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Quine's 'needlessly strong' holism

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ABSTRACT

Quine is routinely perceived as having changed his mind about the scope of the Duhem-Quine thesis, shifting from what has been called an 'extreme holism' to a more moderate view. Where the Quine of 'Two Dogmas of Empiricism' argues that "the unit of empirical significance is the whole of science" (1951, 42), the later Quine seems to back away from this "needlessly strong statement of holism" (1991, 393). In this paper, I show that the received view is incorrect. I distinguish three ways in which Quine's early holism can be said to be wide-scoped and show that he has never changed his mind about any one of these aspects of his early view. Instead, I argue that Quine's apparent change of mind can be explained away as a mere shift of emphasis.

1. Introduction

Evidential holism, or the Duhem-Quine thesis, is the influential idea that hypotheses cannot be tested in isolation but only in conjunction with background theory. The thesis is often illustrated by recounting how astronomers dealt with the unexpected orbits of Uranus and Mercury in the 19th and early-20th century: where the peculiar orbit of Uranus led to the discovery of Neptune, the problem of the anomalous advance in the perihelion of Mercury was ultimately solved by giving up Newton's inverse square law; the advance turned out to be a relativistic effect accentuated by Mercury's position close to the Sun. Two similarly structured problems, in other words, were solved in two radically different ways: one in which Newton's theory could be saved by giving up an auxiliary hypothesis (the number of planets) and one in which the main theory had to be revised. Testing a scientific hypothesis, the episode teaches us, cannot be done without presupposing a wide range of background theories; in testing Newton's inverse square law, astronomers relied on assumptions about the adequacy of their telescopes, about the existence of a certain number of planets, about the accuracy of their methods of measuring angles, distances, and time, about the precision of their observing skills, and about the exactness of their mathematical machinery. In the words of Pierre Duhem: comparing "calculated perturbations with the perturbations observed by means of the most precise instruments […] will not only bear on this or that part of the Newtonian principle, but will involve all its parts at the same time" (Duhem, 1914, p. 194).

Although evidential holism was first formulated and defended by Duhem, its contemporary influence is mostly due to the work of Willard Van Orman Quine, who extended the scope of evidential holism to "the whole of science" (1951, 42). Where Duhem argued that only *some* hypotheses cannot be tested in isolation but only in conjunction with *some* background theory, Quine, in "Two Dogmas of Empiricism", famously suggests that "[n]o particular experiences are linked with any particular statements in the interior of the field, except indirectly through considerations of equilibrium affecting the field *as a whole*" (1951, 42-3, my emphasis). In perhaps the most-cited passage in twentieth-century analytic philosophy, Quine concludes that in the light of adverse experience "[a]ny statement can be held true come what may" and, conversely, that "no statement is immune to revision" (1951, p. 43).

Despite the extensive influence of his ideas, however, Quine seems to change his mind about the scope of evidential holism in later stages of his career. In 'Two Dogmas in Retrospect', for instance, Quine explicitly claims that he regrets his "needlessly strong statement of holism" in 'Two Dogmas of Empiricism':

> In later writings I have invoked not the whole of science but chunks of it, clusters of sentences just inclusive enough to have critical semantic mass. By this I mean a cluster sufficient to imply an observable effect.[1] (1991, 393)

[1] See also Quine (1975a, 71): "When we look thus to a whole theory or system of sentences as the vehicle of empirical meaning, how inclusive should we take this system to be? […] modest chunks suffice, and so may be ascribed their independent empirical meaning".

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Quine, in other words, seems to switch from what we may call an "extreme holism" to a more modest view.[2] In fact, Quine even seems to give up on his radical revisability thesis in the later stages of his career. Where the early Quine held that in the light of adverse experience we could even amend "statements of the kind called logical laws" (1951, 43), the later Quine appears to make a substantive exception for logic: even if we were to try to revise a logical law like the law of non-contradiction, we would "only [be changing] the subject" (1970, 81).[3]

Quine, in sum, seems to have abandoned his wide-scoped holism for a more moderate view about the logic of theory testing. In this paper, however, I argue that the standard story about the evolution of Quine's holism is misguided. I show that a detailed examination of Quine's views early and late reveals that there is no reason to presume that he changed his mind. More specifically, I argue (1) that there are no less than three ways in which Quine's early variant of holism can be said to be wide-scoped, (2) that he does not significantly change his mind about any one of these aspects of his early view, and (3) that his apparent shift can be explained away by showing how he merely emphasized different aspects of his theory in later stages of his career.

What I offer, in short, is an argument for the claim that although the later Quine would have emphasized different aspects of his theory if he had had the chance to rewrite 'Two Dogmas', he did not believe his early theory to be false. This paper is structured as follows. After introducing Quine's holism and dissolving some misconceptions about how we are to interpret it (sections 2–3), I distinguish three ways in which Quine's view can be said to be wide-scoped (section 4). Next, I examine the evolution of Quine's views with respect to these three aspects one by one (sections 5–7), delving into his views about the unity of science (section 5), the revisability of logic (section 6), and about how we should interpret his claim that wide-scoped holism should be viewed as an "uninteresting legalism" (1975a, 71) (section 7).

2. Evidential holism

Evidential holism is a thesis about the logical relation between theory and evidence; or, in Quinean terms, about the relation between clusters of theoretical sentences and observation categoricals.[4] The logical relation between theoretical sentences and observation categoricals can be best described by what might be called a prediction thesis and a falsification thesis:[5]

(PT) *Prediction thesis*: a single hypothesis does not imply an observation categorical. Only clusters of theoretical sentences will imply observation categoricals.[6]

(FT) *Falsification thesis*: whenever a predicted observation categorical turns out to be false, one cannot logically determine which theoretical sentence is falsified. Rather, the cluster of theoretical sentences that implied the categorical is falsified as a whole.[7]

Applied to the stock example of evidential holism mentioned in the introduction, PT states that Newton's inverse square law does not by itself imply anything about the orbits of Uranus and Mercury, whereas FT states that whenever one's predictions about these orbits turn out to be incorrect, one cannot logically determine whether one ought to revise Newton's law or an auxiliary hypothesis. As such, the two theses aptly explain how it is possible that two similarly structured problems, the unexpected orbits of Uranus and Mercury, were solved in two radically different ways.

Why should we believe that PT and FT are true? According to Quine, PT is simply an empirical fact, firmly supported (1) by scientific practice, as is evinced by the example of the rise and fall of Newton's inverse square law, and (2) by the complexity of the language we use to express scientific theories. Our scientific language is so complicated that it cannot be learned by "continuous derivation" from observation sentences. In consequence, we also cannot follow this process backward and "reduce scientific theory to sheer observation" (1975c, 267). Non-holistic languages are possible, according to Quine, but they would never be rich enough to express our best scientific theories, or so he argues in a response to Robert Nozick:

> [Nozick] asks whether a non-Duhemian language would be impossible for us. Let me say that the observation sentences, in my behaviorally defined sense, constitute already a rudimentary language of this kind […] But I see no hope of a science comparable in power to our own that would not be subject to holism. (1986b, 364)

The prediction thesis, in short, is an empirical thesis; it is justified on the basis of observations about scientific practice and language learning.[8] It is probably because of arguments like these that even the strongest opponents to evidential holism admit that at least PT is true.[9]

3. Falsification and scientific practice

Although there is widespread consensus about PT, there is no such agreement when FT is concerned. We can distinguish two types of argument against FT in the literature. Before I return to the

[2] This reading of the evolution of Quine's position is omnipresent in the literature. See, for example, Massey (2011, 256): "Late-Quine rails against *extreme holism* […] while advocating *moderate holism*"; and Loeffler (2005, 173): "at least since the mid-1970s Quine had moved away from radical holism […] According to [Quine's later doctrine of moderate holism] the unit of empirical significance is not an all-encompassing background theory (the 'whole of science') any more".

[3] See also Fogelin (2004, 32): "not only does Quine's extreme holism become muted in his later writings, the radical revisability thesis associated with it has become muted as well". Quine's apparent change of mind on the status of logic has inspired Arnold and Shapiro (2007, 276) to distinguish between a "radical Quine" and a "logic-friendly Quine".

[4] Observation categoricals are sentences of the form 'Whenever P, Q', where P and Q are observation sentences such that the categorical expresses "the general expectation that whenever the one observation sentence holds, the other will be fulfilled as well". As examples of observation categoricals, Quine mentions 'When it snows, it's cold', 'Where there's smoke, there's fire', and 'When the sun rises, the birds sing' (1995a, 25). It should be noted that Quine has not always explicated observational predictions in terms of observation categoricals. See, for example, Quine (1960; 1975b). I thank an anonymous referee for stressing this point.

[5] The terms 'prediction thesis' and 'falsification thesis' are from Morrison (2010). The distinction is quite common in the literature, albeit under different names. See P. L. Quinn's (1974) distinction between a 'separability' and a 'falsifiability thesis' and Ariew's (1984) distinction between a 'non-separability' and a 'non-falsifiability thesis'.

[6] There is one set of trivial exceptions to PT: if one combines all the theoretical sentences that together imply an observation categorical into one long conjunction, this conjunction will imply the categorical by itself as well. See Quine (1975a, 72; 1986e, 620).

[7] See Quine (1990a, 13-4): "the falsity of the observation categorical does not conclusively refute the hypothesis. What it refutes is the conjunction of sentences that was needed to imply the observation categorical. In order to retract that conjunction we do not have to retract the hypothesis in question; we could retract some other sentence of the conjunction instead". As we shall see in section 7, the notion of implication used in PT and FT can be interpreted in different ways.

[8] See Gibson (1988, 32-4), who dubs these arguments the "scientific practices argument" and the "language learning argument". Duhem uses different arguments to justify PT. See Darling (2002).

[9] See, for example, Sober (1999) who criticizes FT but nevertheless maintains that "hypotheses rarely make observational predictions on their own; they require supplementation by auxiliary assumptions if they are to be tested" (1999, 54).