If You Must Do Confirmation Theory, Do It This Way

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Abstract

In this talk I begin to draw together, and to package into a coherent philosophical position, a number of ideas that in the last 25 years or so I have alluded to, or sometimes stated explicitly, concerning the properties and the merits of the measure of *deductive dependence* $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ of a proposition $\mathbf{c}$ on a proposition $\mathbf{a}$; that is, the measure to which the (deductive) content of $\mathbf{c}$ is included within the content of $\mathbf{a}$. Like $\mathfrak{p}$, a function (or a class of functions) that often goes by the name of *logical probability*, $\mathfrak{q}$ is a generalization of the relation of *deducibility*: $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ may be used to measure the degree to which the **c**onclusion $\mathbf{c}$ is deducible from the **a**ssumption $\mathbf{a}$. To discourage the mindless affiliation of anything to do with logical probability to inductive logic, the probability function $\mathfrak{p}$ is here taken as uninterpreted and neutral, and the function $\mathfrak{q}$ and the *credence* function $\mathfrak{c}$ (often called also degree of *confirmation*) are defined from it by the identities $\mathfrak{q}(\mathbf{c} \mid \mathbf{a}) = \mathfrak{p}(\mathbf{a}' \mid \mathbf{c}')$ (where the prime indicates negation) and $\mathfrak{c}(\mathbf{c} \mid \mathbf{a}) = \mathfrak{p}(\mathbf{c} \mid \mathbf{a})$ respectively. At an intuitive level the functions $\mathfrak{q}$ and $\mathfrak{c}$ are not easily distinguished, and indeed in many applications the numerical values of $\mathfrak{c}(\mathbf{c} \mid \mathbf{a})$ and $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ may not differ much. The epistemological value of the function $\mathfrak{q}$, however, far surpasses that of the credence function $\mathfrak{c}$, and of the *support* or *relevance* function $\mathfrak{s}(\mathbf{c}, \mathbf{a}) = \mathfrak{c}(\mathbf{c} \mid \mathbf{a}) - \mathfrak{c}(\mathbf{c} \mid \top)$. I shall suggest that discussions of empirical confirmation would be much illuminated if $\mathfrak{q}$ were to take the place of both of them.

Each of $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ and $\mathfrak{p}(\mathbf{c} \mid \mathbf{a})$ takes its maximum value 1 when $\mathbf{c}$ is deducible from $\mathbf{a}$. It is in this sense that each provides a generalization of deducibility. But the conditions under which $\mathfrak{q}$ and $\mathfrak{p}$ take their minimum value 0 are quite different. It is well known that if $\mathbf{a}$ and $\mathbf{c}$ are mutual contraries, then $\mathfrak{p}(\mathbf{c} \mid \mathbf{a}) = 0$, and that this condition is also necessary if $\mathfrak{p}$ is regular. Equally, if $\mathbf{a}$ and $\mathbf{c}$ are subcontraries ($\mathbf{a} \vee \mathbf{c}$ is a logical truth $\top$) then $\mathfrak{q}(\mathbf{c} \mid \mathbf{a}) = 0$, and this condition is also necessary if $\mathfrak{p}$ is regular. It follows that $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ may exceed 0 when $\mathbf{a}$ and $\mathbf{c}$ are mutually inconsistent. The function $\mathfrak{q}$ is therefore not a measure of degree of belief (unless a positive degree of belief is possible in a hypothesis $\mathbf{c}$ in the presence of evidence $\mathbf{a}$ that contradicts it). But that does not mean that $\mathfrak{q}$ may not be a good measure of degree of confirmation. Scientific evidence nearly always contradicts (but not wildly) some of the hypotheses in whose support it is adduced.

The paper will explain how the replacement of $\mathfrak{c}$ by $\mathfrak{q}$ brings clarity and simplicity to the thesis of Adams, Stalnaker, and others, that the semantics of a conditional sentence *if* $\mathbf{a}$ *then* $\mathbf{c}$ is best understood in terms of the credence $\mathfrak{c}(\mathbf{c} \mid \mathbf{a})$ due to the consequent given the antecedent. It will also be shown that the replacement of $\mathfrak{s}$ by $\mathfrak{q}$ explains why the degree to which evidence $\mathbf{a}$ supports that part of the content of a hypothesis $\mathbf{c}$ that goes beyond $\mathbf{a}$ is always negative (the theorem of Popper & Miller 1983). Other applications of the function $\mathfrak{q}$ may also be considered.

The thesis of the paper, that $\mathfrak{q}$ may be a better measure of degree of confirmation (in some sense) than are $\mathfrak{c}$ and $\mathfrak{s}$, does not imply that confirmation is a worthwhile activity, or that degrees of confirmation are more valuable than doctoral degrees purchased on line. The entire paper must be understood in the critical spirit of *reductio ad absurdum*: if either $\mathfrak{c}$ or $\mathfrak{s}$ is the best measure of degree of confirmation, then $\mathfrak{q}$ is a better one, and therefore neither $\mathfrak{c}$ nor $\mathfrak{s}$ is the best.

The falsificationist, unlike the believer in induction and inductive logic, attaches value to hypotheses $\mathbf{c}$ for which $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ is low; that is, hypotheses whose content extends far beyond the evidence. I shall provide an economic argument to demonstrate that $\mathfrak{q}(\mathbf{c} \mid \mathbf{a})$ measures the rate at which the value of the hypothesis $\mathbf{c}$ should be discounted in the presence of the evidence $\mathbf{a}$.