woodward's counterfactual account of explanation. In the context of these accounts we can distinguish between coarse-grained and fine-grained analyses of 'explanatory role', so that mathematics may play an explanatory role in a course-grained sense, even if it isn't explanatory in a more fine-grained sense. This is critical, and I urge that the discussion of mathematics' explanatory role (in science) should be conducted more closely in relation to specific theories of explanation.

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