Book Review


Ecological Rationality is a series of essays under the common theme of understanding rationality as a match between mind and environment. This edited volume features authors both from the ABC research group and from outside of it and is a continuation of Simple Heuristics That Make Us Smart (Gigerenzer, Todd, & The ABC Research Group, 1999). That book presented a view of rationality that differed from the commonly accepted views in cognitive science and economics. In particular, the authors argued that there is no one-fit-all rational tool for all tasks, but instead an “adaptive toolbox” of multiple rules of thumb (i.e., heuristics) that often work at least as good as more sophisticated decision making strategies. The question left unanswered by the first volume, however, is under what circumstances exactly a particular tool from the adaptive toolbox works well and why. For example, in inferential judgment, when does it pay to ignore some available information? When does it pay to disregard the relative validity of different pieces of information? When does recognition lead to good inferences? Ecological Rationality fills in this gap by reviewing the evidence accumulated in the last decade on the adaptive fit between “heuristics that make us smart” and the characteristics of the decision environments. Thus, the book is a welcome addition to the demonstrations that simple decision strategies can produce good results. The idea of the match between mind and environment is, of course, not new, and as such, the current volume follows the tradition of Herbert Simon who proposed that human decision making and bounded rationality can only be understood in a combination with the characteristics of the environments (Simon, 1955, 1990).

The book is organized into seven parts. Part I is the introductory chapter in which the editors of the volume define ecological rationality as the fit of a specific decision making tool to particular environments and suggest that “ecological rationality is about the success of cognitive strategies in the world” as measured by accuracy, frugality, and speed of decisions, as opposed to internal consistency, coherence, or logic (p. 14). Several characteristics of decision environments that have been shown to affect the success of cognitive strategies are then reviewed, such as the degree of uncertainty, number of alternatives, sample size of available data, and the redundancy and dispersion of knowledge in the environment. The authors also remind the readers of the main ideas of Simple Heuristics That Make Us Smart by providing a description of the content of the adaptive toolbox (i.e., various heuristics), discussing how different heuristics are selected from the toolbox, and whether there are individual differences in the use of heuristics. The idea that more information and computation is not necessarily better (the so-called “less-is-more effect”) is given a considerable attention in the first chapter, and is further substantiated in the subsequent parts of the book.

Part II, “Uncertainty in the World,” starts with a chapter by Brighton & Gigerenzer who examine the robustness of some heuristics in out-of-sample and out-of-population predictions. The next chapter by Hogarth is an enjoyable reflection on why simple is hard to accept, that is, on why people resist the fact that quite simple models can sometimes satisfactorily handle many complex decision problems. He reviews several examples from the history of science and the decision making literature. These include, for example, the findings that in combining information for prediction, equal weighting of variables is often more accurate than trying to estimate differential weights, and that sometimes decisions are improved when relevant information is deliberately discarded. Gigerenzer, Fiedler, & Olsson provide a compelling case for the need to consider the environment in the studies of human perception. They argue that many psychological phenomena (e.g., base-rate fallacy, overconfidence, miscalibration, contingency illusions, and moral judgments about minorities) that have been explained by cognitive limitations or motivational factors, can be alternatively seen as adaptive reactions to the environments in which people operate. Environmental uncertainty is discussed as one of the factors that may explain several “biases” or “illusions.” The authors conclude by a call for an “ecologically motivated cognitive psychology” that would consider both internal and external explanations for human perception.

Part III, “Correlations between Recognition and the World,” focuses on the recognition heuristic that exploits the ability to distinguish previously encountered objects. A chapter by Pachur, Todd, Gigerenzer, Schooler, & Goldstein gives an overview of empirical research on the recognition heuristic, with a focus on when recognition is a good cognitive strategy. Importantly, the authors consider not only normative considerations of when recognition should be used, but also review the literature on whether people’s decisions in fact follow recognition and when they do not. Schooler, Hertwig, & Herzog discuss

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how forgetting can be functional and specifically analyze how it might facilitate human inference by benefitting the recognition heuristic and its sister, the fluency heuristic. In the last chapter of this part, Katsikopoulos & Reimer focus on group decisions and provide a detailed analysis of how the effectiveness of various group decision making strategies is affected by group composition and group members' recognition and knowledge.

The chapters included in Part IV, “Redundancy and Variability in the World” use the guinea pig of the recent research on heuristics—the “take-the-best” heuristic. This decision rule searches information in the order of its validity and stops the search when the first piece of information that discriminates between two objects is found. Rieskamp & Dieckmann compare the accuracy of various heuristic strategies, including take-the-best, under varying levels of redundancy in the environment and, consistent with previous research, conclude that decision strategies that ignore some information—such as take-the-best—benefit the most from information redundancy. A chapter by Bröder reviews experimental evidence on whether people in fact use this heuristic and concludes that they do—under conditions when the heuristic tends to work well (e.g., high variability of information validity). However, many people seem to have a “slight compensatory bias,” meaning that they continue information search after the first discriminating piece is found. Gigerenzer, Dieckmann, & Gaissmaier further discuss how different search and stopping rules work best in different environment. The last chapter, by Dieckmann & Todd, addresses the question of how people determine the order in which they search information when making a decision in an unfamiliar environment. The experimental evidence reviewed in this chapter suggests that people seldom search information in the order of its validity.

Part V, “Rarity and Skewness in the World,” starts with a chapter by McKenzie & Chase, in which the authors review the literature showing that people are “remarkably sensitive to the rarity of events when making inferences” (p. 310). They further argue that this sensitivity may explain such a well-documented “anomaly” of human cognition as positive hypothesis testing. Reimer & Hoffrage focus on group decision making and report the results of simulations that test the accuracy of the majority rule in groups with heterogeneous individual decision making strategies. Martignon, Katsikopoulos, & Woike define and provide a theoretical analysis of “fast and frugal” classification trees that, in analogy with one-reason decision heuristics, ignore a part of available information. Finally, Hertwig, Hoffrage, & Sparr consider skewed environments that are best described by power laws and provide a theoretical analysis of how accurate heuristics are in such environments. They also review experimental evidence on whether people use heuristics in skewed decision environments.

Part VI, “Designing the World,” consists of three chapters that bring the heuristics from experimental laboratories to the “real world.” A chapter by Bennis, Katsikopoulos, Goldstein, Dieckmann, & Berg is a highly enjoyable and insightful piece on the interplay between decision heuristics that people use and institutional design. Using vivid examples, such as organ donation, traffic regulation rules, professional soccer rankings, and slot machines, the authors argue that human decision making is better understood when the match—or mismatch—between decision heuristics and the decision environments put into place by institutional designers is taken into account. Kurzenhäuser & Hoffrage focus on risk/medical communication and consider how different representations of information affect the understanding of risks and uncertainties in medical contexts and thus may lead to different choices. Mammography screening is used as a prime example. The last chapter by Hutchinson, Fanselow, & Todd provides a theoretical analysis of heuristics within the context of car parking sequential search.

Finally, in the afterward, the editors of the volume emphasize the importance of considering the individual within the context and thus measuring rationality by some standard of success in the external world instead of the standard of internal consistency. Building on the work of Herbert Simon, they conclude by proposing that the study of heuristics can be normative through answering the question of what particular heuristics work well in a given environment when optimization—a tool of full as opposed to bounded rationality—is not feasible.

Like in many edited volumes, coherence across chapters could be improved in this volume too. For example, many chapters sound like an ode to the take-the-best heuristic, which assumes that information has been reordered by its validity. And yet, other chapters suggest that people (1) do not seem to search information in the order of its validity, and (2) can be easily tricked into basing their decisions on less valid or irrelevant cues (e.g., in strategically designed decision environments such as casinos). This apparent contradiction emphasizes the need to closer consider the assumptions underlying various heuristics to ensure that they properly describe human decision processes. In the example above, a better integration of theoretical and empirical ideas could be reached by systematically including possible ordering errors into the analyses of accuracy of the heuristics that assume validity ordering (e.g., Hogarth & Karelaia, 2007). Also, some chapters would appear more coherent with the idea of ecological rationality as a match between decision processes and the environment if they provided more characteristics of the datasets used to compare the accuracy of various heuristics. Moreover, the logic of placing some chapters into specific parts of the book was at times unclear to me. Finally, I felt that adding a short description of all chapters (and not only scattered references to some of them in the introductory first chapter) would make navigating the book easier.

Yet, the book more than makes up for these drawbacks by providing a thorough overview of the last decade of research on heuristic decision making. The chapters are self-contained, which at time makes them appear a bit repetitive, but provides the possibility to read the chapters separately. The book should be of great interest not only to scholars in decision making and psychology, but also to those in the domains of behavioral and experimental economics, institutional design, and risk communication. The metaphor of ecological rationality has already been fruitful in generating a significant volume of research on the match between decision processes and environments, and this volume is likely to lead to a number of new insightful publications.
References


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