Philosophy of Science // Fall 2015

Handout 11

Analyticity: Carnap, Quine

Analytic and synthetic. The analytic/synthetic distinction is the distinction between two kinds of statements. Some are true or false by virtue of their own properties (A-statements). Others are true by virtue of the state of the world (S-statements). Of course, strictly speaking, every statement's truth is dependent on the statement's own properties (such as the property of containing a certain name). Nevertheless we could say that S-statements are true or false *also* by virtue of the state of the world. A-statements will be called 'analytic', S-statements are 'synthetic'.

For Leibniz, *analyticity* went along with two other concepts: *necessity* and *apriority*. The truth of analytic statement should be ascertained by reason (analysis) alone. Thus analytic statements are a priori (prior to experience). But the truth of synthetic statements should be ascertained by perception, by looking at the world. Secondly, analytic statements are true in every possible circumstance. Thus they are necessary.

Example 1. Compare the statements 'Triangle has three angles' and 'The Earth has one satellite.' The first is analytic, a priori, and necessary. The second is synthetic, a posteriori, and contingent.

Kant and logical positivism. Kant's innovation was in separating analyticity from necessity and apriority. There are synthetic statements that are a priori (and necessary). There are three families of synthetic a priori statements: statements of geometry, of arithmetic, and of metaphysics. Fast forward to logical positivism: *there are no synthetic a priori statements*. There are, however, a priori statements, and all of them are analytic. These are statements of mathematics, logic, and their derivatives.

Carnap on analyticity: scientific discovery. Our selection presents Carnap's views expressed *after* Quine's critique. We find Carnap still insisting on the analytic/synthetic distinction. He announces at the outset that the distinction is of 'supreme importance' for the philosophy of science. The reason is unclear. As we gather from the GTR example, it may be that new discoveries are made once the domain of analytic statements is adjusted. Where previously physical space was supposed a priori to be Euclidean, Einstein saw that its geometry is to be determined empirically. Hence statements of physical geometry became synthetic (and a posteriori).

This example can only be made sense of if we assume that earlier theorists regarded physical geometry as analytically Euclidean. Now there were hardly any such theorists (none that I know of, anyway). Instead, if they thought it to be a priori, they would also claim it to be synthetic. But, as we have said above, for positivists there are no synthetic a priori statements. So, if anyone were to regard physical geometry a priori (i.e. part of mathematics), he had to *also* regard it analytic.

Analyticity in observational language. If we assume a sharp distinction between observational language and theoretical language, it is natural also to assume that formulations of analyticity will be different in the two cases. Carnap acknowledges difficulties with analyticity in O-language. Suppose we have a sentence 'All red-headed woodpeckers have red heads.' This may be considered analytic for average speakers, but not so for ornithologists. The latter would not consider 'red-headednness' an 'essential component' of meaning. They will define the species by its intrinsic biological properties.

A couple of comments are in order. (1) The example is ill-chosen. Hardly anyone would believe that 'Red Skins are red skinned' is analytically, or even synthetically, true. The ambiguity is whether 'red-headed woodpeckers' features as a proper name for species (just like 'Red Skins' is a proper name for a team) or as a descriptive term. If the latter, then ornithologists are unlikely to protest. (2) It is curious that Carnap has to resort to the terminology of 'essential components'. The concept of necessity was supposed to be explicated by the concept of analyticity, not *vice versa*.

Artificial languages. In any case, the remedy, according to Carnap, is to lay down explicitly meaning postulates for observational terms. They can be cumbersome, but this is merely a technical inconvenience. Once we have specified them, we can articulate the analytic/synthetic distinction. The truth of analytic sentences will be discovered by examining the meaning postulates for component terms. The truth of synthetic sentences will be discovered by examining the world.

Carnap again acknowledges that, for any given sentence, it might not be easy (or even possible?) to determine to which category it belongs. But any ambiguity will stem from an ambiguity in postulates, and *not* from an ambiguity in the very distinction between analytic and synthetic sentences.

Quine on meaning. Quine begins his essay with the claim that meanings are suspicious entities. First of all, meaning has to be separated from reference (or: intension from extension, connotation from denotation). Thus the theory of essences foreshadowed the theory of meaning, but once meaning and reference are kept apart, this link drops out. Analyticity is a proper locus of meaning. We say (compare above) that a statement is *analytic* iff it is true or false in virtue of its meaning alone. Analytic statements are to be contrasted with *synthetic* that are true or false in virtue of the state of the world.

Logical truth and analyticity. Analytic statements fall into two groups. One includes statements that have to be formalised by logical notation as tautologies. They are *logical truths*. The second group includes statements that resist direct transformation into tautologies. However, they can be so transformed if some of their parts were to be replaced by synonymous expressions. Quine believes that the notion of logical truth is unproblematic. However, he finds fault with the synonymy procedure and, correspondingly, with the second group of analytic statements.

Question 2. Give an example of a logically *false* statement. Explain.

Question 3. Give an example of an analytic statement other than (2) in the text. Explain.

Definition. A way for characterising synonymy may be suggested by using the idea of definition. We could say that 'bachelorhood' is defined to be 'unmarried man-ness'. But how do we know what definitions are appropriate? If we look into the dictionary, we may find an entry for 'bachelor' containing reference to 'unmarried man'. Yet the dictionary's author himself is an *empirical scientist* registering facts of linguistic behaviour. So the entry reflects the fact of actual synonymy between the terms. We are still unable to clarify the concept of synonymy.

Explication. Another possibility is explication. Scientists achieve explication of familiar terms. One purpose of the theory of heat, for example, is to tell us 'what heat really is'. That is, they explicate the term 'heat' by identifying heat with the motion of molecules. However, explication too is a way of reporting existent usage. In explicating 'heat' we preserve some contexts where 'heat' is used. Thus we do not alter the use of 'heat' in describing certain types of sensations. And so we still rely on synonymy exemplified by the explicated term.

Remark 4. As a matter of fact, this discussion of explication may appear superfluous. Hardly anyone, positivists included, would think that a statement 'Heat is the motion of molecules' should be regarded as analytic.

Stipulation. There is an altogether different option: convention. Some definitions are not even supposed to reflect antecedent synonymies. They are introduced as a matter of stipulation. We have been exposed to this idea earlier in the course when we discussed conventionalism in geometry.

Example 5. I can say: let the number π have the value obtained by dividing the circumference by the diameter of the circle. So the statement 'The number π is the fraction S/d' is analytic. More generally, we can stipulate that inferences are valid if they were obtained from arbitrarily chosen axioms by using arbitrarily chosen logical rules (say, modus ponens).

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