Disagreements in Logic

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Abstract

Logic is sometimes held to be the "final arbiter" of disagreements, itself beyond the scope disagreement. If sheer logic is not conclusive, what is? As the history of logic shows, however, this view is just false. In the first part of this essay I examine the nature of disagreements in logic and the methodology of rational choice between different theories of logic. The discussion puts on the table the notion of consistency, and in particular the role it plays in disagreements. That matter is examined more closely in the second part of the essay. An upshot of the discussion is that consistency, though it may be a theoretical virtue, is not one which perforce overrides all others.

1 Introduction

Logic is sometimes held to be the "final arbiter" of disagreements, itself beyond the scope disagreement. If sheer logic is not conclusive, what is? As the history of logic shows, however, this view is just false. In the first part of this essay I examine the nature of disagreements in logic. The discussion puts on the table the notion of consistency, and in particular the role it plays in disagreements. That matter is examined more closely in the second part of the essay.

2 Getting the Geography Straight

Let us start with some ground-clearing.

The word 'logic' is used in many different ways. For the purpose of this essay, I shall understand it as: *what* (*conclusions*) *follows from what* (*premises*). And one needs to note immediately that there are two different (but inter-related) ways in which something may be thought to follow: *deductively* and *non-deductively* (*inductively*, or to give it a more modern name, *non-monotonically*). I will make a brief comment on non-deductive logic in what follows, but otherwise when I use the word 'logic' I will be referring to deductive logic.

Even with the meaning of the word 'logic' thus narrowed down, it is still highly ambiguous. Crucially, we need to distinguish between it as referring to a *theory* about what follows from what (and why) and what *actually* follows from what. The word 'dynamics' has a similar ambiguity (Newtonian dynamics, Aristotelian dynamics *vs* the dynamics of the moon, the dynamics of falling bodies). If we are talking about disagreements in logic, we are talking about the first of these.[1]

A modern formal logic can be thought of as providing a theory of the correct logic, in this sense. And as anyone familiar with the history of 20th Century logic knows well, there have been many disputes about which formal logic gets matters right: "classical logic", intuitionist logic, some many-valued logic, relevant logic, etc. In fact, disputes of this kind have been going on throughout the history of Western logic. Thus, in the Middle Ages, there were numerous theories of *consequentiae*, and disagreements over which was right.[2]

Moreover, the received theory, when there has been one, has changed from time to time. Not only has it changed, it has been changed for rational reasons. So consider the change from the orthodoxy of "traditional logic" (the is, what was left of Medieval logic, once much of its sophistication had been forgotten) to that of "classical logic" (that is, the logic invented by Frege, Russell, and polished by others) which occurred in the first few decades of the 20th century. This was brought about when the drive for rigor in 19th century mathematics eventually forced mathematical reason-

[1] Just to complicate matters, 'logic' can also refer to a practice of inferring. There can also be disputes about whether or not a practice is correct, but these can be resolved only with reference to a theory of the correct practice.

[2] See, e.g., Ditilh Novaes (2020).

ing under the microscope. Traditional logic was just not up to the job. The power and precision of classical logic delivered a much better theory of correct reasoning in the mathematics of the time—so much so, that it soon became accepted (rather uncritically) as the correct theory of reasoning about *anything*—though it should also not be forgotten that the new "mathematical logic" was rejected by many traditional logicians for some decades.

It is still sometimes suggested in the way that logic is taught that traditional logic is just a fragment of classical logic, and that classical logic simply provides a more comprehensive and powerful version of the same thing. Such is just false. Some inferences that are valid in traditional logic are invalid in classical logic. Thus, for Aristotle, the inference called by Medieval logicians *Darapti* is valid:

All As are Bs
All As are Cs
So some Bs are Cs

In classical logic it is not. One can make this inference valid in quantification theory by adding an existential conjunct to Aristotle's A form, so that 'All As are Bs' is understood as $\forall x(A(x) \supset B(x)) \wedge \exists x A(x)$. However, this destroys other parts of traditional logic, such as the fact that the A and O forms are contradictories. (The O form is: Some As are not Bs.)

The matter goes in the other direction as well. Classical logic tells us that from a contradiction anything may be inferred (Explosion). But Aristotle tell us explicitly that an inference from a contradictory pair of propositions may not be valid.[3] Consider, for example

No As are Bs
Some Bs are As
So all As are As

This is not a valid syllogism, though the premises are contradictory.

So we face our central question: when is one theory of what follows from what rationally preferable to another? That is: how are disagreements about what logical theory is correct to be rationally adjudicated?[4]

[3] *Prior Analytics* 63^b31-64^a16.

[4] For more on the material in this section, see Priest (2003) and (2014).

3 Inference to the Best Explanation

There is, in fact, a very general method employed in rational theory-choice. It is familiar from the philosophy of science, and is called *abduction*, or *inference to the best explanation*. Thus, if your car stops, and the petrol gauge shows empty, you infer that you have run out of petrol. The cause could be a simultaneous failure of the petrol gauge and the fuel injector, but that is much less plausible. More profoundly, the Special Theory of Relativity was adopted over Newtonian Dynamics because it was the best theory to explain phenomena such as that exposed by the Michelson-Morley experiment.

This method is not used just in science, however. It is used whenever we theorise about some topic, be it in science, history, metaphysics, and so on.

We formulate a theory or theories when we have some phenomenon we want to understand. We know some things about this, and wish to explain them—and maybe predict others. Let us call the things we wish to explain the *data*. In science, these will be the empirical observations we make, usually nowadays as a result of experimentation. The most important criterion for a theory to satisfy is, then, adequacy to the data.

However, matters cannot end there. Rarely will a theory account for all the data. It may even be the case that two theories account for much the same data (as was the case, for example, with the Theory of Special Relativity and the Lorentz-Fitzgerald Contraction Theory). Other criteria—or virtues, if you like—must therefore be involved. The list of these is somewhat contentious; how, exactly, to understand some of them is certainly so. But we need not pursue these matters here. A general and reasonably uncontroversial, list includes:

- simplicity
- consistency
- power
- unifying ability
- avoidance of *ad hoc* auxiliary hypotheses

Now, these criteria may well not all pull in the same direction. Thus, when Copernicus proposed his heliocentric account of the cosmos, it and its rival

geocentric (Ptolemaic) account, were roughly equal on accuracy of predications. The Copernican account was somewhat simpler since it eschewed the use of the equant (but not of epicycles); but the Copernican account was incompatible with the received dynamical theory of the day—that of Aristotle, which made it impossible for the Earth to move. (This, of course, changed later, when the Aristotelian theory of motion was itself replaced by that of Galileo and Newton.)

Given that the criteria may well pull in different directions, what is the rationally acceptable theory? The one that works best overall. That's vague, of course. It may be tightened up somewhat by giving a (rough) numerical value to the performance of each theory at issue on each criterion, attaching a (rough) weight of relative importance to each criterion, and then taking the best theory (if there is one) to be the one which has the greatest weighted sum over all the criteria. We need not go into the details here.[5]

What should one do if two (or more) theories perform about the same? Perhaps one should suspend judgement, till one knows more. Perhaps one has a rational free choice. After all, in real life, two (more or less) rational people, each knowing what the other knows, may still disagree over something. Again, for present purposes, we do not go into the matter here.

4 Logical Abductivism

Being a very general method of rational theory choice, it is no surprise that it is applied in the choice of logical theory. Thus, the account explains, for example, why "classical logic" replaced traditional logic at the beginning of the 20th Century. It also accounts well for the considerations adduced by advocates of different logics as the century progressed. Not that one typically finds advocates doing an explicit cost-benefit analysis—though one can.[6] Rather, what one finds is advocates making the case that their preferred logic performs better than a rival on the various criteria.

The recognition that such a procedure is at work in logic is now often referred to by the somewhat ugly name of *logical anti-exceptionalism*. I prefer the simpler name *logical abductivism*.[7]

[5]They are spelled out in Priest (2016).

[6]See, e.g., Priest (2019).

[7]Further, see, e.g., Hjortland (2019).

Although abduction is a general method of rational theory choice, its application to logic does raise a number of specific issues. In the rest of this section I will discuss some of them.[8]

4.1 The Logical Data

First, and perhaps most obviously, what counts as the data to which logical theories should be (as) adequate (as possible)? The answer is that we make judgments about the validity or otherwise of various simple inferences. Thus, we hold that the inference:

> John is in Paris
> If John is in Paris, John is in France
> So John is in France

is valid. But the inference:

> Mary is in France
> If Mary is in Paris, Mary is in France
> So Mary is in Paris

is not. Inferences like this provide the data. A good theory should explain that and why the first in valid and the second is not.[9]

Of course, if lay people are asked about the validity of such inferences, there are many pitfalls to be avoided. They must understand the difference between (deductive) validity and soundness (= validity plus truth of premises); they must be clear on the difference between 'if' and 'if and only if', and so on.

It is also well known that people make systematic errors, even when these things are not factors. Thus, for example, there is the well known Wason Card test.[10] People know that there are cards with a letter one one side and a numeral on the other. On the table lie four cards showing A, Q, 2, 3. They are then asked which cards need to be turned over to check the truth of the conditional: *if there is an A on one side of a card there is an even number on the other*. Most people say A, or A and 2, whereas the

[8]Further discussions of most issues can be found in Priest (2016).

[9]Note that I am not talking about inference schemas, like *modus ponens*, here, but particular inferences. Schemas being universal generalisations, our judgments about them are much more fallible.

[10]Wason and Johnson-Laird (1972),

right answer is A and 3. Interestingly, people are much less likely to make a mistake if they are given an isomorphic problem about a "real life" situation. Exactly what cognitive mechanism is operative here is a contentious matter. Crucially, however, people can come to see that they have made a mistake, and not because of any high-powered theory about conditionals, but simply by turning cards over. Performance-errors of this kind must be ruled out. It is no accident that early 20th Century logicians took mathematical reasoning to be a paradigm of correct reasoning. A training in mathematics tends to eliminate such errors.

4.2 Fallibilism

Next, one should note that abduction is a fallible business. Our conclusion may be wrong. This is obviously the case, since we choose between the theories available, and a new and better theory may well appear. This is so in science, but it is equally the case in logic. Indeed, this is exactly what happened with the appearance of classical logic.

It is not only the conclusion that is fallible. The data against which a theory is judged are also fallible. This is a well known phenomenon in the philosophy of science. Data can turn out to be wrong, due to problems (practical or theoretical) with measuring devices, faulty auxiliary assumptions, and so on. A theory that is strong in other regards may well be used to undermine empirical data. Of course, where this happens, there had better be an independent explanation of why the data are wrong, or the move is *ad hoc* and unsatisfactory.

Exactly the same is true in logic. Let me give a well known example. (I am not endorsing it.) The inference:

x is red
So x is coloured

looks very much like a valid (deductive) inference. According to most contemporary logical theories, it is not. Explanation? What is valid is the inference with the obvious and suppressed premise: all red things are coloured. We confuse the inference with the enthymeme.

Whatever one thinks of this example, it shows that though our judgments concerning data may be *a priori* in one sense (you can make them with your eyes closed and your ears stopped), they are not *a priori* in another sense, viz., incorrigible.

4.3 Prediction

Next, there is an issue about prediction. Is the fact that a theory makes successful novel predications one of the rational virtues? And if so, what could such predictions be in the case of logic?

There are many issues to be borne in mind here. First, certain criteria may be applicable only when theorising about particular areas. Thus, numerical accuracy is an important criterion in physics; it is not normally so in metaphysics. It is quite possible that the making of novel and confirmed predictions is important in physics, but not in logic.

Secondly, even where successful novel prediction is a criterion, it is not obvious that it is an *independent* criterion. One might argue that novel predictions, whether verified or not, simply provide more data against which the criterion of *adequacy to the data* is implemented. Thus, it may be of singular importance that the theory used to make the prediction explains the new data, whilst another theory does not.

Third, there is an important and well known issue about what, exactly, a novel predication is. Is it something that was literally unknown before the predication was tested; or, perhaps more plausibly, is it something that was known, but not taken into account in the construction of the theory?[11]

Answers to the above questions are necessary before one can adjudicate the issue of what might constitute successful or unsuccessful novel predictions in logic. However, here is one relevant observation.[12] When classical logic was invented, what concerned its founders was mathematical reasoning. Reasoning in non-mathematical areas was not on their agenda. So whether the theory makes correct predictions in other areas, is clearly one possible understanding of novel prediction. And classical logic would seem to fare rather badly when one looks at such predications. It does not seem to give the right results when dealing with conditionals outside of mathematics, vague predicates (think the sorites paradox), other kinds of paradox. This does not show that the theory cannot be augmented or saved with various (maybe *ad hoc*) manoeuvres. But the point remains: one might think of this as a case of unsuccessful novel prediction.

[11] See Barnes (2018).

[12] For a fuller discussion of the matter, see Martin and Hjortland (2020).

4.4 Logical Pluralism

Next, let me say some words about logical pluralism. 'Logical pluralism' can have many senses. In some, logical pluralism is trivially true. In some, it is not. And in some of these it is more plausible than others. I think the most plausible (though I am not inclined to it) concerns the claim that different logics are correct for different topics, domains, or kinds of thing about which we reason (middle sized dry goods, mathematical constructions, etc). Let us fix on this sense of logical pluralism.[13]

I have so far talked about the rational choice of the correct logic, and that may have given the impression that the abductive method of revising logical disputes applies only to logical monism. It does not. Suppose logical pluralism (in the sense specified) to be correct. It remains that we must determine which is the correct logic for any given domain. The method here is exactly logical abductivism.

Logical pluralism *vs* logical monism itself is a meta-theoretical issue. We must choose between one single logic for all domains, and a bunch of different logics, one for each of the domains in question. That theoretical choice will itself by determined by the familiar abductive procedure. Pluralism might well have an advantage, in that the plurality of logics may make it easier to do justice to the different inferences we may be wont to make for different domains. But on the other hand, it will perform poorly with respect to monism on the question of simplicity and uniformity. (Think how appealing a planetary dynamics would be if there were a different dynamical theory for every planet.)[14]

4.5 Circularity

We come now to the trickiest subject. When we apply abduction to determine which logical theory is the best, a certain amount of deductive reasoning may be required. Clearly we have a circularity of some kind. It might be thought that the circularity is vicious, and that what it shows is that there must be a logic, at least of a core kind, whose correctness must be determined in some other way. In the end, there must be some kind of logical court of final appeal: some ultimate *a priori* ground for validity.

[13]For a fuller discussion of logical pluralism, see Priest (2001).

[14]For further discussion, see Priest (202+a).

That does not follow, however. All rational belief, logic included, is *situated*. There is no *tabula rasa*. A community of inquirers has no choice about where to start from. That is given to its members by their culture and education. What they do have power over is how to revise a received position rationally. This may be by the investigation of problems with received theories, the discovery of new data, the invention of new theories, and so on.

I might add that the point applies to a theory of the *methodology* of theory choice as well. The method I have described was not brought down from Mt Sinai on tablets of stone. Epistemological methodology has itself been a work in progress, and may continue to be so. The abductive methodology I have describe above is, I take it, something like that which we have now. But it too, is open to revision. After all, it is itself a fallible theory of the best way to proceed in theory choice.

Anyway, given the situated nature of our understanding, if we need to reason deductively in making the abductive inference of what the correct logic is, we should use the logic we currently take to be correct—whatever that is. This is a circularity, but an unavoidable one. It might be thought that the logic delivered in this process will inevitably be the one we currently accept. That, however, by no means follows. There is absolutely no reason why, reasoning correctly according to one logic may not deliver the conclusion that a different logic is better.

This is not the danger. The danger is precisely that reasoning according to one logic we will arrive at the conclusion that a different logic is better. In this case, what can one do but redo the choice-computation with the new logic? If the new logic still comes out best, all well and good. If it does not, we face a problem. In particular, if the new computation shows that the old logic was better, we are forced back to the beginning of a vicious circle.

I think that in practice, this is most unlikely to happen. The logical inferences required to implement the theory-comparison sketched in §3 require nothing more than those governing some primitive recursive arithmetic (addition, multiplication). And—at least so far in the history of logic—these have not been challenged.

However, one cannot deny that the viciously circular situation is a possibility—at least in some sense of 'possible'.

What ought one to do if it actually does happen? Clearly, it shows some sort of infelicity in our methodology of theory choice. It, itself, would therefore need to be revised. How should one do this? There may be no fact of the matter concerning this. We can only be creative. But that, after all,

is what theory-invention is all about.

Let me expand a little on this point. We are dealing with certain kinds of norms: those of rationality. Now, systems of norms can fail to determine some things. Consider the following examples. We play a simple game. We take it in turns to cut a pack of cards. If a red card is shown, I pay you $1. If a black card shows up, you pay me $1. After playing the game for 10 minutes, we cut the pack and a Joker turns up. (Maybe it's red and black.) The rules of the game do not determine what should be done—but could be changed to do so: no one pays anything; the person who cuts pays; the person who was paid last time pays this time.

Real-life situations of this kind can occur in laws and other kinds of regulations. The constitution of the United States says that if the president dies, the vice president becomes president. If both die together, it is up to Congress to determine who assumes presidential responsibilities. But what should happen if Congress itself cannot function (perhaps due to a nuclear terrorist attack in Washington) is not specified. So the constitution does not determine who is president in this situation. Congress has made various determinations from time to time, but the succession lists are very finite, and if no person on the list is alive, there is still an indeterminacy in the law.

These examples concern norms of games, laws, and regulations, not norms of rationality. But they make the point: systems of norms can just leave matters undetermined. There is, as far as I can see, no reason why norms of rationality must determine what it is rational to do in every situation—especially unusual ones.

4.6 Non-Deductive Inference

Let me end this section by saying something about non-deductive inference. (The connection with the last subsection will become clear in a moment.)

In the history of logic, non-deductive logic has been given much less attention then deductive logic. (Maybe that is because logicians have been mathematicians and philosophers, rather than lawyers and doctors.) Consequently, many issues about it are still unclear. Is there a plurality of different kinds of non-deductive inference? How best should it (or each of these) be understood? What role, if any, does probability play?

However, abduction is clearly one important kind of non-deductive inference. And there may well be different theories of what makes an abductive inference valid. Given this, how is one to determine, rationally, which is

best? Someone who takes abduction to be the generally correct method of rational theory choice can give only one answer: one has to use abduction. Clearly, we face the same circularity we met in the last subsection—and now not just with regard to one aspect of our procedure, but with regard to the whole procedure itself. What account of abduction should be used in the process? We have to use the one that we take to be correct. The result may be unproblematic, or it may lead us round in the vicious circle we saw to be possible in the deductive case.

Actually, I think that, at least at present, this situation is unlikely to arise. Unlike deduction, there has never been a generally accepted and well articulated theory of abduction. When we abduct, we generally just fly by the seat of or pants: no actual theory is invoked. However, at least in principle, we could find ourselves in the viciously circular situation. And if we do, I am inclined to say the same about it as I said for deductive logic.[15]

5 The Virtue of Consistency

Let us now focus on one of the standardly suggested theoretical virtues: consistency.

Assuming that our theories should be closed under what we take the correct logic to be, and if we take the correct logic to be explosive—that is, according to which, a contradiction implies everything—then a contradictory theory about some topic is going to fare very badly. It will score very high marks on simplicity! However, since it implies everything it will perform very poorly on adequacy to the data: it will imply all the data we take to be *wrong*. Given the importance of adequacy to the data, it is hard to see how such a theory could be rationally acceptable.

However, if we take the correct logic to be paraconsistent—that is, not explosive—this is no longer the case. Indeed, consistency, like all the other virtues, will become a matter of degree. Some theories will be more inconsistent than others. (Though one might debate how, exactly, to define the notion of degree of consistency.)

That does not mean that consistency is not a virtue; but since inconsistency does not then have to be *really* bad, it does mean that the theory on some topic that performs over-all best may be inconsistent, the lack of consistency being over-ridden by other virtues. And if so, one should believe that

[15]For further discussion of the whole matter, see Priest (202+b).

contradictions are true of some of the objects with which the theory deals since, as Hume puts it,[16] the wise person apportions their beliefs according to the evidence. Indeed, I take it that on some topics, such as the paradoxes of self-reference, this is indeed the case, though here is not the place to go into the matter.[17]

Of course, there is an important issue about *why* consistency is a virtue. Indeed, for every mooted virtue, there is the tricky issue of why one should take it to *be* a virtue.[18] One answer to the question of why consistency is a virtue is that we have found that, for the most part (whatever that means), reality is consistent. When inconsistency occurs, it does so as a result of self-reference, borderline cases, or other odd cases.

A quick argument for this is as follows.[19] There are certain inferences which are valid according to classical logic, but which are paraconsistently invalid. According to most paraconsistent logics, the disjunctive syllogism (DS: $A, \neg A \vee B \vdash B$) is a paradigm example of such. But an application of the DS is truth-preserving provided that the situation is consistent. That is, it will lead us astray only if the situation is inconsistent. Moreover, we use the DS frequently, and rarely do we find that it leads us astray. (The only people who had the ability to commit the murder were the Butler and the Maid. But the Maid was having a drink in the local pub at the time. So it must have been the Butler.—The Butler later confesses.) So inconsistent situations are not the norm.

The DS may, then, be a perfectly good non-deductive inference[20]—we should not be gulled into supposing that it is deductively valid by a one-sided diet of examples, as Wittgenstein puts it.[21] At any rate, consistency remains a (defeasible) rational virtue.

6 Inconsistency and Disagreement

But, now, there may be thought to be an issue here. If contradictions are sometimes rationally acceptable, how can disagreement be possible? If you

[16] *Enquiry Concerning Human Understanding*, §10i.
[17] See, e.g., Priest (1998), §3.
[18] For one account, see Lycan (1988), and on simplicity in particular, see Baker (2016).
[19] I take this from Priest (1987), §8.4.
[20] See Priest (1987), ch. 16 of the 2nd edn.
[21] *Philosophical Investigations*, §593.

say A, and I say $\neg A$, then for all you know I may still agree with you.

Here, it is crucial to distinguish between negation and denial.[22] Negation is a logical/grammatical construction which applies to a sentence (statement, proposition or wot not); denial is a speech act, like asserting, questioning, commanding, etc. How to understand the various speech acts is a somewhat sensitive matter, but for present purposes, we may understand assertion and denial as follows:

- To assert A is to utter something with the intention of getting the hearer to accept A, or at least believe that the utterer does so.
- To deny A is to utter something with the intention of getting the hearer to reject A, or at least believe that the utterer does so.

According to some, notably Frege,[23] denial is not a *sui generis* speech act. A denial of A is simply an assertion of $\neg A$. This, however, is false. Most of us have inconsistent beliefs. These are often exposed by Socratic questioning. The questioner will get us to assert A, but then, with further questions, get us to assert $\neg A$—without our having had a change of mind. The situation may well cause us to revise our beliefs, and perhaps correctly so. But the point is that the assertion of $\neg A$ is not a denial of A. We are still committed to A. That is exactly the problem.

That does not mean that one *cannot* deny A by uttering $\neg A$. The utterance of one and the same sentence may perform different speech acts. Thus, if I utter 'The door is open', this could be an assertion, a question, a command (to close it). What speech act is performed is determined by the intentions of the utterer. These have to be decoded by the hearer, who will take into account context, power relations, intonation, and perhaps other things. So uttering $\neg A$ could be a denial of A or it could be an assertion of $\neg A$. It all depends. Thus, suppose you (a non-dialetheist about the Liar Paradox) say to me (a dialetheist about the Liar Paradox), 'The Liar sentence is consistent', and I reply, 'The Liar sentence is *not* consistent'. That would be a denial. If I then say 'The Liar sentence is true' and add 'Moreover, it is not true' that would be an assertion. I am giving *more* information about the sentence.

[22] For full discussion, see Priest (2006), ch. 9.

[23] Frege (1919).

7 Rival Theories

We are not finished yet. Another objection lurks. Suppose that you and I are supporters of mutually inconsistent theories, T_1 and T_2, about some subject. You say 'T_1 is correct'. I deny this and say, 'No, T_2 is correct'. There is no problem about expressing our disagreement; but why, if one may rationally accept a contradiction, need we disagree at all? We can just accept them both.

The objection is lame. The mere fact that something is logically possible does not make it rationally possible. (It is logically possible that Donald Trump is a frog.) And the mere fact that some contradictions are rationally acceptable, does not mean that all contradictions are so—any more than the fact that some statements are rationally acceptable means that all statements are so. But let us examine the situation more closely.

To accept both theories would be to accept the theory $T_1 \cup T_2$. If this is a serious possibility, it is one of the theories on the table, and should be evaluated in the same way as other theories. In general, however, that theory is likely to have little to recommend it. Most obviously, the joint theory is inconsistent.

Indeed, if the logic of the theories is explosive then the joint theory is trivial. And even if this is not the case, putting the resources of T_1 and T_2 together will, generally speaking, allow us to infer all sorts of things in conflict with the data. Thus, if T_1 says that the Earth moves, and T_2 says that the Earth does not move, but that objects not attached to a moving object will fall off, then $T_1 \cup T_2$ entails that people will fall off the Earth.

It might be suggested that rational belief need not be closed under logical consequence. Thus, in the Preface Paradox, we may rationally believe each of the statements in a non-fiction book, $A_1, ..., A_n$, but also believe that at least one of them is false, $\neg(A_1 \wedge ... \wedge A_n)$. But we do not believe $(A_1 \wedge ... \wedge A_n) \wedge \neg(A_1 \wedge ... \wedge A_n)$.[24] Indeed. But if $T_1 \cup T_2$ is not logically closed, this itself is a problem. True, scientific knowledge is sometimes chunked in this way. The Bohr theory of the atom gave inconsistent accounts of how electrons worked when in orbit and when not in orbit, with only a limited amount of information flow between the two.[25] And in the Preface Paradox our beliefs are chunked between what we believe about the topic of the book,

[24] See Priest (1997), §7.4.

[25] See Brown and Priest (2015).

and what we believe about the *genre* of non-fiction books. But there is no ground for chunking in the present case, simply because, *ex hypothesi*, we are dealing with two theories about exactly the same thing. The refusal to put the two theories together would be entirely *ad hoc*.

Indeed, the joint theory is liable to suffer from other vices as well. What makes two theories rivals is not simply inconsistency. Suppose that T_1 explains some human behavioural symptoms in terms of a chemical imbalance in the brain, and T_2 explains them in terms of demonic possession. The combination of these two theories is quite consistent! (The chemical imbalance can be a manifestation of demonic activity.) The joint theory fares very badly in terms of the criterion for a certain kind of simplicity, however—namely, Ockham's Razor.

8 Conclusion

In this essay, we have seen that there are (and always have been) different logical theories of what follows from what, and why. There may then be disputes about which is right—or at least, better. We have also seen how a quite general mechanism for rational theory-choice applies in the case of logic. In the second part of the essay, I singled out one piece of the jigsaw puzzle for closer examination: consistency. We saw that this plays an important role in disagreements—though not the flat-footed one often attributed to it.

Those who want to find a bedrock of certainty in logic, or at least in consistency, will be disappointed. Welcome to the complexities of real life.

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