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§1

EDITORIAL

I am very happy to be asked to write this editorial. Of course, the main editorial duties were performed by Federica and Jon. My main contribution, besides conducting an interview and this editorial, was to delay the issue as I am currently making a move from cold and rainy northern Europe to warm and sunny northern California (the final version was sent from a rest area off of Route 66 somewhere between Santa Fe, New Mexico and Sedona, Arizona).

I decided to interview my former Ph.D. supervisor, Rohit Parikh. We recently co-taught a course at the [European Summer School for Logic, Language and Information](#) in Dublin. The title of the course was *Introduction to Formal Epistemology*. Readers who have attended FEW or heard general talks on the subject by Branden Fitelson may be worried that the content of our

course is much too narrow to warrant the title ‘Formal Epistemology’. For one thing, we essentially ignored probability and probabilistic models of beliefs. Now, this was not any sort of statement on our part, but rather a pragmatic choice given time constraints and the interests of the intended audience. We focused primarily on epistemic logic, especially *dynamic* epistemic logic and some of the main issues such as logical omniscience. But the main (and, in my opinion, most exciting) goal of the course was to show how the formal models we presented fit into a larger theory of *Social Software*. The idea is that the formal models developed to reason about the knowledge and beliefs of a group of agents can be used to deepen our understanding of social interaction and aid in the design of successful social institutions.

Fully working out this idea raises a number of interesting questions. *Who* are we trying to model? I.e., what does it mean to be a *rational* agent? Which aspects of social situations should we focus on? (Knowledge, Beliefs, Group Knowledge, Preferences, Desires, Ability, Actions, etc.) Are we after one grand system, or many smaller systems that loosely “fit” together? Can we empirically test our proposals? These questions were very much part of the general discussion at two recent workshops I attended. The first in Montreal ([Dynamic Logic](#)) and the second in London ([Workshop on Decisions, Games and Logic](#)). In particular, a recent paper by Johan van Benthem discusses some of these themes (2006: *Where is logic going, and should it?*, *Topoi* 25).

Finally, a comment about the interview. The interview is based on a conversation I had with Prof. Parikh over lunch in Dublin as we were preparing our afternoon lecture. As I tried to turn my notes into a readable text, I was reminded of a story he once told me. He was

on a walk with Larry Moss during which they proved a beautiful theorem. The next morning, they decided to write down this theorem, but not only did they forget the proof, they also forgot the statement of the theorem! Fortunately, during our conversation I took notes, so I was able to recover much of it (and Prof. Parikh was able to fill in some details I missed). However, I am a bit worried that I have inadvertently left out a major new result!

Eric Pacuit

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§2

FEATURES

Interview with Rohit Parikh

Rohit Parikh is a distinguished professor in the Department of Computing and Information Science at Brooklyn College and a distinguished professor of computer science, philosophy and mathematics at the Graduate Center of the City University of New York.

EP Typically, before we would began our seminars, you would start with a joke or an amusing story. Do you have a joke that you would like to tell before we start the interview?

RP Yes, I enjoy jokes as they often reveal a hidden assumption or a defect in our usual reasoning. Here is a story with a moral.

A Frenchman walks into a bar. There's a parrot wearing a tuxedo sitting on his shoulder. The bartender says, "Wow, that's cute. Where did you get that?"

The parrot says, "In France. They've got millions of guys like this over there."

Plato and a Platypus, by Cathcart and Klein
p. 175 .

The story points out that there is a hidden convention in the use of the word "you". The convention says that it is the human who is the addressee and not the parrot. The story gets its charge by flouting the convention.¹ But the convention is not absolute. If a woman looks in the direction of her guest playing with her dog and says, "It is time for your din din," it is most likely that she is addressing her dog. I have argued elsewhere [7, 8] that conventions and behaviour precede knowledge and common knowledge and are not created by it. Indeed

¹In another story in the same book, a customer asks a chef how he prepares his chickens. "Nothing special," is the answer. "We just tell them they're gonna die."

this point, that behaviour is primary, has already been made in the past by Ramsey and Savage [10, 11], and has tended to be ignored by some of the current work in formal epistemology.

EP You have worked on a number of different topics, why did you start working on Epistemic Logic?

RP I was asked to referee a paper on knowledge by Albert Meyer but was rather disappointed with what was said in this paper. I then noticed that Joe Halpern had started to publish on the topic and I decided to publish also. My first paper was on the sum and product puzzle and the concept of "all I know" [5, 6]. After that I started working with Ramanujam on a history-based semantics for knowledge [9].

EP Currently, you are not just focusing on epistemic logic, but how formal models of knowledge and beliefs fit into a larger theory of *Social Software*. First of all what is Social Software?

RP Social Software is the formal study of social procedures focusing on three aspects: (1) the logical and algorithmic structure of social procedures, (2) knowledge and information, and (3) incentives. It is similar to game theory, but wider.

EP Perhaps you can expand on the last point. There are, of course, game-theorists that have written about knowledge and information (for example, Robert Aumann or Adam Brandenburger, to name just two). How is social software different from game theory?

RP The reason I said wider than game theory is because I also want to emphasize the logical structure of procedures, and I do not want to take the Savage notion of utility for granted as is done in most of the standard work in game theory. I feel that this notion of utility is too much of an abstraction and certainly does not exist in real life. Consider, for example, a bar that only wants to allow in people who are mature enough to drink alcohol. Measuring maturity of an individual is too difficult, so bars use *age* to measure the maturity of the individual. But age is only a rough approximation to maturity and there are many instances in which "immature" people are allowed in while "mature" people are turned away. The concept of utility is like the concept of age when what we are really after is a concept of maturity.²

²Of course, there has always been dissatisfaction with this notion of utility, which can be traced back to Aristotle, and has been reinforced by the paradoxes of Ellsberg, Allais, etc.

EP So what is utility approximating?

RP Happiness or personal satisfaction. Utility has a “linearizing” influence which seems very unnatural to me. Furthermore, choices are situation-dependant. Certainly there are people whom you would invite for a talk, but would not trust to watch your children!

EP I imagine we could go on and on about this, but let’s turn to the second aspect of Social Software: knowledge and information. How do you see knowledge and information fitting into a general theory of Social Software?

RP Knowledge is crucial for the design of many social procedures. The following story nicely illustrates the critical role knowledge plays in social interactions.³ Prof. DD, up for promotion, is also on one the committees, hence the interesting features about his comings and goings—which information he should have, and which information he should be prevented from having. The following is the plan devised to ensure the appropriate flow of information.

On Magsar 4, at 1:40, all professors currently at the rank of associate professor or above must attend a promotions meeting in Room 3344. Professor AA will be interviewed at 1:45, Professor BB at 2:05, Professor DD at 2:25, and Prof. CC at 2:45. Professor DD, who is on the Appointments Committee, will be present for the interviews of the two candidates for tenure, Profs. AA and BB, and will then be interviewed in turn for his own promotions candidacy. Following his interview, Prof. DD will leave the room until the Promotions meeting is concluded. Following all four interviews, the committees will discuss the promotion candidacies seriatum and vote whether or not to recommend the promotions. If the discussion continues past 3:20, the meeting will be held over to Magsar 6 at 1:30, right before the department meeting.

Following the promotions meeting on Magsar 4 (whether or not it has reached a vote), members of the Appointments Committee will remain in the room, and Professor DD will return to the room. The Committee will discuss the two tenure candidacies and vote on them.

On Magsar 6, at 1:30PM, the promotions discussion will continue if necessary, followed by the regular department meeting.

The person who came up with this plan never even had a course on epistemic logic! See also [4] for a discussion of knowledge based obligation.

³Kartik and Magsar are months in the Hindu calendar, used to enhance anonymity.

EP This example certainly illustrates that knowledge and information take center stage in many social procedures. But, how do you see formal models of knowledge aiding in the design of procedures?

RP I feel that formalizing knowledge, beliefs and intentions will lead to (1) a better understanding of society and (2) possibly better AI agents. Clearly, proving that a particular Epistemic Logic is PSPACE-complete is less important for (1), though it could be relevant for (2).

EP What is missing from current formal models of knowledge (eg., Kripke structures) that is needed for Social Software?

RP In my opinion, one of the main issues that needs to be addressed is the fact that knowledge, preferences and behaviour are intimately connected. This was already addressed by Ramsey, Savage and others in the context of beliefs. Of the three aspects of Social Software that I described above, it seems to me that only the first logical structure can be somewhat separated from the other two. I am not convinced that in the context of Social Software, one can talk separately about knowledge and preferences in a modular way.

EP Finally, in your view, what is an important open problem in Social Software?

RP One that comes to mind concerns electoral systems. Much of the formal work on electoral systems focuses on impossibility results, non-monotonicity effects and so on. One question that, to the best of my knowledge, has received less attention is *What do we want an election to achieve?* We should demand an electoral system in which it is rational for parties to present candidates who work in the national interest. That parties work for their own interest is a given which we cannot change. But the electoral system should see to it that the interest of the parties coincides with the national interest.

Many other problems come to mind: I feel that the field of Social Software—from transportation issues to legal issues to education—is wide open.

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Kripke, Pierre and Constantinescu

Difficult problems sometimes attract desperate solutions. Cristian Constantinescu's proposed solution (*The Reasoner* 1(4) 2007: 8-9) to Kripke's puzzle about Pierre is one such. Frenchman Pierre, on the evidence of magazine pictures of London that he and his Parisian friends peruse, asserts "Londres est jolie". After moving to Brixton, a particularly unlovely part of London (I'm enriching Kripke's story thanks to some local knowledge) and picking up English from the monolingual English, Pierre, who never travels out of Brixton except to equally ugly adjoining parts of town such as Stockwell and Tulse Hill, announces "London is not pretty". Pierre, of course, does not know that London and Londres are one and the same town. Pierre, so we are told, is a rational person and a good logician. He is not prone to assenting to contradictions. Yet, since "Londres est jolie" is a translation of 'London is pretty', it seems as if he has done just that and hence believes both that London is pretty and that it is not! What's more, *you*, a subscriber to *The Reasoner* no less, are

now finding yourself sucked in to assenting to a contradiction: that Pierre believes London to be pretty and that he does not believe that.

Constantinescu's solution is that 'London' is not here the correct translation of 'Londres'. He doesn't tell us what he takes the correct translation to be. In fairness to Constantinescu, his claim is only that the correct translation of 'Londres' in Pierre's idiolect is not 'London'. So Constantinescu is denying that 'London' and 'Londres' mean the same to Pierre—in Fregean terms, Pierre is attaching different Sinne to the two words. This suggestion, however, seems unsatisfactory because, as Kripke insists, Pierre is an ordinary native speaker of French and he becomes a competent speaker of English; he does not use words of either language idiosyncratically.

The reason that Constantinescu offers for supposing that it is wrong to translate Pierre's 'Londres' as 'London' is that there are cases (he cites two) where the translation would be unhappy. The second case simply replicates (without solving) Kripke's original problem. The first case is one in which Pierre somehow comes to learn that the names 'Londres' and 'London' in fact denote the same city. Pierre reports this discovery in French: "Incroyable! Après tout, Londres est London". Constantinescu claims that Kripkean principles of translation would enjoin us to translate that as "Unbelievable! After all, London is London", but rendering it like that, Constantinescu says, "would have Pierre foolishly rejoicing in the discovery of a trivial *a priori* identity statement—which is clearly not what his French utterance reports" (2007:8). However, pretty clearly, Pierre's French utterance, properly transcribed, is quotational, viz. "Après tout, <ce que j'appelais> 'Londres' est London" and that would translate unproblematically, since the material within the quotation marks would remain untouched. If you want to insist that the utterance is non-quotational, then you would have to decide how to translate both the 'Londres' and the 'London'. A good rendering would be "After all, London is Londres".

Imagine that Pierre had had the good sense to bring his 'Londres' pictures with him to England. Let us suppose that he has them spread out on the filthy table in his Brixton bedsit and is wistfully contrasting the scenes they depict with the depressing view from his window. As his gaze wanders back and forth, he is acquiring a mass of perceptual beliefs, but we should not want to say that there is anything contradictory about his perception. The contradiction that we have attributed to him occurs only when he opens his big mouth.

I have suggested, in the penultimate paragraph, that the utterance ("Incroyable!...") that Constantinescu attributes to Pierre is shorthand for a different utterance involving a quotation of the word 'Londres'. Another way of putting this is that, if you pressed Pierre to spell

out what he meant (what he really believes), he would come up with (something like) the longer utterance I mentioned, and this translates unproblematically into English. Exactly the same point can be made about the original Kripke example in which Pierre, after living in Brixton for some time, but not knowing that ‘Londres’ and ‘London’ are co-designative, says “London is not pretty”. If you asked Pierre what he meant by that, what he really believes, one possibility is that he would spell it out at greater length, e.g. “On the evidence of the neighborhoods I’ve seen, London is not pretty”. *That* does not contradict any opinion he voiced while living in France. On the other hand, suppose that, even though we pointed out to him that the parts of London he had seen while in England might be unrepresentative, Pierre insisted that what he meant was just: *London is not pretty*. Now, if such were the case then we would be right to convict Pierre of irrationality. He might be a good deductive logician, but, when it comes to induction and probability, he is just *merde*.

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The Mechanist’s Challenge. Did we really hope to get away with The Gödelian Argument?

INTRODUCTION—THE GÖDELIAN ARGUMENT

In a talk given on 25/5/96 at a BPS conference in Oxford, J. R. Lucas (1996: The Gödelian Argument: Turn Over the Page), articulated his original Gödelian argument (J.R. Lucas. 1961: “Minds, Machines and Gödel, *Philosophy*, XXXVI, 1961, 112–127) afresh as follows:

The Mechanist claims to have a model of the mind. We ask him whether it is consistent: if he cannot vouch for its consistency, it fails at the first examination; it just does not qualify as a plausible representation, since it does not distinguish those propositions it should affirm from those that it should deny, but is prepared to affirm both indiscriminately. We take the Mechanist seriously only if he will warrant that his purported model of the mind is consistent. In that case it passes the First Public Examination, but comes down at the Second, because knowing that it is consistent, we know that its Gödelian formula is true, which it cannot itself produce as true. More succinctly, we can, if a Mechanist presents us with a system that he claims is a model of the mind, ask him simply whether or not it can prove its Gödelian formula (*according to some system of Gödel numbering*). If he

says it can, we know that it is inconsistent, and would be equally able to prove that 2 and 2 make 5, or that $0=1$, and we waste little time on examining it. If, however, he acknowledges that the system cannot prove its Gödelian formula, then we know it is consistent, since it cannot prove every well-formed formula, and knowing that it is consistent, know also that its Gödelian formula is true. In this formulation we have, essentially, a dialogue between the Mechanist and the Mentalist, as we may call him, with the Mechanist claiming to be able to produce a mechanist model of the Mentalist’s mind, and the Mentalist being able to refute each particular instance offered.

DO WE REALLY HOPE TO GET AWAY WITH THIS ARGUMENT?

Do we really hope to get away with this argument? For instance, when we ask a Mechanist whether or not his model can prove its Gödelian formula, the Mechanist would be quite justified in asking:

Before I commit my resources to something that may be impossible, can you assure me that it is provable?

Of course we cannot, since we, too, cannot give the proof of the formula that we are asking of the Mechanist’s model.

If we were to, nevertheless, attempt to assert our superiority over the Mechanist by claiming, somewhat superciliously, that we do know, however, that the formula in question is true, but that the Mechanist’s model does not, we would cut an even sorrier figure. The prompt, astonished—and subtly cunning—reply would be:

Whatever gave you that idea! My model can even *prove* that it’s true.

THE MECHANIST’S CHALLENGE

If, unwittingly, we were to express incredulity, we would face the humiliating challenge:

The Gödelian formula, which Gödel refers to by its Gödel-number, 17*Genr* (K. Gödel, 1931, *On formally undecidable propositions of Principia Mathematica and related systems I*. Translated by Elliott Mendelson. In M. Davis (ed.), 1965, *The Undecidable*, Raven Press, New York., p.25), is of the form $[(Ax)R(x)]$. Neither of us can prove it from the agreed set of premises by the specified rules of inference of the Arithmetic in

question (ibid., p.25(1), “17*Genr* is not *k*-provable”). However, for a large enough numeral $[n]$, my model can always provide a proof sequence for $[R(1)\&R(2)\&\dots\&R(n)]$ from the premises faster than you.

The reason we would have to sheepishly concede defeat, without even addressing the challenge, is that Gödel (ibid., p.22(45)) has given a primitive recursive relation, xBy , which ensures that the Mechanist—whose model contains Turing’s Universal Machines as sub-models—can provide a proof of $[R(n)]$ for any given numeral $[n]$ (ibid., p.26(2)).

Gödel (1931, p.22, def. 45) defines xBy (primitive) recursively, in the standard interpretation of a Peano Arithmetic, so that it holds for natural numbers x, y , if, and only if, x is the Gödel-number of a proof sequence in the Arithmetic for the formula of the Arithmetic whose Gödel-number is y .

Further, since our definition of the truth of a formula under an interpretation is based on Tarski’s specification that it hold exhaustively, i.e., every instantiation of it must hold in the interpretation, our argument for our intellectual superiority over the Mechanist’s model fails miserably in this particular instance. End of story? Not quite.

THERE’S MORE TO COME . . .

We could try to find solace, and console ourselves, with the fact that our brains are not designed ideally to tackle problems that can only be tackled by brute force, but are, surely, superior to the Mechanist’s model when it comes to proofs that require ingenuity. However, we will, then, face even greater discomfiture.

Gödel has given (ibid., p.22(44)) another primitive recursive predicate, $Bw(x)$, that the Mechanist can program on a UTM to—given sufficient time—create a set of theorems that will contain, and continue to be larger than, the set of all the arithmetical theorems that we have ever proven, and verified, collectively, using only pencil, paper, and our superior intellects!

Gödel (ibid., p.22, def. 44) defines $Bw(x)$ (primitive) recursively in the standard interpretation of a Peano Arithmetic so that it holds for any natural number x if, and only if, x is the Gödel-number of a proof sequence in the Arithmetic.

Moreover, the set would contain theorems that we could not even conceptualise, since we would be unable to grasp even the statement, leave alone the proof, of these theorems!

CONCLUSION

So, what is really wrong with the Gödelian argument?

Well, ironically—and perhaps paradoxically—it’s simply another instance of human insecurity applying very common, and very human, double standards—namely, matching our truth against the Mechanist’s provability—to subtly load the dice in our favour when faced with semantic arguments that threaten to expose the continuing inability of the human ego to come to terms adequately with, and tap constructively into, the awesome conceptual power, diversity, and potential of any Intelligence, human or otherwise.

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Does conceivability entail possibility?

What is the relationship between conceivability and possibility? In the previous issue of *The Reasoner* (issue 1(4)) Anand Jayprakash Vaidya defended the strong thesis that conceivability entails possibility:

CET: If I can conceive of a state of affairs S ,
 S is logically possible.

He notes that if CET admits of no possible counterexamples, it’s true. He states that any counterexample to CET would have to satisfy two conditions. First, a subject would have to conceive of a scenario, S , in which the antecedent of CET held, but the consequent did not. Second, “ S must be possible in some sense of possibility strong enough to ground a counterexample”. There couldn’t be counterexamples to CET, Vaidya argues, so CET must be true.

Here’s his argument for the impossibility of counterexamples to CET. Suppose S is said to do the trick. S is a state of affairs in which I conceive of p , but p isn’t possible. I’d presumably argue against CET as follows:

1. I can conceive of a state of affairs, S (where S is a state of affairs in which I’m conceiving of p but p isn’t possible).
2. If I can conceive of S , S is possible.
3. S is possible.
4. If S is possible, CET must be false.
5. CET must be false.

Consider the inference from (1) and (2) to (3). What sense of ‘possible’ are we dealing with? If we say that it’s something ‘wider’ than logical possibility, such as epistemic possibility, we don’t get our conclusion because CET isn’t inconsistent with the claim that so far as we know there are counterexamples to CET. The sense

of ‘possible’ has to be logical possibility, but then it seems that the inference from (1) and (2) to (3) is self-defeating. So, because it’s impossible to produce counterexamples to CET, CET must be true.

But this is too good to be true. Consider the thesis that believability entails possibility:

BET: If p is believable, p is logically possible.

Roy Sorensen (1996, “Modal Bloopers: Why Believable Impossibilities are Necessary”, *American Philosophical Quarterly*, 33, 247-61) made quick work of BET. He believes that it is false. His critics think he’s mistaken. What if they were right? Then his belief (i.e., the belief that BET is false) couldn’t possibly be true. Roy wins! BET is false. And yet, it seems that if the above defense of CET is sound, a similar argument should save BET. Because we know no argument could save BET, we should be sceptical of the defense of CET.

The trouble with Vaidya’s defense of CET is the assumption that an attack on CET would have to assume the form of the self-defeating argument above. It could be cast instead as follows. Assume that CET is true. That is, assume that if I can conceive of S , S is possible. Let S be the state of affairs in which I’m the kind of creature that conceives of merely apparent possibilities. I’m now conceiving of S . According to CET, it is possible to be the kind of creature that can conceive of merely apparent possibilities. According to CET, what this creature conceives of is possible. But that’s impossible because this creature conceives of merely apparent possibilities. CET is false.

Either you should deny the initial premise (i.e., that I’m conceiving of a creature that conceives of merely apparent possibilities), which seems question begging in the context of defending the entailment from conceivability to possibility, or you should accept that the negation of CET follows from the conjunction of a contingent claim about my psychology (i.e., I’m conceiving of creatures that conceive of merely apparent possibilities) and CET itself. A proper defense of CET would have to show something substantive about what it is to conceive. It would have to show that the state picked out by ‘conceive’ is less like the state denoted by ‘believe’ and more like the one denoted by ‘perceive’. Just as you can’t perceive what isn’t there, perhaps you can’t conceive what isn’t genuinely possible. To hallucinate is to seem to perceive. To consider a merely apparent possibility, perhaps, is to seem to conceive. Or, perhaps it is to conceive. This is something that can’t be established on merely formal grounds just as purely formal considerations couldn’t alert us to an important difference between ‘knows’ and ‘believes’, which is that only the former is a factive mental state operator.

Does ‘conceive’ pick out a mental state that takes only possible states of affairs as its object? To test this,

we might rely on the sorts of linguistic intuitions we’ve relied on elsewhere to determine whether ascriptions of knowledge and belief or reports of a subject’s perceptual experiences are factive. We can proceed as follows. Audrey is evaluating a philosophical theory according to which q is a logical consequence of p . She says:

6. I’m conceiving of a situation, S , in which p is true, but q is not. Suppose Cooper reports:

7. She’s conceiving of a situation, S , in which p is true, but q is not.

He then adds:

8. But of course, it’s impossible for p to be true when q isn’t.

I don’t see that by asserting (8), he’s negated (7). The linguistic evidence we’d hope to find to support CET and expect to find on the hypothesis that CET is true isn’t where it should be.⁴

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A note on conceivability

I don’t think Anand Jayprakash Vaidya (*The Reasoner* 1(4)) shows that conceivability entails logical possibility. I use his framework: $C(x; p)$ means ‘ x finds p conceivable’, ‘ P ’, ‘ M ’ and ‘ L ’ stand for physical, metaphysical and logical possibility, respectively, and scenario S is where x conceives that something conceivable might nevertheless be impossible. Vaidya’s claim is that while you may do this for Pp and Mp , you cannot for Lp so long as his condition CE applies:

Condition (CE): In order for a subject to give an a priori counterexample to a formula of the form $p \rightarrow q$, two conditions must hold:

- (a) the subject has to conceive of a scenario S in which p is true, and q is false,
- (b) S must be possible in some sense of possibility strong enough to ground a counterexample

Let’s look at his hierarchy of claims.

- 1. $C(x; p) \rightarrow Pp$

is the strongest claim—conceivability clearly does not make something physically possible, and scenario S here substitutes $C(x; p) \& Pp$ for p in

- 2. $C(x; p) \rightarrow Mp$

⁴Thanks to Mike Almeida for his comments.

And, because this, in turn is a stronger claim than

- 3. $C(x; p) \rightarrow Lp$

the same tactic can be employed, of substituting $C(x; p) \& Mp$ for ‘ p ’ in 3.

So it seems he exhibits the point that the conceivability that something might be conceivable yet physically impossible is our 1st S , and that the falsehood of 1. is metaphysically possible. Similarly, because 3 is a weaker claim than 2. the conceivability that something might be logically possible yet metaphysically impossible is our 2nd S , so that the falsehood of 2. is logically possible.

This tactic cannot apply to 3., however, Vaidya argues, because of the absence of a plausible

- 4. $C(x; p) \rightarrow \diamond p$

where \diamond would be a form of modality which could ground a counter-example of the form of S to 3.

But the embedding of ‘conceivabilities’ here is misleading, as is the need for an a priori counterexample to a formula of the form $p \rightarrow q$ and the need for de re modality to ground the counterexample to 1–3. We do not need to proceed by substituting $C(x; p) \rightarrow Pp$ for p in $C(x; p) \rightarrow Mp$. It is the truth of $\diamond \neg Pp$ which makes 1. false, so we can keep the original sense of p and write:

- A. $C(x; (p \& \diamond \neg Pp))$

Which states the obvious truth that one may conceive of some p which may not be physically possible. In the same way, it is the truth of $\diamond \neg Mp$ which makes 2. false, so p can keep its original sense and we get:

- B. $C(x; (p \& \diamond \neg Mp))$

Which states the (possibly less obvious) truth that one may conceive of some p which may not be metaphysically possible. In the same way, it would be the truth of $\diamond \neg Lp$ which would make 3. false:

- C. $C(x; (p \& \diamond \neg Lp))$

If C. does not imply a contradiction then, arguably, one may conceive of some p which may not be logically possible. What is wrong with this? Is there some conceivable proposition p which is possibly not logically possible. There must be, otherwise it would be impossible to frame a reductio. And the \diamond involved here doesn’t even seem to need to be de re. Representations, rather than things themselves, would appear to be contents of conceiving.

What would the consequences be if conceivability did entail logical possibility? Consistency becomes the test of conceivability: if $C(x; p) \rightarrow Lp$ but Lp is false because p entails a contradiction, then, despite *feeling*

that s/he has conceived p , x is wrong, and $\neg C(x; p)$. It seems to me that this sets the criteria for conceivability too tight, for all that these might appeal to philosophers. Consider a historical example—naïve set theory. Did Frege not conceive this theory, and was it not left to Russell to discover the paradox which brought the theory down? Surely Frege did not belatedly discover that he had not after all ‘conceived’ of a membership relation which led to paradox. How else could it have been sufficiently clear to have been refuted as it was?

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On the Paradox of Rationality’s Rationality

Is it rational to be rational? Can rationality justify itself? Can it be justified in a non-circular way, without a prior commitment to reason and rationality itself? If not, is the circularity implicated a *virtuous* kind, as opposed to a vicious one? Does the skeptic’s objection to rationality entail the self-justification of rationality by virtue of its performative contradiction? Or does our commitment to rationality rest in the end on some prior (ideological) commitment or (non-rational, though not irrational) faith in (the value of) reason? The paradox of rationality’s rationality is of course not new. It is arguably as old as philosophy itself, but its solution or dissolution has taken on a greater urgency in the aftermath of the radical dialectical critique of the Enlightenment. Thus, various modern and contemporary philosophers have defended the following positions: (1) Rationality can justify itself; the paradox is apparent and can easily be put aside. (2) Rationality cannot justify itself; the paradox is real and cannot be dismissed or dissolved easily. (3) Rationality cannot be justified in a non-circular way, but the circularity is virtuous and pragmatic in nature. (4) It need not be justified; our commitment to rationality is a historically contingent matter, morally motivated, and/or based on faith. What is at stake here, and why is this problem important, particularly in the area of *education*?

Suppose one adopts “critical thinking” as the ideal of education. Suppose further that by “critical thinking”, we mean “the ability and the willingness to decide what to believe and how to behave on the basis of good reasons”. Then, education would consist in becoming more rational.

The role that critical rationality plays in education is of great import to those who object to dogmatic and doctrinaire approaches to the transmission of knowledge and culture, as may be found among fundamentalist groups (religious or secular), authoritarian or totalitarian regimes. If there is to be “a difference that makes a difference” between *education* and *ideology* or *indoctrination*, or between *liberal* and *dogmatic* con-

ceptions of cultural transmission, then presumably an unmitigated defense of the conception suggested above should be possible.

Various philosophers drawing upon the Enlightenment’s legacy, differently interpreted, have most notably advocated such a conception. They focused for this purpose respectively on *respect*, *empowerment*, *traditions of inquiry*, and *democratic citizenship*, or even all four notions. However, generally speaking, these various defenses have had to contend with two serious objections, based respectively on *rationality-as-ideology*, and *education-as-indoctrination*.

Let’s take “ideology” to be “a general framework that shapes individual consciousness, guides and legitimates belief and action, and renders experience meaningful”, the first objection points out that critical thinking cannot be justified independently of any ideological commitment. The latter is logically prior to a commitment to educational ideals. What counts as a reason depends on what one’s ideology recognizes as a reason. Rationality itself is ideology dependent. This is a reminder of the paradox of rationality. Short of a solution, the independence of reason from ideology is in doubt. What we need is a justification of rationality that does not itself depend on a prior (ideological) commitment to the value of reason.

Critical rationality does not seem to fair better in response to the second objection. Let’s take “indoctrination” to be pertaining to intentions, methods, or content, and to consist in the promotion of a “non-evidential style of belief-formation”. A non-evidential belief is one held without regard to evidence relevant to its rational assessment; it is thus an indoctrinated one. Insofar as indoctrination consists in all those modes of belief inculcation that foster a non-evidential style of belief, it is anti-critical. If it is inevitable in education, as some have argued, this certainly constitutes a problem for critical thinking as an educational ideal. Indeed, it is even argued that the non-evidential inculcation of the value of rational critical thinking is inevitable as well.

Suppose we admit that some form of indoctrination is inevitable, since all societies inculcate ideas and values in youngsters whose rational capabilities are still limited. How could we then go on to defend critical rationality? We could say for example that as children grow up intellectually, they would acquire the capabilities required to replace the non-rational grounds of their previously inculcated ideas and values with good reasons? We could say their ideas and values are somehow “redeemable by reasons”, and even draw a distinction between “indoctrination” and “non-rational belief inculcation”: indoctrinated ideas are not redeemable by reasons, whereas inculcated ones are. The problem however arises again when we ask: Is critical rationality itself thus redeemable?

Unless we have a viable solution to the paradox of ra-

tionalty’s rationality, there seems to be no basis for the claim that critical thinking is redeemable by reasons. If the very process of reasoning is itself non-redeemable, then there is also no basis to the belief that reasons are capable of redeeming any other commitments a person (child, youngster, or adult) might be inculcated to adopt. The earlier distinction collapses because rationality is not redeemable, and with such a collapse, we are left with the inevitability of indoctrination and the consequent impossibility of critical thinking.

Perhaps, rather than taking a purely logical or epistemological approach to the problem (“Is it rational to be rational?”), we are better off adopting an ethical perspective (“Why should one be rational?”). Underwriting various attempts to “justify” critical rationality and stress its importance in education, there seems to be a way of thinking that is plausible and even compelling at least to those who favor liberal or radical democracy and an open society. Such a perspective presupposes a “Copernican revolution” in thought in that it calls for the recognition that we base our commitment to critical rationality on *conceptions of the good life for moral persons* rather than base our conceptions of the good on *rational justifications*. Critical thinking, in other words, is not the educational ideal. It is merely a tool we use to achieve that ideal. Rationality is not the end in view. It is only a means used to cultivate moral personhood.

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Abstraction vs. Idealization

In her *Nature’s Capacities and Their Measurement* (Oxford: Clarendon Press, 1989, pp. 185-198), Nancy Cartwright introduced the distinction between *abstraction*, which refers to that fact that not all the properties of a physical system are included in the corresponding scientific models of it, and *idealization*, which refers to the fact that characteristics of a system are deliberately distorted. Here I unravel, based on a conceptual analysis of the terms “abstraction” and “idealization”, the relation between both concepts.

The concept of *abstraction* involves subtracting certain properties of a physical system when representing the system by means of a scientific model. The concept of *idealization* involves deliberately distorting certain properties of a physical system when representing this system by means of a scientific model. Correspondingly, I define abstraction and idealization as follows:

(a)^{df} We *abstract* from property \mathcal{P} of a physical system x ($\exists \mathcal{P}^x$), iff in our corresponding scientific model property \mathcal{P} is not included ($\sim \exists \mathcal{P}^m x$) (where “ \mathcal{P} ” is the property exhibited by x , “ x ” refers to x as a target, and “ m ” to x as represented by a model).

(i)^{df} We idealize a property \mathcal{P} of a physical system x ($\exists \mathcal{P}^t x$), iff in our corresponding scientific model property \mathcal{P} is not included ($\sim \exists \mathcal{P}^m x$) and, furthermore, is replaced by a different property ($\exists \mathcal{Q}^m x$) (where “ \mathcal{Q}^m ” which is not exhibited by x as a target, and which replaces \mathcal{P}^t).

Given these definitions, it follows that *idealization* always presupposes *abstraction*, but that the converse does not hold. “Idealization” is thus a weaker notion than “abstraction”. From the above, I conclude that idealization is a subset of abstraction.

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Is the Answer to this Question No? Semantic Paradoxes for Questions and Imperatives

It is possible to construct semantic paradoxes for imperatives and questions resembling the liar paradox. Consider *question 1* below.

Question 1 *Is the answer to this question no?*

If we answer ‘yes’ to *question 1*, then the answer is ‘no’. Similarly, if we answer ‘no’, the answer is ‘yes’. So, the answer to the question is ‘yes’ if and only if the answer is ‘no’.

Now, consider the imperative below.

Imperative 1 *Violate this imperative!*

Given that the addressee violates the imperative, the addressee fulfils it. Given that the addressee fulfils it, the addressee violates it.

It is also possible to make analogies to the well-known variants of the liar paradox, finite loops and infinite ω -paradoxes, (see S. Yablo, (2006: “Circularity and Paradox”, in *Self-Reference*, CSLI Lecture Notes, 165–182). Here are a few examples.

Question 2 *Is the answer to question 3 yes?*

Question 3 *Is the answer to question 2 no?*

If the answer to *question 2* is ‘yes’, then the answer to *question 3* is also ‘yes’, in which case the answer to *question 2* is ‘no’. If the answer to *question 2* is ‘no’, then the answer to *question 3* must be ‘no’, and in such a case the answer to *question 2* is ‘yes’.

For the ω -paradox of imperatives, assume an infinite sequence of imperatives $S = (S_1, S_2, \dots)$, where S_i has the following form, for $i = (1, \dots)$:

S_i : For all $n > i$: Violate S_n !

Assume that S_1 is fulfilled. Then for all $n > 1$, S_n is violated, in particular S_2 . But then, for some $m > 2$, S_m is fulfilled. In that case S_1 is violated.

Instead, assume S_1 is violated. So for some $i > 1$, S_i is fulfilled. Let S_n be any such imperative. So for all $m > n$, S_m is violated, in particular S_{n+1} . So there is an $k > n + 1$, with S_k fulfilled. So S_n cannot be fulfilled. Since nothing special was assumed about S_n , S_1 must be fulfilled.

In conclusion, S_1 is violated if and only if it is fulfilled. By substitution, the same goes for all the rest of the sentences of the sequence S .

Of all the possible points of criticism, I will now only briefly consider the possible objection that the paradoxical element of the paradoxes displayed above is not an imperative or a question at all, but rather, it is produced from a reduction of the imperatives and questions to their non-linguistic fulfilment and answering conditions. A ‘true’ paradoxical imperative would for instance be the following.

Imperative 2 *Violate and do not violate this imperative!*

Although there is a point here, which might prove fruitful if investigated further, the paradoxical part of the liar paradox is also not the actual indicative liar sentence. The liar paradox ensues from the liar sentence by considering the non-linguistic conditions for its being true or otherwise.

Finally, this is not the place to go in depth with solutions to the paradoxes. I will just note that some of the usual attempts at solving or undercutting the liar paradox also carry over to imperatives and questions. In particular, one might reject (an analogy to) *tertium non datur* for yes-no questions. It could be argued that in addition to ‘yes’ or ‘no’, there is a third possible answer, e.g., ‘maybe’. We still assume that one and only one answer is given to each question. If this strategy is adopted the answer to *question 1* becomes ‘maybe’, since it cannot be either true or false, and no contradiction follows from assuming that the answer is ‘maybe’. However, we will have to deal with strengthened forms of the paradox, such as the following.

Question 4 *Is the answer to this question no or maybe?*

There are 3 possible answers: 1) ‘yes’, 2) ‘no’ or 3) ‘maybe’. 1) If the answer to *question 4* is ‘yes’, then it is ‘no’ or ‘maybe’. If the answer is ‘no’, then it is both ‘yes’ and ‘no’. If the answer is ‘maybe’, then it is both ‘yes’ and ‘maybe’. 2) If the answer to *question 4* is ‘no’, then it is either ‘no’ or ‘maybe’ and hence

‘yes’. 3) If the answer to *question 4* is ‘maybe’, then, again, it is either ‘no’ or ‘maybe’ and hence ‘yes’. In conclusion, either the answer to *question 4* is ‘yes’ and ‘no’, or the answer is ‘yes’ and ‘maybe’. In either case, the underlying assumption that the 3 possible answers are mutually exclusive is contradicted.

Generalizing to any finite number of exhaustive and mutually exclusive answers, a new paradox can be generated by asking whether the disjunction of the answers, except yes, obtains. If the answer is ‘yes’ one of the possible answers must also be the case. If the answer is one of the possible answers, the answer must also be ‘yes’.

In conclusion, I have shown analogies to the liar paradox and some variants, (loops, the ω -liar and a version of the strengthened liar), for imperatives and questions. Apart from being amusing, these structural similarities point towards deeper philosophical questions. E.g., how do these paradoxes relate to the usual supposition that imperatives and questions cannot be true or false?

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The Divine Liar Resurfaces

Peter Milne (2007: ‘Omniscient beings are dialetheists’, *Analysis* 67, 250–51) has rediscovered the paradox of the Divine Liar first put forward by Patrick Grim (1983: ‘Some neglected problems of omniscience’, *American Philosophical Quarterly* 20, 265–77). The (supposedly) paradoxical sentence is:

(S) No omniscient being knows that which the sentence S expresses.

That which is expressed by S , so the argument goes, is true, since, if it were not true, then some omniscient being would know it, which would imply its truth. Rather than derive the conclusion that there is no omniscient being, Milne derives the conclusion that if there is an omniscient being then both S (by the above argument) and $\neg S$ will be true (since there is, on this hypothesis, an omniscient being that knows that which the sentence S expresses). Milne concludes that any omniscient being there is must be a dialetheist, since it will know the contradiction $S \& \neg S$, and know that it knows it.

This argument is just the Strengthened Liar (‘ L : That which L expresses is not true’) in theistic (and dialetheistic) dress. Milne could have got the conclusion that there was no omniscient being from considering:

(S') Either that which S' expresses is not true or there is no omniscient being.

And he could have got dialetheism from considering:

(S'') Either that which S'' expresses is not true or there is a true contradiction.

Suppose that that which is expressed by S' is not true, then it follows by propositional logic that neither disjunct expresses a truth, and, in particular, that that which is expressed by the first disjunct isn’t true, and, hence, by the content of that disjunct, that it is not true that that which S' expresses is not true, which contradicts our supposition. This contradiction (allegedly) shows that that which S' expresses is true and, since that which is expressed by the first disjunct then isn’t true, it follows by propositional logic that that which is expressed by the second disjunct is true. And similarly for S'' , with the added bonus that one cannot escape the conclusion of the argument by invoking dialetheism.

If I am right that Milne’s paradox is just a version of the Strengthened Liar then a solution for the Strengthened Liar should fare just as well for Milne’s paradox. Space precludes a detailed treatment of the Strengthened Liar, so I shall examine just one attempted solution: that of Whitehead and Russell (1927: *Principia Mathematica*, Cambridge: Cambridge University Press) and Tarski (1956: ‘The Concept of Truth in Formalized Languages’, in his *Logic, Semantics, Metamathematics*, Oxford: Clarendon Press, 152–78). This solution denies that there is any such property as truth *simpliciter*; postulating instead that there is an infinite hierarchy of truth properties. Propositions like the proposition that snow is white that, intuitively, involve no alethic properties are of degree 0; such a proposition is true₀ if and only if it is true in the intuitive sense of the folk predicate ‘is true’, and is false₀ if and only if it is false in the intuitive sense of the folk predicate ‘is false’. Propositions that involve a property such as that corresponding to ‘is true₀’ or that corresponding to ‘is false₀’ are of degree 1; propositions that involve a property such as that corresponding to ‘is true₁’ or that corresponding to ‘is false₁’ are of degree 2, and so on. There is no property of truth *simpliciter*, so predicates such as the folk predicate ‘is true’ (i.e. with no subscript) fail to correspond to a property. On this solution, the Strengthened Liar turns out to be ill-formed, since it uses the folk predicate ‘is true’ without a subscript, and, hence, expresses no proposition at level 0, 1, etc., i.e. is not true₀, false₀, true₁, false₁, etc. Since it is ill-formed the paradoxical inference is blocked.

Now let us see whether this solution can be extended to Milne’s paradox:

(S) No omniscient being knows that which the sentence S expresses.

What is it to know that which the sentence S expresses? It is warranted to believe it (assuming it is true). What

is it to believe that which the sentence S expresses? It is, intuitively, to think it true. Since, however, there is no single property of truth, there can be no single belief relation either: there is belief_0 when one thinks that a proposition is true_0 , belief_1 when one thinks that a proposition is true_1 , etc. Likewise, there is no single knowledge relation: there is knowledge_0 when one warrantedly thinks a proposition is true_0 when it is true_0 , knowledge_1 when one warrantedly thinks that a proposition is true_1 when it is true_1 , etc. It follows that S , since it attempts to involve the non-existent relation of knowledge simpliciter, is ill-formed, i.e. expresses no proposition at level 0, 1, etc., i.e. is not true_0 , false_0 , true_1 , false_1 , etc. The same goes for S' and S'' too. Hence no conclusion can be derived as to the non-existence of an omniscient being or the truth of dialetheism.

Milne may try to regroup with the following:

(S_0) No omniscient being knows₀ that which the sentence S_0 expresses.

This would be parallel to:

(L_0) That which L_0 expresses is not true_0 .

Again, however, no conclusion can be derived as to the non-existence of an omniscient being or the truth of dialetheism since S_0 (like L_0) does not express a truth₀; in fact it expresses a truth₁ and would thus be known₁, not known₀, by every omniscient being. Nor can Milne respond with:

(S_ω) For every knowledge relation, knowledge _{n} , no omniscient being stands in knowledge _{n} to that which the sentence S_ω expresses.

This would be parallel to:

(L_ω) For every truth property, truth _{n} , that which L_ω expresses is not true_n .

Since that which the sentence S_ω expresses quantifies over knowledge _{n} for every n (if indeed this is permitted), it (like L_ω) cannot be true_0 , true_1 , etc. So, if it has any kind of truth value, it will be true_ω and therefore known _{ω} . So, if the Russell–Tarski solution works for the Liar it also works for Milne’s paradox.⁵

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⁵I should like to thank Prof. Mark Sainsbury, Prof. Richard Gaskin, and Dr Michael Scott for helpful comments, and Dr James Heather for his help in typesetting this essay in L^AT_EX.

New Centre for Reasoning at Kent

The world’s first [Centre for Reasoning](#) has recently been set up at the University of Kent to act as a hub for research on reasoning and inference.

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The centre welcomes visitors: if you would like to visit please contact [Jon Williamson](#) with a CV and a brief research plan. While we can’t pay expenses, we can provide office space and a congenial working environment. The Centre for Reasoning is based at the [Canterbury](#) campus of the [University of Kent](#). [Canterbury](#) is an attractive city in the south-east of England, close to the coast and the [North Downs](#). London, Paris and Brussels are all within striking distance for day trips.

STOP PRESS: some funds have become available for visiting research fellowships to the University of Kent. If you are a non-UK citizen, within 8 years of your PhD and would like for visit for 9-10 months, please [contact me](#) by 10th September 2007.

[Jon Williamson](#)
Philosophy, University of Kent

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CONDITIONALS AND RANKING FUNCTIONS: Special issue of Erkenntnis, franz.huber@uni-konstanz.de, deadline 31 May 2008.

§4

EVENTS

PROGIC 2007

The Third Workshop on Combining Probability and Logic, University of Kent, 5–7 September 2007.

BLC 2007: British Logic Colloquium, London, 6–8 September 2007.

IDA 2007: The 7th International Symposium on Intelligent Data Analysis, Ljubljana, Slovenia, 6–8 September 2007.

MIND & SOCIETY 2007: Philosophical and Sociological Approaches to Mathematics, Manchester, UK, 7–8 September 2007.

DYNAMICS OF KNOWLEDGE AND BELIEF: Workshop at KI-2007, 30th Annual German Conference on Artificial Intelligence, Osnabrück, 10 September 2007.

CSL 2007: Computer Science Logic, Lausanne, 11–15 September 2007.

RANDOMISED CONTROLLED TRIALS: Second Annual Conference on Randomised Controlled Trials in The Social Sciences: The way forward, University of York, 13–14 September 2007.

INTERNATIONAL CONFERENCE ON NORMATIVE CONCEPTS: Zurich University, 21–22 September 2007.

A IPL-07: Workshop on Artificial Intelligence Planning and Learning, Providence, Rhode Island, 22

September 2007, organized in conjunction with the International Conference on Automated Planning and Scheduling (ICAPS-07).

SYMCON’07: The Seventh International Workshop on Symmetry and Constraint Satisfaction Problems, Providence, RI, USA, 23 September 2007.

ICAPS 2007: Workshop on Planning in Games, Providence, Rhode Island, USA, 23 September 2007.

SPRING BAYES 2007: The 4th annual meeting of Australasian Society for Bayesian Analysis (ASBA) will take place in Coolangatta, 26–28 September, 2007.

TBILISI: The Seventh International TBILISI Symposium on Language, Logic and Computation, 1–5 October 2007.

REASON, INTUITION, OBJECTS: The Epistemology and Ontology of Logic, Buffalo, 13 October 2007.

LPAR 2007: Logic for Programming, Artificial Intelligence and Reasoning, Yerevan, Armenia, 15–19 October 2007.

WOMEN IN MACHINE LEARNING: Orlando, Florida, 17 October 2007.

CASE STUDIES OF BAYESIAN STATISTICS: The Ninth Workshop on Case Studies of Bayesian Statistics, Carnegie Mellon University, Pittsburgh, 19–20 October 2007.

MWPMW 8: Eighth annual Midwest PhilMath Workshop, to be held at Notre Dame, 27–28 October 2007.

ECSQARU’07: Ninth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, October 31, 1–2 November 2007, Hammamet, Tunisia.

NOVEMBERTAGUNG: 18th Novembertagung on the history, philosophy and didactics of mathematics, Bonn, Germany, 1–4 November, 2007.

INFINITY: International Conference on Infinity in Logic and Computation, University of Cape Town, South Africa, 3–5 November 2007.

CURVES: Modern challenges of curve modelling: inverse problems and qualitative constraints, Bristol, 7–9 November 2007.

CONTEXT-DEPENDENCE: Context-Dependence, Perspective and Relativity in Language and Thought, Ecole Normale Supérieure, Paris, 9–11 November 2007.

URSW: 3rd Workshop on Uncertainty Reasoning for the Semantic Web, Busan, Korea, 12 November 2007.

EPSA07: 1st Conference of the European Philosophy of Science Association, Madrid, 15–17 November 2007.

LOGKCA-07: ILCLI International Workshop on Logic and Philosophy of Knowledge, Communication and Action, Donostia, 28–30 November 2007.

M4M5: Methods for Modalities 5, Cachan, France, 29–30 November 2007.

NIPS: Neural Information Processing Systems—Natural and Synthetic, Hyatt Regency Vancouver, 3–6

December 2007.

WORKSHOP: International Workshop on Applied Bayesian Statistics, EpiCentre, Massey University, Palmerston North, New Zealand, 10–14 December, 2007.

GRADUATE CONFERENCE: 1st Cambridge Graduate Conference on the Philosophy of Logic and Mathematics, St. John’s College, Cambridge, 19–20 January 2008.

FoIKS 2008: Foundations of Information and Knowledge Systems, Pisa, Italy, 11–15 February 2008.

ARTIFICIAL GENERAL INTELLIGENCE: The First Conference on Artificial General Intelligence, Memphis, Tennessee, 1–3 March 2008.

CONSTRAINT-SAC2008: Track on Constraint Solving and Programming, at the 23rd Annual ACM Symposium on Applied Computing, Fortaleza, Brazil 16–20 March 2008.

CAUSATION: 1500-2000: King’s Manor, University of York, 25–27 March 2008.

RELMiCS10-AKA5: 10th International Conference on Relational Methods in Computer Science & 5th International Conference on Applications of Kleene Algebra, Frauenwörth, Germany, 7–11 April 2008.

REDUCTION AND THE SPECIAL SCIENCES: Tilburg Center for Logic and Philosophy of Science, 10–12 April 2008.

WORKSHOP: XVIII Inter-University Workshop on Philosophy and Cognitive Science, Madrid, luis.fernandez@filos.ucm.es, 22–24 April 2008.

SIG16: 3rd Biennial Meeting of the EARLI-Special Interest Group 16—Metacognition, Ioannina, Greece, 8–10 May 2008.

UR 2008: Special Track on Uncertain Reasoning, 21st International Florida Artificial Intelligence Research Society Conference (FLAIRS-21), Coconut Grove, Florida, USA, 15–17 May 2008.

COMMA’08: Second International Conference on Computational Models of Argument Toulouse, France, 28–30 May 2008.

HOPOS 2008: Seventh Congress of the International Society for the History of Philosophy of Science, Vancouver, Canada, 18–21 June 2008.

EPISTEME: Law and Evidence, Dartmouth College, 20–21 June 2008.

ISBA 2008: 9th World Meeting, International Society for Bayesian Analysis, Hamilton Island, Australia, 21–25 July 2008.

FIRST FORMAL EPISTEMOLOGY FESTIVAL: Conditionals and Ranking Functions, Konstanz, 28–30 July 2008.

CONFERENCE: Language, Communication and Cognition University of Brighton, 4–7 August 2008, Brighton, UK.

SOFT METHODS FOR PROBABILITY AND STATISTICS: 4th International Conference, Toulouse, France, 8–10 September 2008.

VALENCIA MEETINGS: Valencia / ISBA Ninth World Meeting on Bayesian Statistics, Spain, June 2010.

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JOBS

SENIOR RESEARCH FELLOWSHIPS: All Souls College, University of Oxford, deadline 10th September 2007.

LECTURER IN MEDICAL STATISTICS: Centre for Medical Statistics and Health Evaluation, University of Liverpool, deadline 10th September 2007.

MEDICAL STATISTICIAN: University of Southampton, deadline 10th September 2007.

RESEARCHERS: 8–12 Postdoctoral Researcher / University Researcher positions, Helsinki Collegium for Advanced Studies, University of Helsinki, deadline 12 September 2007.

LECTURER IN BIostatISTICS: Institute of Psychiatry, King’s College London, deadline 13 September 2007.

2-YEAR POSTDOC: Konstanz University, Germany. The Emmy Noether junior research group Formal Epistemology, two year postdoctoral research position in Philosophy, on the project ‘Belief and Its Revision’, deadline 1 November 2007.

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COURSES AND STUDENTSHIPS

Courses

SECEVITA 2007: Summer School in Artificial Life and Evolutionary Computing, 31 August – 4 September 2007, Baia Samuele, Ragusa, Italy.

BAYESIAN ANALYSIS, MCMC AND WINBUGS: MRC Biostatistics Unit Cambridge, 11–12 September 2007, Instructors: Dr David Spiegelhalter and Dr David Lunn.

DISCRETE CHOICE MODELLING: Centre for Transport Studies at Imperial College London, 28–30 November 2007.

SECOND INDIAN WINTER SCHOOL ON LOGIC: IIT Kanpur, 14–26 January 2008.

Studentships

LEARNING THEORY, STATISTICS AND INFORMATION THEORY: 4 year PhD position, Information-Theoretic Learning Group CWI, Amsterdam (National Research Institute for Mathematics and Computer Science in the Netherlands), deadline 7 September 2007.

ENACTIVE ARTIFICIAL INTELLIGENCE: Interfaculty Research Studentships, Steps Toward Enactive Artificial Intelligence, Philosophy / Computer Science, University of Hertfordshire, deadline 7 September 2007.

FORMAL ARGUMENTATION AND TRUST MANAGEMENT:
PhD position, The University of Luxembourg (Computer Science and Communications Research Unit), leon.vandertorre@uni.lu, deadline 30 September 2007.

LOGIC AND PHILOSOPHY OF SCIENCE: 4 year PhD position or a 80%-funded 4 year post-doctoral research position, The Center for Logic and Philosophy of Science at the Vrije Universiteit Brussel, sonsmets@vub.ac.be, deadline 1 December 2007.

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