PHILOSOPHY OF LOGIC AND LANGUAGE

WEEK 7: LOGICAL PLURALISM

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OVERVIEW

This week, we'll look at **LOGICAL PLURALISM**, the view — roughly — that there is more than one correct logic.

We'll look at different ways of understanding this view, its historical roots in the work of Rudolf Carnap, and some responses.

LOGICAL PLURALISM

What is logical pluralism? In what way is it interesting and controversial?

In 1st year, you encountered a range of different logics:

- Propositional logic, L_1.
- Predicate logic, L_2.
- Predicate logic with identity, $L_=$.

But these can all be regarded as parts of a single logic, **CLASSICAL LOGIC**.

If you have done Philosophical Logic, you'll also have encountered:

- Second-order logic.
- Modal propositional logic, *MPL*.
- Predicate modal logic, *QML*.

Second-order logic extends $L_{=}$ by adding *predicate* variables, allowing for sentences such as '$\exists X\,(Xa \wedge Xb)$'.

MPL and *QML* extend L_1 and $L_{=}$ respectively by adding operators, $\Box$ and $\Diamond$, expressing necessity and possibility.

But these are **EXTENSIONS** of classical logic. They are compatible with the claim that there is just one logic, of which these are all parts.

You have also encountered various other logics, however, which raise more interesting issues.

We saw that Kripke's theory of truth employs Kleene's strong three-valued logic, *K3*.

This is an alternative to L_1 which employs three truth-values — true, false, and indeterminate.

In *K3*, the classical Law of Excluded Middle, according to which all sentences of the form $(\phi \vee \neg\phi)$ are true, does not hold.

We also saw that dialetheists employ Priest's Logic of Paradox, *LP*.

This also can also be understood to employ three truth-values: true, false, and both.

LP is a **RELEVANCE LOGIC**. Relevance logics are intended to capture the idea that the premises of a valid argument must be *relevant* to the conclusion.

Relevance logics reject **DISJUNCTIVE SYLLOGISM**, the classical rule that one may infer ψ from $(\phi \vee \psi)$ and $\neg\phi$.

Last week, we saw that **INTUITIONISTIC LOGIC** rejects double negation elimination, i.e. the classical rule that one may infer ϕ from $\neg\neg\phi$.

In its place, they allow *ex falso quodlibet* instead, the rule that one may infer $(\phi \rightarrow \psi)$ from $\neg\phi$.

Relevance and intuitionistic logics are not *extensions* of classical logic. Unlike, say second-order logic, they do not simply add new logical expressions.

Rather, they seem to be **ALTERNATIVES** or **RIVALS** to classical logic. Despite agreeing on the logical expressions, they seem to offer different answers to the question, which arguments are logically valid?

It seems, then, that there is more than one *rival* logic. If so, we have a form of logical pluralism. But it is a comparatively weak form, and not particularly interesting.

We get something a bit more interesting when we note that more than one of these different rival logics can be **APPLIED** to characterise phenomena.

Relevance logics, for example, are used to characterise and understand electronic circuitry, and in database management.

There is more than one rival logic *that can be applied in a fruitful way*, then. This is a more interesting form of logical pluralism.

But these differences in application are unrelated to what makes these logics *rivals*: that they seem to offer different answers to the question, which arguments are logically valid?

In its most interesting and controversial form, logical pluralism is the view that different rival logics correctly characterise **DEDUCTIVE REASONING**.

LOCAL V. GLOBAL

Some have argued that different rival logics correctly characterise deductive reasoning *in different domains*. This is **LOCAL** logical pluralism.

Hillary Putnam (1968), for example, argued that deductive reasoning about quantum phenomena is correctly characterised by **QUANTUM LOGIC**.

Quantum logic rejects the distributive law, that from $\phi \wedge (\psi \vee \chi)$ one may infer $(\phi \wedge \psi) \vee (\phi \wedge \chi)$.

Similarly, intuitionistic logic might be thought to correctly characterise deductive reasoning in mathematics, or at least in parts of it.

Local logical pluralism contrasts with **GLOBAL** logical pluralism, the view that different rival logics correctly characterise deductive reasoning *in every domain*.

Global logical pluralism stands opposed to (global) logical **MONISM**, the view that exactly one rival logic correctly characterises deductive reasoning in every domain...

...and to (global) logical **NIHILISM**, the view that no rival logic correctly characterises deductive reasoning in every domain.

CARNAPIAN TOLERANCE

Logical pluralism is often compared to **LOGICAL TOLERANCE**, a view held by Rudolf Carnap.

"*In logic, there are no morals*. Everyone is at liberty to build his own logic, i.e. his own form of language, as he wishes. All that is required of him is that, if he wishes to discuss it, he must state his methods clearly, and give syntactical rules instead of philosophical arguments."

Carnap (1934), §17.

For Carnap, different logics are tied to different "linguistic frameworks": roughly, different formal languages.

The choice of framework is governed only by pragmatic concerns — by what we are trying to do and how well the framework serves that task.

WITHIN a framework, we can ask whether a given argument is logically valid. But this is to ask whether the argument is logically valid *in that framework*.

There is, according to Carnap, no **EXTERNAL** point of view from which we can ask whether an argument is logically valid *full stop*.

Consider the following argument:

1. $\neg\neg\phi$
2. ϕ

On a Carnapian view, this is logically valid in the classical framework but logically *in*valid in the intuitionistic framework.

Since there is no external perspective to adjudicate between these frameworks, we seem to get the result that both characterise this deduction equally correctly.

This seems to be some form of logical pluralism. We might think that different frameworks might be better suited to different kinds of reasoning: *local* logical pluralism.

We might also think that different frameworks might equally well be suited to *any* kind of reasoning: *global* logical pluralism.

But there is a problem. On the Carnapian picture, we only seem to get logical pluralism by giving up on the idea that the different logics are *rivals*.

The inference from ¬¬ϕ to ϕ is logically valid in a classical framework but not in an intuitionistic one.

But on the Carnapian picture, the shift from a classical to an intuitionistic framework brings with it a shift in the meaning of the operator '¬'.

For the meaning of a logical expression, on this picture, is fixed by the syntactic rules. (Indeed, that's *why* logic is tied to a linguistic framework.)

In short, the classical logician and the intuitionistic logician are using *different negations*. But then any disagreement between them is **MERELY VERBAL**.

By way of analogy, suppose that Donald says "Donald is a billionaire" and Theresa says "Donald is not a billionaire".

In US English, "billion" is synonymous with "one thousand million"; in UK English, it is synonymous with "one million million".

So if Donald is speaking US English and Theresa is speaking UK English, the disagreement between them is merely verbal.

If this is all logical pluralism amounts to, it is far less interesting than it first appeared.

What we expected was the view that different *rival* logics correctly characterise deductive reasoning. But if disagreement is merely verbal, it is unclear we have a genuine rivalry.

BEALL/RESTALL PLURALISM

JC Beall and Gregory Restall have developed an influential account of logical pluralism.

The heart of their view is the **GENERALIZED TARSKIAN THESIS** (**GTT**):

- An argument is valid IFF in every case in which the premises are true, the conclusion is also true.

The **GTT** is a schema: to obtain an instance of it, we need to specify both what counts as a **CASE** and what it is for something to be true in a case.

According to Beall and Restall, there are equally acceptable or admissible instances, each of which yields a different extension of the expression 'valid argument'.

They argue that an instance of **GTT** is admissible IFF the consequence relation that results is (1) necessary, (2) normative, and (3) formal.

These are the requirements that (1) that the truth of the premises of a valid argument **NECESSITATE** that of the conclusion...

...(2) that one do something **INCORRECT** in accepting the premises but not the conclusion of a valid argument...

...and (3) that a valid argument be truth-preserving in virtue of its **FORM**.

According to Beall and Restall, these requirements are all met if we take cases to be Tarskian models, delivering classical logic.

But they are also met if we take cases to be **SITUATIONS** (roughly: partial specifications of possible worlds), delivering relevance logic.

And are also met if we take cases to be **STAGES** or **CONSTRUCTIONS**, delivering intuitionistic logic.

(They also think they are met if we take cases to be **POSSIBLE WORLDS**. Though this is a bit odd, as it doesn't seem to meet the formality requirement.)

Since these different specifications yield different extensions of 'valid', we seem to have different rival logics correctly characterising deductive reasoning — logical pluralism.

Moreover, we get all this without any of the relativisation to a linguistic framework or language that we get with Carnapian tolerance.

OBJECTION 1

Beall and Restall's argument, very briefly, is that there is more than one way of fleshing out the notion of *case* operative in **GTT**, consistent with the requirements they identify.

But are the requirements they identify *all* of the requirements that admissible instances of **GTT** ought to meet?

If not, one might wonder whether further requirements might whittle down the range of admissible instances to just one after all.

"To cause problems for pluralism, one needs to show that a given job (use in presentation of fundamental theory, or something akin to it) is an essential characteristic of consequence; that is, one needs to show that a given application is required of any admissible instance of **GTT**."

Beall and Restall (2006), p. 99.

What other requirements might there be? Here are a few suggestions, taken from Paseau (2007).

FIRST, one might think that, where an argument is valid, it should be knowable *a priori* that its conclusion is true in a given case if its premises are.

SECOND, one might think that an adequate account of logical consequence ought to give the best account modelling of arguments in natural language and/or mathematics.

THIRD, one might think that any acceptable logic must be ontologically neutral — incurring no existential commitments.

Are there any good reasons for rejecting these additional requirements?

One might worry that if we accept too many requirements, there will be *no* admissible instances of **GTT**. This would be an argument for **NIHILISM**. But what's wrong with that?

OBJECTION 2

Beall and Restall think they are offering something quite different to Carnap. Here's Greg Restall on the issue (2002, p. 432):

"To put it graphically, as a pluralist, I wish to say that

$A, \neg A \vdash_C B$, *but* $A, \neg A \nvdash_C B$

A and ¬A together, *classically* entail B, but A and ¬A together do not *relevantly* entail B.

"On the other hand, Carnap wishes to say that

$A, \neg_C A \vdash B$, *but* $A, \neg_C A \nvdash B$

A together with its *classical* negation entails B, but A together with its *relevant* negation need not entail B."

That's to say, Beall and Restall intend to offer *not* a picture in which there are a plurality of different (equally acceptable) meanings for the logical connectives...

...but *rather* a picture in which there are a plurality of different (equally acceptable) relations of logical consequence.

Why does this matter? As before, if the meanings of the logical expressions vary between the different logics, it's not clear those logics are genuine *rivals*.

According to Graham Priest, Beall and Restall fail in this regard. As he sees it, they want to "generate different logics by giving the truth conditions of the connectives in different ways" (2006, p. 204).

But this, he thinks, is just to give the "formal connectives different meanings". We do not have logical pluralism without meaning pluralism after all.

The general worry that there cannot be a difference in logic without a corresponding difference in the meanings of the logical constants goes back to Quine (1986, Ch. 6).

Michael Dummett (1991, p. 302-3) presents a forceful argument to this effect. The argument fails, however. And it's useful to see how.

FIRST, whether or not an argument is valid depends on whether or not it is constructed in such a way that the truth of the premises guarantees the truth of the conclusion.

So any change in our assessment of an argument as valid or invalid must correspond to a change in the way we take the truth values of the premises and conclusion to be determined in accordance with their structure.

SECOND, whether or not an argument is constructed in such a way that the truth of the premises guarantees the truth of the conclusion depends on the meanings of the logical constants.

So any change in the way we take the truth values of the premises and conclusion to be determined in accordance with their structure must correspond to a change in the way we regard the meanings of the logical constants.

The mistake is in the second step. Whether or not an argument is constructed in such a way that the truth of the premises guarantees the truth of the conclusion *depends* on the meanings of the logical constants...

...but it is not *determined* by those meanings.

It also depends on the class of **CASES** with respect to which we spell out what it is for the truth of the premises to guarantee that of the conclusion!

SUMMARY

I started out by trying to get clearer on what an interesting and controversial **LOGICAL PLURALISM** might amount to.

I then looked at **CARNAPIAN TOLERANCE**, raising the worry that it loses sight of the idea that the different logics are genuine *rivals*.

I finished off with **BEALL/RESTALL PLURALISM**, which centres on the idea that there are different, equally admissible instances of **GTT**.

We looked at two worries about this. First, that Beall and Restall fail to identify all the requirements that admissible instances of **GTT** ought to meet.

Second, that like Carnapian Tolerance, Beall/Restall Pluralism doesn't get away from meaning pluralism — though there may be some scope for addressing this concern.

Next week: a closer look at the relationship between logic and reasoning.