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BAYESIANISM AND SCIENTIFIC REASONING

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Bayesianism and Scientific Reasoning

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Abstract: This Element explores the Bayesian approach to the logic and epistemology of scientific reasoning. Section 1 introduces the probability calculus as an appealing generalization of classical logic for uncertain reasoning. Section 2 explores some of the vast terrain of Bayesian epistemology. Three epistemological postulates suggested by Thomas Bayes in his seminal work guide the exploration. This section discusses modern developments and defenses of these postulates as well as some important criticisms and complications that lie in wait for the Bayesian epistemologist. Section 3 applies the formal tools and principles of the first two sections to a handful of topics in the epistemology of scientific reasoning: confirmation, explanatory reasoning, evidential diversity and robustness analysis, hypothesis competition, and Ockham's Razor.

Keywords: Bayesianism, explanatory reasoning, formal epistemology, inductive logic, scientific reasoning

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Contents

Introduction	1
1 Probability Theory, a Logic of Consistency	4
2 Bayesian Epistemology	34
3 Scientific Reasoning	67
References	108