Rational Inattention with Sequential Information Sampling*

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Abstract

We generalize the rationalize inattention framework proposed by Sims (2010) to allow for cost functions other than Shannon's mutual information. Unlike other general treatments of the problem, our particular concern is with the additional structure that results when a large number of successive samples of information about the decision situation (each only minimally informative by itself) can be taken before a decision must be made. We assume that the cost required for each individual increment to information satisfies standard assumptions about continuity, differentiability, and convexity, and monotonicity with respect to the Blackwell ordering of experiments, but need not correspond to mutual information. We give particular attention to the case in which the cost function for an individual increment to information satisfies the additional condition of prior-invariance, so that it depends only on the way in which the probabilities of different observations depend on the state of the world, and not on the prior probabilities of different states. In a continuous-time limit of this "sequentially prior-invariant" case, the quantitative implications of rational inattention depend only on a finite number of parameters, which measure the degree of difficulty in distinguishing different states of the world. We characterize optimal information sampling in this case, and show how the resulting theory of rationally inattentive choice differs from both static and dynamic versions of a theory based on mutual information.

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