

Week 6. Quine's Empiricist Platonism

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Recap

Last week we discussed *intuitionism*, the idea that we should reject classical logic because mathematical truth concerns mental construction (in some sense or other).

One of the key ideas from Dummett's thought (we didn't discuss this too much last time) was the view that meaning is tied to *verification*: To know the meaning of a term is to be capable of recognising what would count as verifying the statement.

Quine attacks this idea in the process of attacking the analytic-synthetic distinction.

Quine sought to establish the importance of *empirical* observations for establishing mathematical claims.

1 Empiricism

Empiricism has a long tradition in philosophy.

The idea goes back to at least the 'early modern' empiricists (Hume, Locke, etc.) where the idea was that all concepts/knowledge are derived from experience

They are often (controversially) contrasted with the rationalists like Descartes and Leibniz.

Empiricism then received expression in the idea of **Logical Positivism/Empiricism** that held the:

Verification Principle. Only those statements that are verifiable or falsifiable are meaningful.

(**Optional Exercise.** Can you use self-reference to find a problem with the verification principle?)

A problematic issue for the empiricists is to say how the truths of mathematics/logic are 'verifiable'.

Clarifications?

2 The analytic-synthetic distinction

Here we find a role for the analytic-synthetic distinction.

Recall that the analytic-synthetic distinction concerns whether a statement is true in virtue of the *meanings* of the terms involved.

If you have a good analytic-synthetic distinction, it's easy enough to get an account of mathematics and mathematical truth on which empirical observation has no role to play: Mathematical truths can be analytic (they are 'verified' by *any* state of affairs).

As part of an account of the analytic-synthetic distinction, Quine contends, we will need an account of synonymy (when two words/sentences have the *same* meaning).

Reference can't cut it (e.g. Hesperus/Phosphorus, Renate/Cordate).

The best candidate for rescuing the distinction, Quine contends, is *verificationism*:

to know the meaning of a statement is ... to be capable of recognising whatever counts as verifying the statement. (Dummett, 'The Philosophical Basis for Intuitionistic Logic', 1975)

(**Note:** This is an anachronistic reference, but forms of verificationism had been in play since the days of the Vienna Circle.)

One can then handle the analytic truths as being the *logical* truths, they are the statements that are confirmed *no matter what*.

We could then opt for a deductivism of the appropriate kind.

Clarifications?

3 Holism

The issue for Quine: Verificationism is problematic. Rather, we should accept:

Confirmational Holism. No sentence is confirmed in isolation, rather it is *bodies* of knowledge that get confirmed.

This is visible with respect to scientific theories, where we do not look at statements in isolation but rather the predictions the theory as a whole makes.

An example from Linnebo: The universal law of gravitation only implies that two particles attract one another when we add the claim that they have zero mass.

If one is allowed to 'cook-up' theories, one can push this very far.

This is often referred to as the **underdetermination of theory by evidence** and the related idea of **auxiliary assumptions**.

I need to fix the latter in order to say when an observation counts for or against by theory.

Note. There has been a lot of discussion recently surrounding epistemology and conspiracy theories. The more extreme conspiracy theories are (assuming that they are false) utilising exactly this underdetermination of theory by evidence.

A standard way of responding to underdetermination of theory by evidence: **Theoretical virtues**.

e.g. parsimony, explanatory power, predictive power (given some assumptions)... **Others?**
Clarifications?

4 Indispensability and existence

When should we say a mathematical object exists then?

Quine's Criterion of Ontological Commitment. "A theory is committed to those and only those entities to which the bound variables of the theory must be capable of referring in order that the affirmations made in the theory be true." (Quine, 'On What There Is', 1948).

Of course we then have the question of what we should say are in the ranges of the first-order quantifiers.

Quine's response: **Indispensibility.**

Indispensibility. We should commit to the existence of those mathematical entities that are indispensable for our best theory (or theories) of the world.

Since Fartein and Jonas are presenting on this, I'll leave the details of indispensibility for discussion.

It will also come up when we discuss nominalism next week.

5 Discussion

5.1 Holism

What are the virtues? One clear point that needs to be addressed is what virtues there are, and how they can be compared.

Parson's complaint. Some mathematics seems to not be holistically confirmed, e.g. very easy statements like $2+2=4$.

Natural response. They are just *really close* to the centre of the 'web of belief'.

Question. (Haochong/Julius/Nicola) How convincing is the objection on the grounds of obviousness (e.g. $2+2=4$)?

Question. (Fartein/Jonas) Does the analytic-synthetic distinction hold up?

Question. (Birgit/Jonas) How would inconsistency in a theory be dealt with holistically?

Question. Does holism lead to pluralism?

5.2 Indispensability

Extent of mathematics. A big issue for those who are more mathematically inclined is that mathematics is often developed in isolation from empirical application.

It is only later that *some* of it is found to be applicable.

e.g. 'imaginary number' was originally a pejorative term, before the complex plane found use in physics.

Quine's response. Bite the bullet: mathematics that is not applied in science is mere recreation.

Moreover, the abstract entities which are the substance of mathematics—ultimately classes and classes of classes and so on up—are another posit in the same spirit. Epistemologically these are myths on the same footing with physical objects and gods, neither better nor worse except for differences in the degree to which they expedite our dealings with sense experiences. (Quine, *Two Dogmas*, p. 42, 1951)

However perhaps it is the case that more than one might think can be justified on holistic grounds?

e.g. Set theory seems like an ontologically profligate theory *par excellence*.

Cantor's Theorem. For any set x the cardinality of the powerset of x (set of all subsets of x) is strictly larger than the cardinality of x .

But it also has great *systematising power*, natural numbers can be represented by finite sets (von Neumann ordinals), using those we can get ordered pairs and represent the integers, we can then represent the rational numbers as pairs of integers, once you have functions (i.e. sets of ordered pairs), you can get sequences, and can construct the continuum as sequences of rationals, analysis can be done as functions on the continuum, and much much more...

They are not wholly inscrutable. The main axioms of set theory are generalities operative already in the applicable part of the domain. (Quine, *Pursuit of Truth*, 1992)

But the 'systematising aspect' of set theory seems to occur (though this is controversial) only given a few iterations of the powerset operation over the set of all finite sets (more on this in future weeks).

Question. What exactly do we mean by 'indispensable' and 'best theory'?

Question. (Nicola/Fartein) What do we think of the claim that "To be is to be the value of a bound variable"?

Question. (Fartein/Jonas) Is mathematics indispensable for empirical sciences?

Question. (Michel) What bits of mathematics are indispensable? (e.g. \mathbb{N} , \mathbb{R} ...?)

Question. (Fartein/Jonas) And is this sufficient for making us ontologically committed to mathematics?

Question. (Brian) What is the line between the empirical and non-empirical?

Question. (Fartein/Jonas) Are there issues with Quine's holism? Is it satisfactory?

Question. (Jonas) How are indispensability and naturalism related?