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Rationality in human nonmonotonic inference

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Abstract

This article tests human inference rationality when dealing with default rules. To study human rationality, psychologists currently use classical models of logic or probability theory as normative models for evaluating human ability to reason rationally. Our position is that this approach is convincing, but only manages to capture a specific case of inferential ability with little regard to conditions of everyday reasoning. We propose that the most general case to be considered is inference with imperfect knowledge - in the present case restricted to uncertain knowledge - and that a natural framework for testing the rationality of plausible reasoning is System P. This system provides rational postulates for nonmonotonic inference.

The semantic of the nonmonotonic inference is given by a possibilistic constraint introduced by Dubois and Prade (1991). This constraint states that a rule p (q is a plausible rule if "the degree to which p (q is possible" is greater than "the degree to which p ((q is possible". Given the choice of this constraint, we study two supplementary postulates of rationality. Eighty-eight subjects participated in an experiment whose results confirm - provided that reflexivity and left logical equivalence would be tested in a further experiment - the rationality of human nonmonotonic inference according to the rational postulates of System P.

For technical reasons, this article is stored as two separate computer files, labelled "Part I" and "Part II", respectively. Please replace the present page by a printout of the "Part II" file.