Scientific Reasoning Is Material Inference: Combining Confirmation, Discovery, and Explanation

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Abstract

Whereas an inference (deductive as well as inductive) is usually viewed as being valid in virtue of its argument form, the present paper argues that scientific reasoning is material inference, i.e., justified in virtue of its content. A material inference is licensed by the empirical content embodied in the concepts contained in the premisses and conclusion. Understanding scientific reasoning as material inference has the advantage of combining different aspects of scientific reasoning, such as confirmation, discovery, and explanation. This approach explains why these different aspects (including discovery) can be rational without conforming to formal schemes, and why scientific reasoning is local, i.e., justified only in certain domains and contingent on particular empirical facts. The notion of material inference also fruitfully interacts with accounts of conceptual change and psychological theories of concepts.

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