

**Section «Philosophy. Cultural studies. Religious studies»**

**Interpretation of probability and the 'rationality wars' in the psychology of judgment under uncertainty**

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The so-called 'heuristics and biases' program in the cognitive psychology was inaugurated in 1970s with a series of elegant experiments carried out by Daniel Kahneman and Amos Tversky. According to the standard interpretation, those experiments clearly depicted that acting under uncertainty humans do not follow formal rules of inference but rather make use of several so-called heuristics, or rules of thumb. Although following these heuristics often yields reasonable judgments, it sometimes leads to drastic violations of normative prescriptions of the mathematical calculus of probability. These violations, called 'cognitive biases' by Kahneman and Tversky, seem to reveal the deep and systematic irrationality of human judgment under uncertainty.

Since its origin the 'heuristics and biases' program has become extremely influential within the boundaries of the cognitive psychology itself as well as in many other disciplines, such as economics, decision theory, law, philosophy etc. Nevertheless, the presumed rebuttal of human rationality by Kahneman and Tversky has been questioned, inter alia, by a group of evolutionary psychologist claiming that, contrary to the heuristics and biases program, the human mind is well adapted for dealing with uncertainties which it can encounter in its environment. Gerd Gigerenzer, surely the best-known propagator of this view, claims that the so-called cognitive biases can be very easily made disappear if one modifies Kahneman and Tversky's experiments to a form better suited to the human cognitive capacities. The Gigerenzer's main point is that human mind is evolutionary well prepared for dealing with what he calls 'natural frequencies'. Many experiments carried out by evolutionary psychologists seem to support this thesis: replacing percentages with natural frequencies in the information given to subjects drastically improves human experimental performance in comparison to the Kahneman and Tversky's results. Human reasoning making use of natural frequencies gives results quite close to those supplied by mathematical probability devices such as Bayes' formula. Gigerenzer concludes that humans are quite good in probabilistic or statistical inference and cognitive biases are not a real phenomenon but rather a consequence of unnatural experiments.

The empirical aspect of the 'rationality wars' between 'heuristics and biases' program and evolutionary psychologists has come under close scrutiny and it is now quite commonly assumed that the actual differences between both sides are not as serious as it may be inferred from the hostile rhetoric. However, it is important not to overlook that apart from the empirical one there is also a conceptual, or philosophical, aspect of the rationality wars. Gigerenzer often highlights that 'heuristics and biases' scholars tacitly assume a controversial philosophical thesis, namely the subjective, Bayesian interpretation of probability. It is pointed out that in 'heuristics and biases' experiments subjects are typically asked to provide an assessment of single-event probability and their responses are confronted with the norms of Bayesian probability.

For Gigerenzer such a method is unacceptable for at least two main reasons. First, although single-event probability is valid within the Bayesian framework, according to some other interpretations of probability (especially the orthodox frequentism) single-case probability statements are completely senseless. Then it is weird to blame lay people for failing to do their task in accordance with the Bayesian canons while, in opinion of many leading philosophers and scientists, this task (i.e. assigning probability to single events) is essentially absurd. Second, even if one were to recognize the validity of single-case probability statements, there is still no conclusive argument for claiming that *the* normative theory for such statements is the probability-calculus-as-Bayesians-see-it. Non-Bayesians can argue that mathematical probability is applicable only to some objective features of the world (e.g. long-run frequencies) and probability of single-case judgments is probability in some other, maybe more colloquial, non-mathematical sense. If so, one cannot argue for the irrationality of single-case probability judgments confronting them with the standard axioms of probability, as 'heuristics and biases' scholars do.

Both abovementioned arguments deserve serious philosophical examination. The 'single-case probability' argument may be questioned in two ways. First, one can argue that non-Bayesian interpretations of probability do not necessarily reject single-case probabilities. On the contrary, there are even frequentist interpretations that quite plausibly make sense of the probability of single events. Second, it may be claimed that objective interpretations (frequentist, propensity etc.) have its place in examining objective feature of the world and that do not conflict with the fact that subjective interpretations are the best tool for analyzing personal beliefs.

The 'normative' argument should be confronted with the almost century-long philosophical discussion on the normativity of subjective probability. One can cite the so-called pragmatic arguments for normativity (the Dutch book argument or arguments from the representation theorems) claiming that an agent whose beliefs fail to satisfy the standard axioms of probability may fail to maximize his utility function or be prone to a sure loss. Other, non-pragmatic, arguments concentrate on the fact that the rules of probability, like the rules of formal logic, guarantee the minimal consistency of the agent's beliefs.

To sum up, evolutionary psychologists attack the 'heuristics and biases' program with arguments which are either empirical or philosophical. The philosophical arguments are non-trivial and deserve more attention from the philosophical side than they have received so far. Nevertheless, it seems that these arguments may be confronted with quite plausible conceptions created within the Bayesian philosophy of probability, supporting the thesis that subjective probability is the best tool for analyzing consistency (and, presumably, rationality) of human beliefs.

## References

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