

CAN BAYES RULE BE JUSTIFIED BY COGNITIVE RATIONALITY PRINCIPLES ?

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Summary: The justification of Bayes rule by cognitive rationality principles is undertaken by extending the propositional axiom systems usually proposed in two contexts of belief change: revising and updating. Probabilistic belief change axioms are introduced, either by direct transcription of the set-theoretic ones, or in a stronger way nevertheless in the spirit of the underlying propositional principles. Weak revising axioms are shown to be satisfied by a General Conditioning rule, extending Bayes rule but also compatible with others, and weak updating axioms by a General Imaging rule, extending Lewis rule. Strong axioms (equivalent to the Popper-Miller axiom system) are necessary to justify Bayes rule in a revising context, and justify in fact an extended Bayes rule which applies even if the message has zero probability.