Game theory and interdependence

GAME THEORY AND ITS APPLICATIONS IN THE SOCIAL AND BIOLOGICAL SCIENCES, Andrew M. Colman, Oxford: Butterworth-Heinemann, 1995. 375 pp, ISBN 0-7506-2369-1.

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Several years ago, I asked an expert on decision making whether he could give an example of a decision that does not impact the wellbeing of others. After some period of silence, his response was: 'Well, ... eh, ... yes, eh, ... how about the decision what to wear on a particular day?' The extended response latency as well as the example itself illustrate that it is exceptionally difficult to think of decisions that do not have social or interpersonal consequences. Indeed, it is easy to imagine that a decision about what to wear has several direct or indirect social or interpersonal consequences (e.g. a partner may feel bad because of the lousy combination of colours).

Andrew Colman's book entitled *Game Theory and its Applications in the Social and Biological Sciences* is about decisions that affect one another's wellbeing. It is a book about *Interdependence*, one of the most pivotal concepts in the social and behavioral sciences, and a concept that receives increasing attention in the biological sciences as well. Indeed, the fields of game theory and interdependence are rapidly growing, not only in theoretical development but also in terms of its applications to a wide variety of topics. The book does an excellent job in outlining what game theory is and what it is not. Any theory can be evaluated in terms of two general criteria: (a) abstraction, a theory should offer an abstract conceptual framework for describing specific phenomena, and (b) construction; a theory should integrate abstract concepts in meaningful ways so that it allows for novel predictions. The book describes that the utility of game theory derives not so much from construction; instead, its utility is deeply rooted in abstraction. Game theory provides a powerful conceptual tool (i.e. games) for our analysis and comprehension of interdependence situations. It deals with the features of interdependence that help us understand what a given interdependence situation is about and what it calls for (e.g. coordination, cooperation, competition). In that sense, it is useful that Colman devotes chapters to non-interdependence (i.e. one-person games), to coordination games, zero-sum games, prisoner's dilemmas and related games, thereby providing a comprehensive game-theoretical framework for understanding each of these domains of interdependence. Also, this book convincingly demonstrates why the 'extreme' forms of interdependence (i.e. coordination games and strictly competitive games) are important and worthy of empirical and theoretical investigation. Moreover, issues such as trembling hand equilibria, bargaining, and Axelrod's tournaments of the prisoner's dilemmas are well discussed in this book, thereby nicely complementing Colman's first edition of this book, which was entitled *Game Theory and Experimental Games: The Study of Strategic Interaction*. Finally, I also believe that this book is successful in integrating game theory and extant interdependence theories which focus more strongly on the psychological underpinnings of interdependent decision making and which have been successfully served as a framework for issues varying from interpersonal relationships, cooperation and competition, prosocial behavior, and negotiation.

The title of this second edition emphasizes 'applications in the social and biological sciences'. The applications discussed by Colman focus on strategic voting, theory of evolution, and philosophical issues, illustrating how game theory can be used (a) to understand voting procedures (and why it is difficult to develop fair and efficient procedures), (b) to analyze the functional and evolutionary aspects of strategies such as Tit for Tat or Win–Stay–Lose–Change, and (c) to help clarify classical philosophical controversies focusing on issues such as morality and rationality. These 'applications' are useful in that they provide the reader with broader frameworks that are relevant to various 'mini-theories' and specific domains of research that are developed within specific disciplines.

At the same time, by emphasizing 'applications' in the title and elsewhere, most readers will also expect other types of applications, anticipating a thorough discussion of the manner in which game theory contributes to our understanding critical interpersonal, intergroup, or societal problems (e.g. destructive forms of interpersonal relationships, various forms of intergroup hostility, overpopulation, environmental pollution, energy conservation). Although the author uses many real-life examples as illustrations of particular game structures, there is relatively little attention to the analysis of real-life problems and how game theory and interdependence might contribute to understanding and solving such problems. Also, the book could have devoted attention to some other theoretically and application-relevant topics, including research focusing on comparisons of individuals and groups (i.e. it tends to be exceedingly difficult to promote co-operation among groups) and research focusing on structural solutions to social dilemmas (e.g. how should social dilemmas be managed?). Given that it is 'easy' to draw attention to issues that are not discussed, I should note that I was actually impressed by the large number of

issues that Colman addressed. As Colman outlined in his preface to the first edition 'I have not attempted to achieve the impossible', and one could only add that thirteen years later 'the impossible has become even more impossible'.

In conclusion: Colman's book provides a comprehensive and thoughtful overview of game theory and its applications, thereby effectively extending his former book which has been fruitfully used by many colleagues in the field. I can highly recommend Colman's new book also because the writing and its structure (i.e. using illuminating real-life examples and clear summaries at the end of each chapter) make the fields of game theory and interdependence accessible even to those that are not yet familiar with these fields. The author is to be praised for undertaking this painstaking task and for successfully bringing together game theory and 'applications' in various sciences.

Image theory and its applications

DECISION MAKING IN THE WORKPLACE: A UNIFIED PERSPECTIVE. Beach, Lee Roy (ed.), Mahwah, NJ: Lawrence Erlbaum Associates, 1996, 216 pp, ISBN 0-8058-1992-4

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A no doubt apocryphal anecdote has a graduate student saying to Bertrand Russell, 'Mr Russell, Mr Whitehead says that you are simple-minded', to which Russell replied 'You tell Mr Whitehead that he is muddle-headed'. The first fundamental epistemic issue raised by this book is the tension between desirable simplicity and necessary complexity. Unlike the majority of Anglo-American psychologists, Beach and his authors and co-authors have come down on the side of complexity, not because they are muddle-headed but because they see it as necessary in order to explicate decision making in the workplace.

A second fundamental issue raised in this book is the tension between the axiomatic and the empirical, between the construction of would-be self-consistent logical structures (*pace* Goedel) and the observation and description of the world. Psychology, except for a few fringe areas, has always firmly aligned itself with the empiricists. One fringe activity, however, where the axiomatists (if one can so term them) rather than the empiricists hold the high ground, is decision making, where what is labelled by Connolly in his book chapter as traditional decision theory (TDT) has always been dominant. (Those members of EADM or JDM who demur at this categorization should look at the number of pages that decision making receives in the canonical literature, where the canon is defined by textbooks, particularly introductory texts.) Psychologists, and their academic fellow-travellers have always been tentative about the axiomatic approach to epistemic activity. Although many behavioural and even social scientists have found the writings of decision theorists compelling, that many of these writings are not well grounded in systematic observation tends to make properly educated psychologists uneasy. Even though reputations have been made by showing the empirical assumptions of expected value theories hold only in part, the fundamental hegemony of TDT has resisted external challenges, even while accepting modest reform from within. It is, therefore, a bold spirit that tangles with TDT, but Beach and his authors have a will to be bold.

A third fundamental epistemic issue raised by this book, which is also a source of discomfort to psychologists, is the notion of prescription; the question of the relationship between is and ought. Standard decision theory is grounded in the idea that some decisions are better than others. Your empirical scientist, be he or she biological or behavioural, is uneasy with the idea that zebras are better than alligators. Everyone should get a prize. On this matter Beach and his group of writers make common cause with TDT. No scientific agnosticism or new-age solipsism for them; in the practical world there are criteria, and some decisions really are better than others.

So we come to *Decision Making in the Workplace* itself. The book consists of fifteen well-chosen and interesting chapters, all of which will stimulate thought, and perhaps even a response. The first two introduce image theory, and argue that, at least in the everyday world, it should replace expected value theory (Beach and Mitchell, and Beach and Lipshitz). These two chapters put the case for image theory simply and clearly, writing with the sure touch of practical men of affairs, who have been there, done that, and know what works and what does not. Their writings are redolent of intellectual streetsmarts. The following twelve chapters cover various aspects of workplace decision making, presenting empirical studies in the areas of job selection (Stevens and Beach), career choice (Stevens), job changing (Lee), auditing (Beach and Frederickson, and Asare), the effects of organizational culture on decision making (Weatherly and Beach, and Walsh),

Game theory is a mathematical theory of strategy which assumes that there are at least two players whose choices determine an outcome. Insofar as the players have conflicting preferences, their conflict may not be total â€" it is not necessarily the case that what one player wins the other loses (as in most sports). Their conflict may only be partial, wherein both players can win or lose simultaneously.Â A game is a situation in which there is interdependence between the participants or players. If there are two players, what you do depends on what I do, and what I do depends on what you do, so the outcome depends on both of our choices. But there may be more than two players, which is likely to lead to the formation of coalitions. Game theory, also known as interactive decision theory, studies the behavior of decision makers in situations of strategic interdependence. Its founders are John Von Neumann and Oskar Morgenstern who published the book The Theory of Games and Economic Behavior in 1944. The relevance of the theory for international relations (IR) goes undisputed; it is a truism to assert that states interact by trying to predict other statesâ€™ reactions to their decisions.Â Game-theory applications to IR take the form of models, that is, the simplification and stylization of statesâ€™ interactions. The three levels of game theory are of help here. The levels are extensive, strategic, and coalitional forms. Game theory is a theoretical framework for conceiving social situations among competing players. In some respects, game theory is the science of strategy, or at least the optimal decision-making of independent and competing actors in a strategic setting. The key pioneers of game theory were mathematician John von Neumann and economist Oskar Morgenstern in the 1940s. Mathematician John Nash is regarded by many as providing the first significant extension of the von Neumann and Morgenstern work. Key Takeaways. Game theory is a theoretical framework to conceive social situations among competing p