

The objective and the subjective in mid-nineteenth-century British probability theory

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Abstract

This paper provides a critical discussion of the historical and theoretical meaningfulness of the distinction between ‘objective’ and ‘subjective’ probability, as it supposedly emerged around 1840, by examining whether and how it appeared in the work of the mid-nineteenth-century British revisionist probabilists. A detailed analysis of the contributions of Augustus De Morgan, John Stuart Mill, George Boole, Robert Leslie Ellis and John Venn to probability is put forward in order to show that in so far as the terms did not appear as contradictories it is not possible to understand or compare these contributions with reference to the modern binary of ‘objective’ and ‘subjective’.

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1. Introduction

1.1. *The emergence of ‘objective’ and ‘subjective’ probability*

Approximately at the middle of the nineteenth century at least six authors – Simeon-Denis Poisson, Bernard Bolzano, Robert Leslie Ellis, Jakob Friedrich Fries, John Stuart Mill and A.A. Cournot – came to distinguish ‘subjective’ (or epistemic) from ‘objective’ (or ontological) probability. These two kinds of probabilities can already be found in the seventeenth and eighteenth century, but, as Ian Hacking, Lorraine Daston and others have shown, classical probabilists such as Jakob Bernoulli and Pierre-Simon Laplace ‘slid easily between sense of probabilities in states of mind and in states of the world’ (Daston, 1994, p. 333) (see also Daston, 1988, Chapters 1 & 4; Hacking, 2006 [1975]; Zabell, 2011). Daston finds the reason for the ‘explosion of concern among [French, English and German] probabilists ca. 1840’ (Daston, 1994,

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p. 331) for careful distinctions within probability theory in the fact that the words ‘subjective’ and ‘objective’ emerged with new philosophical meanings around the same time.¹ On the one hand, for Bernoulli, who was the first to use these two terms in relation to probabilities (e.g. Hacking, 1971a; Schafer, 1996; Schneider, 1984), ‘objective’ referred to the total certainty (*certitudo*) of God’s knowledge of the necessary causes of ‘all things under the sun, past, present and future’ (Bernoulli, 2006 [1713], p. 211) from which the ‘subjective’ degrees of certainty of human knowledge differ as part to whole – such that “‘objective probabilities’” would have been an oxymoron’ (Daston, 1994, p. 332). On the other hand, while embracing Laplace’s determinism, the nineteenth-century probabilists, for whom ‘objective’ referred to an *external reality* independent of all minds and ‘subjective’ to *internal* states dependent upon *individual minds*, could grant probability an ‘objective’ ontological status by opposing it to the ‘subjective’ idiosyncrasies of the mind. Where Hacking has famously argued that the general emphasis on the two-sidedness of probability is what distinguishes the classical or pre-modern period from the ‘non-classical’ period of probability, Daston has explicated in considerable detail that it was the philosophical distinction between ‘objective and subjective which also emerged ca. 1840 [that] destroyed the plausibility of any smooth meshing between the world of things and the world of the mind’ (ibid., p. 341) characteristic of classical probability theory.

The fact that already in the nineteenth century there were several theories for the two kinds of probability – for example, ‘frequencies’ or ‘propensities’ for objective probabilities and ‘logical’ or ‘epistemic’ for ‘subjective’ probabilities – and several interpretations of Bernoulli’s ‘golden theorem’ is suggestive of the thoroughgoing ‘divergence of motivations, formulations, and consequences’ (ibid., p. 335) of the revision of classical probability theory. Perhaps most importantly, even among those revisionists who spoke the new philosophical and probabilistic language of objective and subjective there was no agreement on the question as to ‘what’, that is, to which ‘entities’, ‘objective’ and ‘subjective’ probabilities exactly referred.

It is by means of describing how the distinction between ‘objective’ and ‘subjective’ appeared in the work of mid-nineteenth-century (ca. 1840s–1860s) British probabilists that the present paper attempts to expose the radicalness of this lack of common ground within probability theory. For what an analysis of the views on probability of Augustus De Morgan (Section 3.1), John Stuart Mill (Section 3.2), George Boole (Section 4), Robert Leslie Ellis (Section 5.1) and John Venn (Section 5.2) shows is not only the impossibility of comparing these in terms of the philosophical and probabilistic binary of ‘objective’ and ‘subjective’, but also that in so far as none of them granted chance an objective status in the world by opposing it to a subjective mind the notion of ‘objective probability’ was a non-sequitur for these revisionists.

1.2. ‘Objective’ and ‘subjective’ in mid-nineteenth-century Britain: a brief overview

This complex situation must be understood with reference to the fact that the British probabilists approached probability as being a part of logic and that in their attempt to come to terms with Richard Whately’s (1787–1863) revival and revision of Aristotelian syllogistics (see McKerrow, 1987) all of them developed a radically different view of logic. There were, on the one hand, the ‘material’ logicians Mill and Venn – with the idealist Ellis in opposition to them on philosophical grounds – and, on the other hand, the ‘conceptualist’ or ‘algebraic’ logicians De Morgan and Boole. Where for the former logic was a real science concerned with inductive propositions about ‘facts or things themselves’ (Venn, 1876, p. 46), for the latter logic was a formal science concerned with deductive mental operations expressed in mathemat-

¹ Daston writes that ‘the relationship between the philosophical and probabilistic distinctions seems to be one of a shared ontology, one which seems to have become not only thinkable but self-evident’ (Daston, 1994, p. 335).

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