On an Allegedly Essential Feature of Demarcation Criteria of Science

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Abstract

Laudan’s argument against the possibility of a demarcation criterion for scientific theories rests on establishing that any criterion must be a necessary and sufficient condition. But Laudan’s argument at most establishes that any criterion must provide a necessary condition and a possibly different sufficient condition. His own claims suggest that such a criterion is possible.

While some consider criteria for the demarcation of science from non-science an important topic of research (cf. Mahner 2007; Hansson 2008), others doubt that such a demarcation criterion is possible at all. A number of proponents of the latter view (e.g., Devine 1996, 331; Monton 2009, 49; Clarke 2009, 134; Leiter 2011, 6ff) endorse and rely on an influential article by Laudan (1983) that, as I will argue, relies on a non-sequitur and actually suggests the opposite of its purported conclusion.

Laudan (1983, 123) considers several candidates for a demarcation criterion and argues that none of them “can be a necessary and sufficient condition for something to count as ‘science’, at least not as that term is customarily used.” This is the main result of his paper. Based on a brief plausibility consideration about the “epistemic heterogeneity of the activities and beliefs customarily regarded as scientific”, Laudan (1983, 124) further suggests the general futility of any search for a demarcation criterion. In objection to Laudan, proponents of demarcation criteria have contended that it is not essential for a demarcation criterion to provide a necessary and sufficient condition for scientific theories (e.g., Thagard 1988, 159; Derksen 1993, 20; Mahner 2007, 521f; Pennock 2011, 183; cf. Ruse 1982, 20). However, Laudan’s demand is not just a stipulation, but rather rests on an argument that must be addressed for the objection to have any force.

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In his argument, Laudan (1983, 118f) concludes that any criterion weaker than a necessary and sufficient condition could not achieve what a demarcation criterion needs to achieve, because a merely necessary condition would not allow inferring that something is a science, and a merely sufficient condition would not allow inferring that something is not a science. One cannot, for example, argue that the theory of evolution is scientific and creation science is not, because

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\text{[w]ithout conditions which are both necessary and sufficient, we are never in a position to say \textit{this} is scientific: but \textit{that} is unscientific}. \quad (\text{Laudan 1983, 119})
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But Laudan’s claim is false: To be able to say that \(a\) is scientific (\(Sa\)) while \(b\) is not (\(\neg Sb\)), all that is needed is one sufficient condition \(\varphi\) that is fulfilled by \(a\), \(\forall x[\varphi(x) \rightarrow Sx] \land \varphi(a)\), and one necessary condition \(\psi\) that is not fulfilled by \(b\), \(\forall x[Sx \rightarrow \psi(x)] \land \neg \psi(b)\). Laudan’s demand that \(\varphi\) and \(\psi\) be one and the same is supererogatory.

Without the demand for a single necessary and sufficient condition for scientific theories, Laudan’s argument actually suggests the opposite of what he intends to show. He states that the candidates for a demarcation criterion are implausible as necessary and sufficient conditions, and that “in \textit{most} cases, these are not even plausible as necessary conditions” (Laudan 1983, 123, my emphasis). But this suggests that \textit{some} candidates are plausible necessary conditions. Furthermore, when Laudan (1983, 118) states that a demarcation criterion “must be an adequate explication of our ordinary ways of partitioning science from non-science”, this seems to presuppose that there is a sufficient condition for scientific theories after all, if only by enumeration of what we ordinarily call ‘science’. Thus, Laudan’s argument suggests that there is a criterion that provides a necessary condition and a (non-equivalent) sufficient condition for scientific theories. It may be that this criterion is very weak, leaving many cases \(c\) undecided (\(\neg \varphi(c) \land \psi(c)\)). But without the demand that any condition must be both necessary and sufficient, such a criterion can already decide important cases and furthermore provide a starting point for stronger criteria.
References


