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Decision, uncertainty, and the history of philosophy: Introduction

Ente di afferenza:
Università di Torino (unito)

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1. *Premises*

The initiative of the special issue presented here started out with an open call for papers in 2022 and it was motivated by two premises.

The first premise we take as relatively uncontroversial. It states that, from the perspective of intellectual history, decision theory is a very recent discipline. Its main developments have taken place in the Twentieth Century, following a series of convergent results across philosophy, mathematics, and economics. In 1926, 23-year-old Frank Plumpton Ramsey (1903-1930), a brilliant and creative scholar and a friend of Russell's and Wittgenstein's, put forward the first comprehensive formal treatment of choice under uncertainty in a fundamental paper which remained unpublished until his premature death[1]. Two years later, an equally young Hungarian genius, John von Neumann (1903-1957) published a mathematical theory of games in which optimal strategic behavior emerges from the computations of ideally rational agents integrating their goals and beliefs[2]. Through these seminal contributions and a few others (such as De Finetti's *La*

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[1] F.P. Ramsey, *Truth and probability*, in *Foundations of Mathematics and Other Essays*, London, Routledge & Kegan, 1931, pp. 156-98; reprinted in *Philosophical Papers*, Cambridge, Cambridge University Press, 1990, pp. 52-94.

[2] J. Von Neumann, *Zur Theorie der Gesellschaftspiele*, «Mathematische Annalen», X, 1928, pp. 295-320 (English transl.: *On the theory of games of strategy*, in *Contributions to the Theory of Games*, ed. by A.W. Tucker and R.D. Luce, vol. IV, Princeton NJ, Princeton University Press, 1959, pp. 13-42).

prévision in 1937[3]), contemporary decision theory has grown to the level of a scientific paradigm around the Forties and Fifties with groundbreaking and overarching treatments by von Neumann and Mongenstern and by Savage[4], becoming the cornerstone of so-called «neoclassical economics» and an influential framework for a diverse collection of disciplines with an interest in behavior and rationality, from cognitive psychology to political science, from neuroscience to evolutionary biology and beyond. If one goes back more than a century or so, however, the philosophical lineage of the concepts of *decision* and *uncertainty* turns out to provide only sparse and thin indications. There seems to be no wealth of options to denote the relevant phenomena in the traditional philosophical lexicon, and even less consensus, especially as compared with other great topics of philosophical reflection such as, say, knowledge, virtue, or justice.

The second premise of our project was complementary to the first one, but rather more conjectural in comparison. Essentially, we suspected that the situation just described could hide much undisclosed value under the surface. After all, decision-making and uncertainty are pervasive phenomena in personal and social life. So, despite their apparent marginality in the philosophical canon, one might still expect that due attentiveness would reveal interesting and perhaps important material showing an involvement with these crucial phenomena by central historical figures. While the perspectives or terminology of classical authors may elude the contemporary paradigm of decision theory at first sight, this need not be a substantial obstacle, and may even turn out to be an opportunity to establish novel connections. Let us take just one example. In *Protagoras*, Plato claims that wisdom can be sufficient for virtue, as long as it takes fully into account future sensations. In more contemporary terms, this approach may be regarded as supporting a utility calculus with no discount rates for the future. Framed in this way, Plato's view can en-

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[3] B. De Finetti, *La prévision: ses lois logiques, ses sources subjectives*, «Annales de l'Institut Henri Poincaré», VII, 1937, pp. 1-68.
[4] J. Von Neumann, O. Morgenstern, *Theory of Games and Economic Behavior*, Princeton (NJ), Princeton University Press, 1944/1947; L.J. Savage, *The Foundations of Statistics*, New York, Wiley, 1954/1972.

ter into modern debates about inter-temporal decisions and biases, just as these debates can help the scholar who wants to understand classical ideas about wisdom and virtue. Scattered as they may be, examples like these suggested how historical perspective could provide insights on decision-making to modern theorising, just as formal clarity and the interdisciplinary tools of decision theory can deepen our understanding of significant aspects in the history of ideas.

2. *Landscape*

Combining the two premises above we then have that the dialogue across the two domains of decision theory and the history of philosophy is largely lacking, for reasons that may be understandable but hardly conclusive. An effort to bridge this gap seemed thus justified. Of course, the connections at issue here can be articulated in several ways. A few earlier and successful examples seemed to come in two distinct flavors, depending on whether a broadly historical or broadly theoretical focus prevailed.

A key instance of the first kind is provided by Ian Hacking's influential formalisation of Pascal's wager on the opportunity to believe in God.[5] Partly relying on the technical apparatus that is nowadays standard in decision theory, Hacking has reconstructed Pascal's celebrated fragment as involving three logically distinct arguments, «all valid, none convincing». In our view, one does not need to fully agree with Hacking's exegesis and conclusions to appreciate the potential of his approach for the task of disentangling the fascinating intricacies of Pascal's line of thought in the *Pari*.

A prime example of the second kind of contribution, with a stronger theoretical focus, comes from the work of Daniel Kahneman, experimental psychologist, Economics Nobel Laureate 2002, and a founder of what has now become widely known as «behavioral economics». In a much cited theoretical article of the late Nineties in the *Quarterly Journal of Economics*, Kahneman and coauthors advocated a revival of Jeremy

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[5] I. Hacking, *The logic of Pascal's wager*, «American Philosophical Quarterly», IX, 1972, pp. 186-92.

Bentham's philosophical view of «hedonic quality» to promote a fundamental revision of the concept of «utility» as it had been employed in neoclassical economics in the Twentieth Century.[6] In our perspective, this is a case in which philosophical doctrines related to decision and uncertainty may exhibit unexplored layers of conceptual depth and thereby enrich, challenge or even defy scientific notions that have meanwhile found a systematic and entrenched characterization.
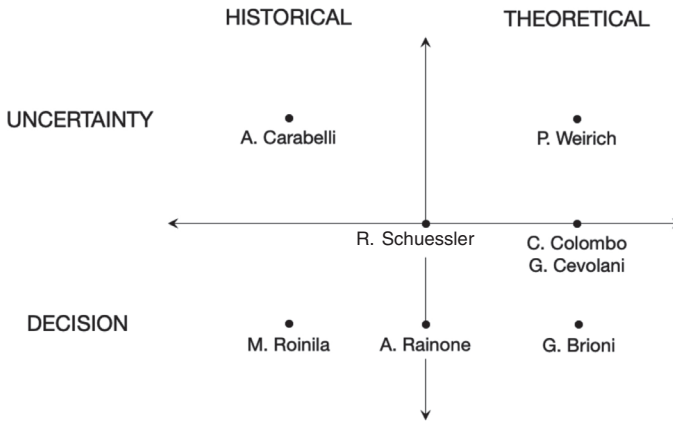

Fig. 1. A chart of the different contributions to the special issue in terms of two dimensions: (i) whether the work is meant to mainly deliver historical or theoretical insight, and (ii) the thematic balance between the two target notions of *uncertainty* and *decision*.

For a comprehensive view of the contributions collected, it is useful to complement this distinction of approaches with a distinction of target, namely, relative to the very notions of *decision* and *uncertainty*. Without a doubt, these two notions are very much intertwined on several levels. Nonetheless, they are also logically distinct and raise problems that are independent at least to some extent. One can therefore map works in this field along two orthogonal dimensions, integrating the methodological spectrum (historical / theoreti-

[6] D. Kahneman, P. Wakker, R. Sarin, *Back to Bentham? Explorations of experienced utility*, «The Quarterly Journal of Economics», CXII,1997, pp. 375-405.

cal) with the thematic balance between our two main target notions.

The papers included in the special issues are all tentatively located in a common display in Figure 1, and they turn out to cover the space rather evenly. In the next section, a survey of the collection will integrate and partly motivate this classification.

3. *Survey*

A fascinating piece of historical discussion is found in Markku Roinila's paper on *Leibniz's vectorial model of rational decision-making and bounded rationality*. According to Roinila's discussion, Leibniz should be understood as one of the early modern pioneers of decision theory along with Pascal and others. In particular, Leibniz is led to address quite explicitly the problem of how different goals can be integrated when they are partially in tension – i.e., in contemporary terms, the need for *trade-offs*. Roinila makes a case that such problem seems to trascend the resources of traditional models, including the practical syllogism or the metaphor of the pair-of-scales weighing reasons for or against a specific option. Leibniz's original solution can then be reconstructed in terms of a «vectorial model», where potentially diverging objectives are balanced against each other in a way similar to vectors representing physical forces acting in different directions. Possible connections with the notion of «bounded rationality» are also discussed in the paper, following Leibniz's idea of humans as finite agents with respect to the infinite perfection of God's choices as a creator.

Anna Carabelli's paper also has a mainly historical perspective, being devoted to *J.M. Keynes on Aristotelian* eudaimonic *happiness, tragic dilemmas, and uncertainty*. It integrates remarks from Keynes' major works with crucial material from his unpublished manuscripts, and it discloses some unsuspected and deep philosophical concerns which underlie and connect different stages of Keynes' rich and influential intellectual trajectory. Keynes is, among other things, a key figure in the develpment of contemporary probability theory, as documented by his monumental *Treatise on Probability*

(1921). This notwithstanding, as Carabelli points out, he has a recurrent interest for forms of uncertainty which tend to elude measurement and quantification. Remarkably, such interest turns out to be inspired by Keynes' early reflections on foundational problems in ethics, which Carabelli traces back to an Aristotelian and pluralist view of the moral good. The connection is given by moral dilemmas, i.e. situations where diverging grounds for action remain irreducible to each other, making competing options ultimately incomparable on rational grounds. By analogy, Keynes highlights a kind of uncertainty – «radical uncertainty», in Carabelli's reading – which is not to be analyzed as a gradation of credence, but in terms of unsettled conflict in the domain of inference and belief.

To the extent that graded belief is the central issue of Paul Weirich's paper on *Subjective probability*, his approach may appear to square better with the standard contemporary framework of decision theory. Such claim would be partly misleading, though. In fact, Weirich develops a subtle criticism against a dominant view – the «modern operationalist concept» – where degrees of belief are only meant to be an empirically adequate element of formal modelling accounting for the manifest choice behavior of an agent on the prior assumption that s/he is an expected utility maximizer. Weirich casts doubts on such «thin» characterization of degrees of belief and provides an opinionated overview of thinkers such as Jacob Bernoulli, Laplace, and De Morgan in support of a different approach. The goal is to point out how degrees of belief have long been seen as quantitative mental attitudes toward propositions, an idea that was progressively left out of the picture in the last century. Weirich advocates full vindication of this idea, in appropriately revised fashion, as a better basis for the expected utility maximization rule as a norm of rational decision-making under uncertainty.

Surely Daniel Bernoulli was himself following a formal model of maximization when recommending smallpox inoculation as a governmental policy in France in the second half of the Eighteenth Century. But does it make sense at all to apply a similar approach when potentially complex societal challenges are at stake? This is a touchstone issue, and one which was immediately seen and addressed head on by

an eminent critical reader of Bernoulli: D'Alambert. In their contribution on *Modeling public policy decisions*: *Lessons from the Bernoulli-D'Alambert debate*, Camilla Colombo and Gustavo Cevolani carry out a careful reconstruction of this case. This instructive episode is then thoroughly reviewed in light of a series of open issues in contemporary debates on the application of decision-theoretic analyses to problems of public interest, including the precautionary principle, the reliability of modeling assumptions and idealizations in a large social setting, and the possibility of comparing utilities across different individuals.

The more theoretical pieces in our collection have a tendency to display a common dialectic. For all its formal rigor and cornerstone success stories, Twentieth Century decision theory under uncertainty ended up facing increasing explanatory difficulties in the last four decades. In the process of setting up the framework as a scientific paradigm in a loosely Kuhnian sense, the roots of such difficulties may have been set aside, but they have not remained unnoticed. In hindsight, basic and important points can be found in early thinkers which suggest or even actually pursue developments that have been left unduly unexplored and can still be fruitful. A variant of this narrative concerning the foundations of game theory is articulated in Giacomo Brioni's paper, *Ripensare i presupposti della teoria delle decisioni attraverso Adam Smith: La prospettiva della* Mainline Economics *e di Vernon Smith*. Brioni's contribution is a critical reconstruction of how a founder of contemporary experimental economics, Vernon Smith, has formalized insights from Adam Smith's moral philosophy to account for systematic patterns of cooperative behavior which elude a satisfactory analysis in purely economic and stretegic terms.

Antonio Rainone's work on *Decision theory and the desire-belief model* is a case in which a balance emerges between a historical and a theoretical perspective. Rainone convincingly describes the «desire-belief model» as the received view in the contemporary analytic philosophy of action as illustrated, in particular, by Donald Davidson. The desire-belief model, moreover, can be regarded as a conceptual precursor of decision theory, for the latter is plausibly understood as capturing mathematically an agent who pursues

their ends by the most effective means in light of their best judgment. (In fact, according to Rainone, an even more fundamental theoretical basis for both approaches arises from Aristotle's theory of practical rationality and decision.) An open issue in the paper is then whether and how the influential philosophical framework of the desire-belief model is affected by potentially controversial features of contemporary decision theory such as its normative force as a benchmark of rationality and its empirical limitations as a description of observed human behavior.

We already pointed out how formal analyses of decision-making under uncertainty have found widespread application, branching out to a variety of disciplinary domains. In this perspective, Rudolf Schuessler's paper on *The Condorcet Jury Theorem and scholastic social epistemology* addresses a remarkable illustration. The Condorcet Jury Theorem is a much discussed mathematical statement by the Marquis de Condorcet concerning the probability that a group of individuals achieve a correct judgment by majority vote. Schuessler's analysis offers a fascinating combination of historical and theoretical elements by exploring a Medieval tradition that predates and largely anticipates Condorcet's famous theorem. As it turns out, not only these sophisticated discussions of «epistemic majoritarianism» in scholastic philosophy did provide a substantial basis for subsequent developments, but they also outlined challenges that remain of interest for contemporary theorists.

The idea of a collection of essays on *Decision, uncertainty, and the history of philosophy* was itself a matter of decision under uncertainty for us – and one which we believe turned out to be lucky. Our bet was that such endeavor would have allowed decision theorists to access relevant historical content while providing historians with new instruments to interpret classical philosophical debates. Now we are willing to bet that the reader will find factual support for this claim, thanks to the efforts of all the authors.

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