

The Crux of Crucial Experiments: Duhem's Problems and Inference to the Best Explanation

Weber, Marcel (2007) The Crux of Crucial Experiments: Duhem's Problems and Inference to the Best Explanation.

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Abstract

Going back at least to Duhem, there is a tradition of thinking that crucial experiments are impossible in science. I analyse Duhem's arguments and show that they are based on the excessively strong assumption that only deductive reasoning is permissible in experimental science. This opens the possibility that some principle of inductive inference could provide a sufficient reason for preferring one among a group of hypotheses on the basis of an appropriately controlled experiment. To be sure, there are analogues to Duhem's problems that pertain to inductive inference. Using a famous experiment from the history of molecular biology as an example, I show that an experimentalist version of inference to the best explanation (IBE) does a better job in handling these problems than other accounts of scientific inference. Furthermore, I introduce a concept of experimental mechanism and show that it can guide inferences from data within an IBE-based framework for induction.

Keywords: Methodology, crucial experiments, Duhem, inference to the best explanation, experimental mechanism, underdetermination

Subjects: [General Issues: Confirmation/Induction](#)

ID Code: 3917

Deposited By: [Weber, Marcel](#)

Deposited On: 03 March 2008

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