Are Rational Explanations Free from Mechanistic Constraints?

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Rational models of cognition explain the ‘why’ rather than the ‘how’ of cognition. An influential class of such models are Bayesian models, which postulate that cognitive behavior is optimized in the sense that it conforms to criteria for rationality derived from probability theory. Even though Bayesian models have been successful in describing and predicting cognitive behavior, their computational plausibility is often contested. For instance, it is well known that the computations that Bayesian models postulate can be computationally intractable. If so, then how could a human mind/brain perform such rational computations? Bayesians have argued that, since rational explanations are agnostic about the ‘how’ of cognition, intractability is a pseudoproblem as far as rational explanation is concerned. Their argument has been that humans do not actually perform the probabilistic calculations described in their models, but only act as if they do much like the planets do not calculate their own orbits, and birds fly without any knowledge of the theory of aerodynamics. Whether such “as if” explanation dissolves the intractability problem critically depends on what is meant by “as if”. In this talk, I analyze the most plausible meanings that are compatible with various statements in the literature, and argue that none of them circumvents the problem of intractability. The analysis will show that even rational “as if” explanations must obey the minimal mechanistic constraint of tractability.