

Non-Empirical Requirements Scientific Theories Must Satisfy: Simplicity, Unification, Explanation, Beauty

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Abstract

A scientific theory, in order to be accepted as a part of theoretical scientific knowledge, must satisfy both empirical and non-empirical requirements, the latter having to do with simplicity, unity, explanatory character, symmetry, beauty. No satisfactory, generally accepted account of such non-empirical requirements has so far been given. Here, a proposal is put forward which, it is claimed, makes a contribution towards solving the problem. This proposal concerns unity of physical theory. In order to satisfy the non-empirical requirement of unity, a physical theory must be such that the same laws govern all possible phenomena to which the theory applies. Eight increasingly demanding versions of this requirement are distinguished. Some implications for other non-empirical requirements, and for our understanding of science are indicated.

Keywords: Simplicity, Unification, Explanation, Symmetry, Methodology, Scientific Theory, Theoretical Physics, Metaphysics

Subjects: [General Issues: Structure of Theories](#)
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