

Lecture 2: **Objections to the verification theory**

Isaiah Berin (1938) 'Verification', *Proceedings of the Aristotelian Society* 39, pp. 225 - 248.

From strong to weak verification

The strong verification principle is too strong, as it doesn't include paradigmatic scientific hypotheses such as 'all swans are white'.

Strong verification theory

1. *A statement S is verifiable if and only if there is some set of observation sentences which logically entail S*
2. *A statement S is factually significant if and only if S is verifiable in principle*

To make all paradigmatically scientific hypotheses come out as factually significant we need a weaker principle.

we may say that it is the mark of a genuine factual proposition, not that it should be equivalent to an experiential proposition, or any finite number of experiential propositions, but simply that some experiential propositions can be deduced from it in conjunction with certain other premises without being deducible from those other premises alone. (Ayer 1935, pp. 38- 39)

Ayer's proposal is to assume, not that some observation sentences must logically entail the empirical hypothesis in question, but that the hypothesis in question must entail at least some observation sentences that otherwise would not be entailed by relevant background assumptions.

Weak verification theory 1.0

1. *A statement S is verifiable if and only if there is some set of sentences $P_1 \dots P_n$ and some observation sentence O such that (i) O follows from S together with $P_1 \dots P_n$ but (ii) O does not follow from $P_1 \dots P_n$ alone*
2. *A statement S is factually significant if and only if S is verifiable in principle*

Some correct results

Observation sentences again come out as trivially verifiable and hence factually significant. (That I am in Paris doesn't entail that this is red, but that this is red and I am in Paris does entail that this is red.)

Take the statement "This is a grape." By itself, this does not entail "This is sour". But if we add the hypothesis that "All grapes are sour" to our initial statement "This is a grape", it now does follow that "This is sour". Hence, our universal hypothesis, together with some other premises, entails an observation sentence ("This is sour") that is not entailed by these other premises alone. As we could put it, the hypothesis predicts specific observations, and it is for this reason that it is meaningful.

1. This is a grape (Background assumption)
 \therefore This is sour (Observation sentence)

1. All grapes are sour (Hypothesis)
2. This is a grape (Background assumption)
 \therefore This is sour (Observation sentence)

A (very) wrong result

To make the weak verification principle apply to statements that are not themselves observation statements, we need to make background assumptions. This is realistic: you can't do science without already having a general body of beliefs about the world. However, the weak verification theory 1.0 remains entirely silent about the contents about these prior assumptions.

Here's a nice hypothesis: 'Time is a vortex channeling the Absolute'. Is this meaningful? Well, it clearly isn't an observation sentence. So it's only meaningful if it entails some observation sentence when taken together with some background assumptions. But clearly it does!

1. Time is a vortex channeling the Absolute (Hypothesis)
2. If time is a vortex channeling the Absolute, then this is sour (Background assumption)
- ∴ This is sour (Observation sentence)

You can find an early development of this criticism in Isaiah Berlin's article 'Verification' (1938).

Second edition, revised definition

What we forgot to include is some constraint on what background assumptions can support an hypothesis's factual significance. It seems that also these background assumptions must in some way be based on experience. In the second edition of *Language, Truth and Logic* Ayer defends a revised version of his verification principle. This new version relies on a distinction between *direct* and *indirect* verifiability.

Weak verification theory 2.0

1. *S* is directly verifiable if and only if *S* either is an observation statement or entails in conjunction with a set of observation statements (O_1, \dots, O_n) some observation statement not entailed by that set of observation statements alone
2. *S* is indirectly verifiable if and only if *S* entails in conjunction with a set Σ of statements (A_1, \dots, A_n) some observation statement *O* not entailed by that set alone, and every statement in Σ is either (a) directly verifiable, or (b) analytic, or (c) capable of being independently shown to be indirectly verifiable
3. A statement *S* is factually significant if and only if *S* is either directly or indirectly verifiable

This allows us to restrict the further assumptions we're allowed to make: the sentences in Σ can only be either directly verifiable, or analytic, or independently indirectly verifiable. The conditional sentence 'If time is a vortex channeling the Absolute, then this is sour' is neither of these.

Church's objection

Alonzo Church, in his 'Review of Ayer's *Language, Truth and Logic*' (1949), formulates the following objection:

It would seem, however, that the amended definition of verifiability is open to nearly the same objection as the original definition. For let O_1, O_2, O_3 be three "observation-statements" (or "experiential propositions") such that no one of the three taken alone entails any of the others. Then using these we may show of any statement *S* whatever that either it or its negation is verifiable, as follows. Let \bar{O}_1 and \bar{S} be the negations of O_1 and *S* respectively. Then (under Ayer's definition) $\bar{O}_1 O_2 \vee O_3 \bar{S}$ is directly verifiable, because with O_1 it entails O_3 . Moreover *S* and $\bar{O}_1 O_2 \vee O_3 \bar{S}$ together entail O_2 . Therefore (under Ayer's definition) *S* is indirectly verifiable—unless it happens that $\bar{O}_1 O_2 \vee O_3 \bar{S}$ alone entails O_2 , in which case \bar{S} and O_3 together entail O_2 , so that \bar{S} is directly verifiable.

Church's argument spelled out

Let's get rid of the subscripts, so that 'O₁, O₂, O₃' becomes 'P, Q, R'. And let's use standard notation for negation, so that 'Ö' becomes '¬O'. (The reconstruction follows Soames 2003, 289ff)

- A. Let P, Q, R be observation sentences that are logically independent
- B. Let S be any sentence you like ('Time is a vortex channelling the Absolute')
- C. Let X be the sentence $(\neg P \ \& \ Q) \vee (R \ \& \ \neg S)$
- D. X is directly verifiable, because X together with P entails R, where R is not entailed by P alone (Weak theory 2.0, clause 1)

For example: "Either this is not red and this is sour, or this is loud and time isn't a vortex channelling the absolute." This sentence together with the assumption that this is red implies that this is loud, which would be a conclusion we can't draw from the assumption that this is red alone.

Now, clearly either X does not entail Q or X does entail Q. Church thinks it doesn't matter. We can show that S comes out as meaningful in either of these two conditions:

Condition one

- E. Assume X does not entail Q
- F. Note, X together with S does entail Q
- G. X is directly verifiable (step D)
- H. S is indirectly verifiable, according to Ayer's definition (Weak theory 2.0, clause 2)

So let's suppose that 'Either this is not red and this is sour, or this is loud and time isn't a vortex channelling the absolute' doesn't itself entail 'this is sour'. Then if we assume that time is a vortex channelling the Absolute, we can infer that this is not red and this is sour, and so that this is sour.

Condition two

- I. Assume X entails Q
- J. This means that $\neg P \ \& \ Q$ entails Q, and that $R \ \& \ \neg S$ entails Q
- K. But this means that R together with ¬S entail Q, while R alone does not entail Q
- L. ¬S is directly verifiable (Weak theory 2.0, clause 1)

Now suppose that 'Either this is not red and this is sour, or this is loud and time isn't a vortex channelling the absolute' does entail 'this is sour'. This means that 'this is not red and this is sour' entails 'this is sour', which it obviously does, but also that 'this is loud and time isn't a vortex channelling the absolute' entails 'this is sour'. But it's clear that 'this is loud' does not by itself entail 'this is sour'.

Church ends his argument here: we can show that for any statement S, either it or its negation is a factually significant proposition. How satisfactory is this? Consider, should a verificationist be happy to accept that either S or ¬S is meaningful, but that we just don't know which?