

## **Deflating Scientific Explanation, or How to Make the Realist Raft Float**

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This paper aims to show that an adequate account of the notion of scientific explanation must: 1) be wary of intuitions about the general notion of explanation, and 2) rely on a statistical understanding of putative causal relations. Among other applications, an account along these lines can be helpful to the scientific realist.

The paper is divided into three parts. The first part identifies one of the main problems with many current accounts of the notion of explanation: The unreasonable demand, proposed by Michael Scriven and subsequently adopted by many philosophers, that we must square our account of *scientific explanation* to our intuitions about explanations in everyday contexts. It is first pointed out that the failure to provide a satisfactory account is not endemic to the notion of explanation, i.e. it is widespread amongst notions. Many of the notions considered in philosophical contexts originate and have a function in broader everyday contexts. Indeed, in evaluating accounts of these notions we rely on intuitions that originate in these broader contexts. Yet, we rarely seem to question the appropriateness of these intuitions in more restricted, in this case scientific, contexts. I argue against this complacency, pointing out that our intuitions can often be inconsistent.

The second part of the paper draws on the idea of defining causal relations in statistical terms, to set further constraints on what is required for an adequate account of the notion of scientific explanation. As argued in the first part, we should refrain from unquestionably relying on intuitions about the non-scientific notion of explanation. A more reliable constraint on the notion of scientific explanation is amenability to empirical testing. I argue that scientific explanations must reveal statistically relevant information which identify *potential* causal relations. Explanations thus construed give rise to predictions and are, therefore, testable.

The third part illustrates the benefits of applying a notion with the above constraints to the scientific realism debate. The realists argue that, among other epistemic virtues, explanatory power indicates a theory's approximate truth. In the absence of empirically testable notions of explanation, anti-realists have argued that past theories with explanatory power were nevertheless abandoned, implying that the explanatory power of current theories cannot say anything about their truth-content. The account outlined above can help the realist undermine the anti-realist claim that past theories had genuine explanatory power, by making it more difficult for an explanation to qualify as scientific. To demonstrate the point, I consider the caloric theory of heat.