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Decision and Game Theory as the Analytical Core of All the Behavioural Sciences

In *Individuality and Entanglement* Herbert Gintis, one of the leading and most dazzling figures in behavioural economics, engages in an extensive charm offensive towards sociologists. His strategy of persuasion is twofold. On the one hand, he puts forward an explicit metatheoretical argument, according to which sociology and other problem children in the social sciences such as anthropology and social psychology need to adopt the analytical core of behavioural economics or otherwise face the ugly truth of being scientifically immature. On the other hand, Gintis attempts to seduce the reader with concrete theoretical studies of quintessentially sociological concepts and phenomena.

The book is not so much a monograph as it is a collection of essays dealing with more or less interrelated themes. Many of the chapters employ dynamic models from evolutionary game theory to study facets of gene-culture coevolution and, in particular, the emergence of social 'facts' such as property rights (Chapter 8) and social norms (Chapter 10). Chapter 3 stands out, since it describes a static model that provides a new solution to the (in)famous paradox of voting based on the idea of distributed effectivity, i.e. the idea that in large elections actors behave as if they were participating in a small election. In all these more applied chapters, Gintis metatheoretical argument is left implicit; apparently these studies are included in the book to demonstrate the power of Gintis's approach by way of example. Finally, there are four chapters (5–7 and 12) in which Gintis takes the bull by the horns and explicates his methodological claims.

This book is full of original and thought-provoking ideas about how to apply the framework of decision and game theory to the study of social phenomena. From the many substantive ideas—social rationality, three kinds of motivations (selfish, non-selfish, universalistic), private versus public personae, etc.—let me briefly just highlight one: modelling social norms via correlated equilibria, since I believe it is among the most profound ideas for social theory.

Let's recall that Rational-Choice Sociology has basically put forward three ideas on how to use decision and game theory to study social norms. First, internalised social norms can be modelled as arguments in a social utility function. Second, the theory of repeated games, and in particular so-called folk theorems, can be interpreted as providing conditions under which social norms emerge. For instance, if two actors play an indefinite number of rounds of a Prisoner's dilemma, there exist equilibria in which both players de facto do cooperate in each round. The strategies that are typically used to show the existence of these cooperative equilibria, such as the Trigger of Tit-for-Tat, can be interpreted as social norms involving some form of reciprocity and endogenous sanctioning [Voss 2001]. Third, signalling models provide

conditions in which it is possible to explain the emergence of social norms, which prima facie appear inefficient because of a waste of resources [Posner 1998]. Gintis supplies a fourth and novel idea of how to study social norms in a game-theoretic framework. To grasp the gist of his exposition, consider the following game: There are two players, Ann and Bob. Both have two actions, they can play either 'up' or 'down'. The following matrix gives their respective payoffs, depending on their profile of actions [Gintis 2010]:

		BOB	
		Up	down
ANN	Up	2,1	0,0
	Down	0,0	1,2

So, both players receive the worst possible payoff if their actions do not match. Ann prefers (up, up) over (down, down), while Bob prefers the latter over the former. In this simple coordination game, there are two Nash equilibria in pure strategies, (up, up) and (down, down), as well as an equilibrium in mixed strategies, in which Ann chooses 'up' with a probability of 2/3 and Bob chooses 'up' with a probability of 1/3. In this equilibrium in mixed strategies both players obtain a payoff of 2/3. Note that in an equilibrium in mixed strategies both players randomise over their action space independently of each other. As a consequence, the action profiles that in terms of payoffs are unfortunate (up, down) and (down, up) obtain with a positive probability of 5/9.

Against this background, Gintis stresses one aspect of social norms—i.e. social norms function as correlating devices for the beliefs and actions of the actors. In formal terms, he argues that social norms provide the basis for game play, which is not so much captured by the Nash equilibrium concept as by the 'correlated equilibrium'. Loosely speaking, a correlated equilibrium is a probability distribution on the action profiles (i.e. a common prior) such that for all the players and all the actions that have a positive probability under the prior it is true that the action is a best response against the posterior induced by the action. For instance, in our simple coordination game there is a correlated equilibrium that puts a probability of 1/2 on the profile (up, up) and a probability of 1/2 on (down, down). Note that in this correlated equilibrium both players obtain a payoff of 1.5 which is higher than the payoff in the mixed-strategy equilibrium; in addition, the payoff distribution is fairer than the unequal distributions in pure Nash equilibria.

In stressing the importance of a common cultural orientation that effectively functions as a 'choreographer' of social interaction, Gintis comes close to a core proposition in Talcott Parsons's social theory. Let's recall that Parsons turned to the problem of strategic interaction, which he called the problem of 'double contingency', while contemplating the question of how to extend his action theory into a theory of social systems. Notably, Parsons was aware of the game theory of his time and acknowledged its relevance for a proper analysis of the problem of double contingency. His final dictum on that matter reads as follows [Parsons 1968: 437]: 'The theory of games can be said to have proved that a complex interaction system with no rules, but in which each unit is supposed only to be "rationally pursuing its self-interest" cannot be stable in the above sense. … The most important *single* condition of the integration of an interaction system is a *shared basis of normative order*.' Gintis's argument regarding the choreography of social interaction by common priors can be understood as an explication and extension of Parsons's dictum by means of epistemic game theory. Game-theoretic solution concepts such as the Nash equilibrium or the correlated

equilibrium cannot be justified by individual rationality alone. Instead, they presuppose strong epistemic conditions regarding forms of interactive knowledge, which can be interpreted sociologically as forms of a common cultural orientation. So far, Gintis's argument is purely Parsonian. He adds the subtle point that the epistemic conditions for a correlated equilibrium are not as restrictive as the epistemic conditions for the Nash equilibrium.

I am dwelling on this issue here for so long because it has substantial implications for one of the fundamental questions in social theory that has puzzled social thinkers since Thomas Hobbes. Can the social order be explained solely on the grounds of individual rationality? Parsons argued that there is no solution to the problem of social order which works without assuming a common cultural orientation and Gintis provides a strong game-theoretic foundation for Parsons' argument. This should be food for thought for many scholars in Rational-Choice Sociology, who tend to believe that game theory supports an individualistic solution. Gintis even goes so far as to call into question the tenability of methodological individualism, because it rejects a casual reality above the level of individual actors, which, so his story goes, the assumption of common priors amounts to. At this point, however, Gintis throws out the baby with the bathwater. The methodological debate around methodological individualism and holism is much more advanced than Gintis's exposition recognises, and the most widely held view in the individualistic camp, called structural or moderate individualism [Udehn 2002; Heintz 2004], is in a sense consistent with the assumption that there is 'a casual reality above the level of individual actors' (p. 42). So, if Gintis wants to double down on his provocative point regarding methodological individualism, he needs to be more explicit and precise in his argumentation.

So much about social norms as the choreographers of social interaction, which is just one of Gintis's many original ideas on how to model social phenomena. As explained above, in addition to concrete theoretical studies of specific phenomena, *Individuality and Entanglement* also contains explicit metatheoretical chapters. Gintis states and advocates two general theses. First, decision and game theory should be adopted as the 'analytical core' of all of the behavioural sciences. To the extent that disciplines such as sociology, social psychology, and anthropology resist in adopting this analytical core, they are scientifically immature. Second, many if not all of the traditional objections against decision and game theory that have been raised by scholars from deviant disciplines are either based on misunderstandings or have become obsolete since the rise of behavioural economics.

With respect to the second metatheoretical claim, Gintis certainly hits the nail on the head. In countless sociological textbooks, monographs, and scientific papers, the rational actor model is criticised for all the wrong reasons. It has been routinely argued that rational choice adopts assumptions such as material egoism and perfect information, which are obviously empirically untenable. Gintis's exposition of decision theory (Chapter 5) does away with many of these misconceptions. Using decision theory to model human behaviour does not involve any pre-commitment whatsoever regarding the motives of actors; material egoism, other-regarding preferences, and even an orientation towards ultimate ideals can be represented within the formal framework. He also stresses that using decision theory to model behaviour does not necessarily involve assuming *instrumental rationality*, which is to say that, '… it does not assume that rational behavior is oriented towards any particular end state or goal, and certainly not that rational behavior furthers the fit-

ness or welfare interests of the decision-maker' (p. 104).

Applying decision theory simply means assuming *formal rationality*, which is to say that the 'calculus' of decision theory can only describe behaviour that is sufficiently consistent. The precise nature of these consistency requirements is well-understood and the object of study in the theory of revealed preferences. Gintis also hints at the underlying reasons for these widespread misconceptions among critics of rational choice. For one, scholars from different camps who feel the need to criticise rational choice on 'fundamental' grounds typically lack the appropriate training in mathematics to understand the content of decision-theoretic representation and measurement theorems. In addition, some proponents of Rational-Choice Sociology did a bad job in presenting and advocating decision and game theory. For instance, the standard way of applying subjective expected utility theory in sociology is simply not in line with decision-theoretic expected utility theory. Also, as a matter of fact, some proponents of Rational-Choice Sociology were much too uncritical of the 'Chicago school' led by Becker and Coleman and only hesitantly let go of the assumption of material egoism once behavioural economists like Fehr and Gintis published the news in *AER*, *Nature*, and *Science*.

Concerning the claim that decision and game theory should be the analytical core of the behavioural sciences (i.e. social sciences and sociobiology), Gintis does not offer a stringent argument with which to back it up. Instead, he merely makes some argumentative points that rather insinuate the claim. First, Gintis compares the behavioural sciences, in which incompatible views on human behaviour are held, to the natural sciences, which '… are consilient in the sense that whenever two disciplines study the same object of knowledge, their models and theories agree where they overlap' (p. 271) and finds the situation in the behavioural sciences to be '… curious, even scandalous' (p. 268) because '… there is only one truth in science …' (p. 268). Second, he states the correct yet obvious fact that sociology has no theoretical core since the decline of Parsons' structural functionalism in the 1960s (Chapters 6 and 7). On a side note, let me highlight that I completely agree with Gintis's judgement that Parsons laid a solid action-theoretic foundation ('Handlungstheorie') for his grand-theory project with 'The Structure of Social Action', but simply did not have the analytical tools at hand to extend his action-theoretic basis to a proper structure theory ('Ordnungstheorie'). What Parsons needed was modern game theory, what he found was organicist system theory. Third, he argues that decision and game theory are natural candidates for the analytical core of the behavioural sciences and are already serving this function in economics, political science, and biology.

Now what to make of this? I agree with Gintis regarding the potential of decision and game theory as a kind of universal language in the behavioural sciences. In the hands of a capable modeler, many substantive ideas which stem from and are typically expressed within non-formal paradigms can be integrated into and studied via decision- and game-theoretic models. However, Gintis seems to be aiming at more than simply stressing the integrative potential of the rational actor model. His talk of scientific immaturity (p. 227) and his demand that all behavioural scientists should be trained in decision and game theory (p. 271) effectively call into question the scientific legitimacy of working within the inherent logic, methodology, and research traditions of paradigms that do not subscribe to his analytical core. Yet, like many other sociologists, I actually do enjoy the intellectual richness and diversity of our field and would definitely not want to get rid of the contributions of Randall Collins, Howard S. Becker, or Harold Gar-

finkel, just to name a few. Note that keeping the different traditions of theorising alive and empirically studying social phenomena does not preclude an interest in the question of how these traditions relate to each other. In fact, it makes integrative efforts such as Herbert Gintis's insightful and thought-provoking *Individuality and Entanglement* all the more profound.

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Man, the Game Player: A Plea for Interdisciplinary Research

This book covers an impressive variety of topics. Gintis aims to provide no less than a rigorous unified theoretical foundation for economics, psychology, sociology, anthropology, political science, and sociobiology. Doing so, he combines formal modelling, rational choice theory, game theory, and evolution theory to advance a transdisciplinary explanation of individual behaviour and the development of human societies. Because of its complexity, the book is certainly not an easy read. Moreover, it lacks a stringent line of argumentation and appears to be more like an edited volume presenting a collection of ideas from previously published articles. Still, it offers thought-provoking insights and, fortunately, the *Overview* preceding Chapter 1 provides some linkage between the discussed arguments and summarises the book's content in seven related themes.

The first theme is that society is a game structured by rules that can be changed by the players. The moral dimension of observing rules is the second theme. Individuals like playing by the rules and feel ashamed if they break them. The third theme is a rejection of economics' strict methodological individualism. Instead, human minds are socially entangled and cognition is distributed across social networks. According to the fourth theme, humans oftentimes act because they want to do the right thing. Morality thus has an important non-consequentialist dimension. The fifth theme describes human preferences as a mixture of self-regarding, other-regarding, and universal motivations and individuals trade off among them (sixth theme). Finally, the seventh theme stresses the importance of transdisciplinary research for getting a better understanding of human behaviour. Given the book's broad coverage of topics from different fields, I will not be able to address all aspects of the book adequately in this review. Hence, I will reflect on Gintis's work from the point of view of a political scientist with an interest in decision theory and the workings and origins of institutions, and I will focus my discussion on the content of chapters 1, 2, 3, 5, 6, 7, 8, and 12.

Chapter 1 'Gene-Culture Coevolution' uses the example of the development of