

# Chapter 23

## Generalized Confirmation and Relevance Measures

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**Abstract** The main point of the paper is to show how popular probabilistic measures of incremental confirmation and statistical relevance with qualitatively different features can be embedded smoothly in generalized parametric families. In particular, I will show that the probability difference, log probability ratio, log likelihood ratio, odds difference, so-called improbability difference, and Gaifman's measures of confirmation can all be subsumed within a convenient biparametric continuum. One intermediate step of this project may have interest on its own, as it provides a unified representation of graded belief of which both probabilities and odds are special cases.

**Keywords** Inductive confirmation • Evidential support • Probabilistic relevance • Odds • Generalized logarithm

### 23.1 Introduction

A high level of troponin in the blood indicates a diagnosis of myocardial infarction. A matching DNA profile suggests that a suspect murderer may in fact be guilty. And the detection of the Higgs boson increased the experimental evidence in favor of so-called standard model of particle physics. In contemporary epistemology and philosophy of science, the general notion of *confirmation* or *evidential support* is often employed to interpret cases of all these different kinds.

Relying on a probabilistic account of graded credences, this idea can be characterized in a rather effective and elegant way. Consider a logical language  $L$  (finite, for simplicity), the subset  $L_C$  of its consistent formulae, and the set  $P$

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