

Michael D. Resnik, *Choices. An introduction to decision theory*. Minneapolis: University of Minnesota Press, 1987.

This book is an excellent introduction to decision theory. Nearly all subfields are covered: decisions under ignorance, probability theory, decisions under risk, utility theory, game theory and social decision theory. The most important results are not only mentioned but the proofs are presented and are discussed in detail. To mention a few: DeFinetti's *Dutch Book Theorem* (probability theory), Von Neumann-Morgenstern's *Maximin Theorem for two-by-two zero-sum games* (game theory) and Kenneth Arrow's *Impossibility Theorem* (social decision theory). Speaking as a mathematician I really enjoyed some of these proofs: clear, perspicuous and avoiding complex mathematical techniques. This implies that the book is accessible to anyone with a basic training in mathematics.

Michael Resnik is a philosopher. This almost tautological statement has the non-trivial consequence that the book is a philosophical introduction as well. The most famous paradoxes - Allais's Paradox, Ellsberg's Paradox, the Predictor Paradox, the Prisoner's Dilemma - are all thoroughly treated. Causal decision theory, developed in an attempt to solve the Predictor Paradox, is mentioned as an alternative. As no introduction to any (serious) subject can claim completeness, it would be too easy to list the topics not treated here. Nevertheless, I just mention one. In the Prisoner's Dilemma it is important to make a distinction

between the game played once and the reiterated version. Michael Resnik discusses what happens if the game is reiterated. However a further distinction should be made: the players know how many times the game will be repeated or they do not know. Rather ingeniously, Robert Axelrod has shown in his *The Evolution of Cooperation* (Basic Books, New York, 1984) that in the latter case cooperation is likely to result. This is an unexpected feature of the Prisoner's Dilemma.

If a philosopher wishes an introduction to decision theory, this book is an excellent starting point. However as the introduction mentions (p. 4): "This book will be concerned exclusively with abstract decision theory and will focus on its logical and philosophical foundations." If that same philosopher wishes an introduction to empirical decision theory - the study of how decisions are actually made by real agents - Resnik's book can be complemented with e.g. D. Kahneman, P. Slovic and A. Tversky (eds), *Judgment under Uncertainty: Heuristics and Biases* (Cambridge University Press, New York, 1982).

Let me speak as a mathematician once more. Amidst all the beautiful proofs I must mention one ugly duckling, viz. the proof on p. 160 concerning the uniqueness of the Nash point. I doubt whether most readers will be convinced by the famous sentence mathematicians are so fond of: "From which it follows that ...". However I must add that I was not able to find another proof up to the standards of this book.

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