
Perfection and bounded rationality in the study of cognition

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Abstract

Cognition rests on an ability to make accurate inferences from limited observations of an uncertain and potentially changing environment. The cognitive system is often regarded as an existence proof of a computational device which is remarkably well adapted to the problem of dealing with uncertainty. In this talk I will contrast two approaches used to examine, and characterize, cognition from a functional perspective: the rational analysis of cognition, and the study of bounded rationality. Although these two approaches are allied in important respects, they can differ in the extent to which the very idea of perfection, and notions of rational action, should be informed by the constraints of computation. The rational analysis of cognition develops rational, ideal observer models used to judge human responses. To the extent the ideal observer model describes human responses, the rational model can constrain which process level theories are capable of explaining how humans compute. In addition, such findings are typically used to label cognition as more or less rational. The study of bounded rationality has several, often confusing definitions. Here, I will discuss the study of simple cognitive heuristics, which focuses on the essence of Herbert Simons original conception of the idea. This approach asks how humans and animals function when optimization is not possible. Rather than maximize, minimize, or optimize, boundedly rational actors seek good enough solutions which can nevertheless perform extremely well under conditions of uncertainty. Differences between these two approaches bring into focus fundamental questions. Should resource-bounded organisms and unbounded fictional observers be judged in the same terms? Is the notion of optimality required to discuss rational action? More concretely, in what ways might boundedly rational agents differ from rational agents?

References

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