Judging the Probability of Hypotheses Versus the Impact of Evidence: Which Form of Inductive Inference Is More Accurate and Time-Consistent?

Katya Tentori,[a] Nick Chater,[b] Vincenzo Crupi[c,d]

[a]*Center for Mind/Brain Sciences, University of Trento*
[b]*Behavioural Science Group, Warwick Business School*
[c]*Center for Logic, Language, and Cognition, University of Turin*
[d]*Munich Center for Mathematical Philosophy, Ludwig Maximilian University*

Abstract

Inductive reasoning requires exploiting links between evidence and hypotheses. This can be done focusing either on the posterior probability of the hypothesis when updated on the new evidence or on the impact of the new evidence on the credibility of the hypothesis. But are these two cognitive representations equally reliable? This study investigates this question by comparing probability and impact judgments on the same experimental materials. The results indicate that impact judgments are more consistent in time and more accurate than probability judgments. Impact judgments also predict the direction of errors in probability judgments. These findings suggest that human inductive reasoning relies more on estimating evidential impact than on posterior probability.

Keywords: Inductive reasoning; Probabilistic reasoning; Inference; Impact; Confirmation judgments; Confirmation measures

1. Introduction

1.1. Posterior probability and evidential impact

Humans' spectacular ability to draw inferences from limited information underpins perception, categorization, prediction, diagnostic reasoning, and scientific discovery. Such inferences are *inductive* because they venture beyond the information given to draw conclusions that are probable given the available evidence but are not logically implied by it.