



Dissecting the Social: on the Principles of Analytical Sociology

Hedstrom, Peter

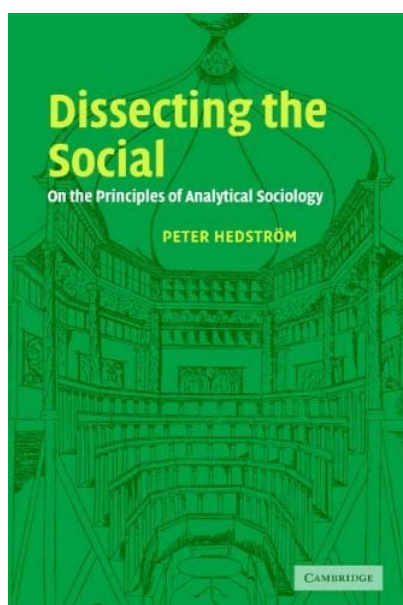
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Reviewed by [Flaminio Squazzoni](#)

Department of Social Sciences, Faculty of Economics, University of Brescia, Italy



Hedström's book on analytical sociology is a must read for social scientists and social simulation practitioners for a number of reasons. The main one is that the book is a thorough presentation of the analytical sociology research programme for advancing the development of the methodology of sociology and the social sciences. Compared to analytical sociology's manifesto, as presented in Hedström and Swedberg (1998), a collection of contributions by Elster, Boudon, Gambetta and Schelling among others, this new book adds systematization, careful attention to methodological issues, the idea of cross-fertilizing sociology and social simulation, and a set of examples. Thanks to the idea of social mechanisms, which can allow fostering the explanatory power of social simulation, it depicts a strategy for fruitfully catalyzing the debate between social scientists and social simulation practitioners.

The book has seven chapters. The first, entitled "The Analytical Tradition in Sociology", deals with the general principles of analytical sociology, trying to anchor it both in classical and modern sociology and to illustrate some preliminary statements. In Hedström's view, sociology's goal is to

explain social phenomena according to an "analytical" method, that is, by "carefully dissecting" complex social processes and then "bringing into focus their most important constituent components". To be worthy of the analytical label, sociology must focus on "middle range" causal theorisation, as Merton first originally suggested, to produce causal theories of social phenomena able to be theoretically generalised and empirically tested through formalised models. Neither philosophical theories of society, nor purely empirical accounts and descriptions of social phenomena are considered hundred per cent science. Science has do to with the creation of formalised models able to support sound causal explanations based on the systematic identification of mechanisms operating behind empirical realities. Formalisation is an important feature to assure causal explanation, inter-subjectivity and th cumulativeness of the scientific progress. Computer simulation is a fundamental component of such a scientific process.

Hedström suggests that analytical sociologists are those who believe in the primacy of the scientific method and causal explanation, who attach importance to formalisation and theoretical abstraction, but who, at the same time, systematically seek for empirical foundations. In contrast to Hedström's position, proponents of non-analytical sociology would include social theorists, grand theorists, theorists of everything, social philosophers, sociological pamphletists and labelists, and, last but not least, those scholars who produce empirical accounts and descriptions without theory.

The reason to differentiate among sociologists is that, in these last "non-analytical" approaches, no causal explanation of empirical social phenomena is possible. Grand theorists and sociological pamphletists aren't interested in referring to empirical realities according to a scientific method. Because of the lack of empirical

foundation and scientific method, what is produced is a kind of theorisation without theory or, at best, a philosophical account of accounts. On the other hand, following Coleman's famous argument against statistical sociology and the role of variable centred correlation (Coleman 1990), sociological empiricism and quantitative sociology cannot support micro-macro causal explanations but, at best, first instance descriptions of social phenomena. Sociological empiricism is a necessary but not sufficient component of sociology as a science.

Concerning this argument, I have a first remark. Let's suppose I'm a reader rather accustomed to the philosophy of science and unacquainted with analytical sociology but deeply interested in understanding what is analytical sociology research, above all from an epistemological viewpoint. In that case, I would expect to find in the book a close examination of epistemological issues. The core of Hedström's argument seems to be as follows: 1) science means a method; 2) in order to have good analytical theories, methodology comes first; 3) epistemology is nothing but methodology. However, epistemology and methodology should not be conflated, and methodology, to be reflexively manipulated, needs to be referred to a higher level epistemological position. It is not until the beginning of the fourth chapter (pp. 70) that Hedström deals with important ontological issues, arguing against critical realism's position advocated by Bhaskar (1978) and Archer (1995), and more recently by Sawyer (2004), which claims the ontological existence of "social entities" and their supposed causal power. To such claims, the author opposes the following pragmatic position: in order to avoid dangerous ontological discussions about social entities and causality, it is better to keep the argument as close as possible to methodology, conflating epistemology and methodology, with the hope that, thanks to the expected future improvements of the research program, some step forward at the ontological level will be sooner or later acquired.

This is a pragmatic position of good sense. But, because the book has the nature of a manifesto, a refined reader would expect to find a clear and explicit position about epistemological issues at the start of the book. The same applies to the argument about the historical embeddedness of analytical sociology. It is well known that social scientists often assume that every theoretical or methodological novelty needs to be justified with a careful anchorage to classical and modern sociology. The natural consequence is that putting forward a new argument always means re-writing the tradition in some sense. The problem is that such a re-writing often turns into a representation of the historical evolution of a discipline as a kind of battle between the good and the wicked, often with little respect for careful historical contextualisation. My personal opinion is that such a widespread attitude toward the continuous historicisation of theoretical and methodological debates is not a kind of professional duty. But, again, let's suppose I'm a reader accustomed to the history of sociological thought or a keen reader of sociological literature. In this case, I would be a little disappointed by Hedström's choice to summarise his foundational literature in a few pages, as a simple succession of authors, and I would pose some questions to the author. For instance, as soon as one understands the author's quick representation of the analytical sociology's roots, from Weber to Coleman, passing by Boudon, Schelling and Elster, one could ask what is the real boundary between the tradition of methodological individualism in sociology and analytical sociology? To be provocative, this same reader would paradoxically conclude that, if such a boundary does not really exist, the use of the label "analytical" does not make much sense. In author's favour, I must point out that, in order to answer questions like these, probably a 400 page book would be needed.

The second chapter, entitled "Social Mechanisms and Explanatory Theory", deals with the mechanisms-based style of explanation. This chapter allows for clarifying a few of the critical points mentioned above. The part on the mechanisms-based style of explanation is one of the best of Hedström's arguments, and it is at the core of analytical sociology, addressing the question of how to increase the explanatory power of sociology. According to Hedström, the explanatory power of sociology can neither be improved by deterministic laws, nor by variables-based explanation, but by social mechanisms explanation. A social mechanism is "a constellation of entities and activities that are linked to one another in such a way that they regularly bring about a particular type of outcome" (11). In the sociological literature, there are alternative definitions of what a "social mechanism" is, as it is summarized in Figure 2.2. (25). But, the definition given by Hedström is quite effective and precise. As it is further investigated in the following chapters, the "constellation" that the author refers to, means a generative model able to keep together entities and activities, where entities and activities are "agents", "action", and "interaction", and the "outcome" is the empirical social phenomenon under investigation.

The part of the chapter where the author focuses on the differences between mechanism explanations and

description, statistical explanations, and covering law explanation is simple, clear and effective. But, again, our idealised reader, who I suppose to be accustomed to philosophy of science, would be delighted to find further explanations of such important issues as the relationship between law, theory and mechanism, the impossibility of a mechanisms-based explanation without a reference to higher level generalised theories, the quest for the theoretical and empirical generalisation of a mechanism, a careful analysis of the difference between probabilistic law-like regularities and mechanisms, and so forth. Anyway, despite the scrupulousness of our idealised former reader, which begins to be irritating, this part of Hedström's argumentation is entirely convincing.

To sum up, the core of analytical sociology is the principle that a mechanism explanation refers to causal theoretical models. Explaining a social phenomenon means elaborating a generative model able to make the underlying mechanisms understandable. The concept of generativeness means that a causal explanation of social outcomes does not refer to a linearization between cause events-effect events, or between cause aggregate - effect aggregate, but rather to agents, actions and interaction, all kept together in a causal constellation. As computational social scientists know better than anyone, this is the bottom-line of any "generative" approach to social phenomena. This is where social simulation enters the picture, as will be clear in the last three chapters.

The third and fourth chapters, respectively entitled "Action and Interaction" and "Social Interaction and Social Change", allow further deepening the understanding of the building blocks of analytical sociology. As Hedström outlines at the beginning of the third chapter (35), in soft methodological individualism's footsteps, the foundation of any theory of a social phenomenon needs to satisfy the following desiderata and components: a strong psychological and sociological plausibility of theory of individual action explicitly assumed, according to Weberian arguments about intentionality; the analysis of the interaction structure and its interplay with individual action; the link between micro and macro outcomes; and, last but not least, the simplicity and parsimony of the statements.

Discussing the desires-belief-opportunities approach to action, which is considered a fundamental building block of analytical sociology, Hedström firmly supports the method of "folk psychology" ideal type-based abstractions on the micro level. His strategy is to reduce the extremism of the rational choice paradigm, while at the same time defending the need for abstracting from empirical richness and detail an ideal-typical foundation able to support explanatory theories. He further suggests embedding on the micro level a careful attention to social interaction. As computational social scientists know very well, social outcomes are often affected by interaction structure and form. A small change at the level of interaction structure often implies big changes at the macro social outcome. In this regard, Hedström rightly emphasises the need for dissecting and differentiating social interaction's effects, where agents interact with each other, as well as with the social aggregate, according to various structures and forms, from environmental and selection effects influencing individual action.

This idea of dissecting social, environmental and selection effects on individual action is quite convincing. As we know, computational social scientists tend to conflate social, environmental and selection effects on individual action, and while they try to understand the role of social influence on agents' behaviour, they do not deal with a complicated interaction between agents and social aggregates, as rightly suggested by Hedström. In fact, in most agent-based models, social influence is conceptualised just in terms of local neighbourhood and local/global selection effects. Hedström's position allows one to emphasise the peculiar properties of social action and to dissect its features and components. The message is that computational social scientists should dissect these different sources of influence on agents and their effects.

Another point concerns micro level assumptions. All the sociological traditions referring to methodological individualism, such as analytical sociology, seem to be satisfied with using concepts taken from so-called folk psychology. Despite the growing overall interest in cognitive sciences, sociologists pay no serious attention to cognition. This is quite curious. Are we sure that we can assume plausible behaviour in our sociological models without taking into account the role of the cognitive foundations of individual action? Are we sure that, by excluding the deep waters of cognition and remaining on the surface of folk psychology, we do not lose an important part of the social phenomenon, if not some specific social process? In a word, is a theory of social action plausible and possible without opening the black box of cognition?

That's a point on which analytical sociology unfortunately does not provide any detail. Since interest in

cognitive science and artificial intelligence, as well as in all the different branches of evolutionary and experimental behavioural sciences, is increasing, one wonders whether a dialogue with cognitive science and these new branches of behavioural sciences is necessary for appropriately theorising about social phenomena. Isn't a clear position about these neighbouring sciences necessary in a 21st Century sociology research programme?

Just to clarify my viewpoint, the fact that cognitive science and these new branches of behavioural sciences have not yet produced a sound common theory of human and social behaviour cannot be an excuse for locking the black box of cognition from sociological models and theories. Again, as most of the social simulation practitioners know very well, the point is that locking the black box of cognition often means missing the chance of deeply understanding complex social phenomena. Folk psychology is a step forward in respect to the rational choice paradigm, but, in order to try to understand the complexity of social phenomena, sociology needs to approach cognition and to deepen the cognitive foundations of individual behaviour in social settings. This is the reason why a strong link between sociology and cognitive science, as well as with all the new branches of behavioural sciences, is desirable.

The fourth chapter, entitled "Social Interaction and Social Change", rightly reminds us that sociological explanations are not about individual but about macro social phenomena, and that this does not imply a need to reify the dualism of micro and macro analytical levels. In this chapter Hedström finally deals with some ontological and epistemological issues about social entities and structures, emergence, and micro-macro debates. Against the argument of the stratification of social reality and the supposed ontological power of social structures put forward by critical realists and macro sociologists, Hedström suggests a pragmatic methodological position: the "un-observables" are essential for theorizing about social phenomena, are analytical objects, but no place can be found in social science for the "mysticism of traditional holistic ontologies" (72-73). He thus excludes ontological holism while dealing with methodological holism. He addresses the question of emergence and causality by emphasizing the role that formal techniques, such as computational modelling, can play for understanding the complexity of social phenomena. Some exemplary simulation models are described in the second part of the chapter in order to point out how interaction structure matters for explaining social outcomes, how effects of individual action are contingent upon the form interaction takes, and how looking at aggregate patterns says little about micro level generative processes.

In this respect, a point I would like to have seen further investigated is the role of social emergence in the mechanism-based framework. For instance, the difference between a mechanism and an emergent social process is left unclear. On this issue, a good exercise for the reader would be to match Hedström's book with Sawyer's new book on "social emergence". In this, a completely opposite position about social emergence and causality is strongly argued and the question is given an ontological solution, according to which social entities and processes have to be analytically distinguished from individual entities and not conflated one another, and macro social emergence can ontologically exercise causal power on individuals ([Sawyer 2004](#)). Of course, Sawyer's position on social emergence could be seriously criticized and opposed, but it clearly demonstrates that understanding social emergence is a main goal of sociology.

In the last two chapters, entitled "On Causal Modelling" and "Quantitative Research, Agent-Based Modelling and Theories of the Social", the latter written with Yvonne Åberg, the author focuses on causality and modelling, and on the link between theory, modelling, and empirical analyses, showing an interesting example of empirical social simulation.

The first argument of this part is the need for a generative causality in sociology. Computational social scientists know very well what is meant by "generative causality". I will not enter into detail on it. The second argument is the need for integrating quantitative research with simulation in order to produce generative theoretical models able to represent formally the mechanisms through which the social outcomes that can be grasped and measured by statistical surveys and quantitative researches are thought to have been brought about. Such an integration has a twofold function: first to allow a model's parameters to be calibrated empirically, as well as to test simulation outcomes; and second to complete available empirical data with a generative theoretical explanation.

The example shown in the sixth chapter is a model of youth unemployment, where the role of social interaction in explaining spatial and temporal patterns in unemployment is carefully emphasized. The author

conforms closely to the macro-micro-macro Coleman approach ([Coleman 1990](#)). A large-scale data set of young people aged 20-24 years in the Stockholm metropolitan area in the 1990s and several case studies of young people are used as empirical data on the macro situation, such as estimated individuals' likelihood of leaving unemployment under social influences, to reproduce a realistic interaction structure and to have plausible behavioural models at micro level. In so doing, empirical data allows the introduction of realism in the macro-micro and micro-micro link. On such a base, the simulation model is used to find a micro-macro generative explanation.

The data indicate that youth unemployment patterns are strongly affected by social interaction and endogenous processes. The hypothesis is that an increase in local unemployment level is likely to reduce the cost of being unemployed ("if your friends are unemployed you do not think it is so bad to be unemployed since everyone else is. But, if you are the only unemployed, you feel like an outsider" - interview reported in the text), reduce the quality of the job information network, and reduce expectations about potential jobs (122).

The simulation confirms the hypothesis about the role of social interaction in clusterising and generating unemployment. It reveals social interaction's importance in generating macro patterns of unemployment, at least on par with other relevant factors, such as educational levels of people.

Unfortunately, despite an emphasis on the role of agents, the simulation model does not include sophisticated agents. Indeed, it does not include agents at all. No beliefs, no desires, no heterogeneity are included in the modelling of the agents. As the author notes, "it would have been desirable also to include beliefs and desires in the analysis, but we do not have any empirical information about them" (132). As often happens, the strong work on empirical foundations is more addressed to modelling space, interaction structure, and quantitative parameters, less to model agents' behaviour. However, this is also true of most agent-based models in social science today.

To be a bit provocative, the point is the following: how is it possible to continue to call "agent-based models" those models that do not contain any explicit representation of social agents (autonomy, heterogeneity, intentional goals, cognition, strategic reasoning, and so on), but often just a simple mathematical function homogeneously regulating agents' behaviour? To say it again, this same question applies to most social simulation models today.

Focussing on important methodological issues, Hedström's emphasis on the need for the empirical calibration and validation of simulation models to improve theoretical insights is commendable. This same inspiration is shared by most of recent contributions on social simulation methodology ([Frank and Troitzsch 2005](#)). Hedström's claim about the need for integrating different methods, kinds and sources of empirical data, and his criticism of the criterion of "generative sufficiency" is equally remarkable. As I suggested in the same sense also in Boero and Squazzoni ([2005](#)), "the fact that a mechanism can explain an outcome does not mean that it *actually* explained it. Many different mechanisms can generate the same type of outcomes, and somehow we must be able to identify the mechanisms that most likely do generate them. This is where empirical research enters the picture" (151).

In conclusion, my general opinion is that Hedström's arguments have to be seriously taken into account both by social scientists and social simulation practitioners. Causal theorisation, computational formalisation, empirical research and social mechanism-based methodology are fundamental steps for improving the progress of sociology and the social sciences, as well as their scientific thickness. This is the reason why I think that analytical sociology is the strongest candidate for being the 21st Century research program in sociology. The point I would like to emphasise is that social simulation is called to play a focal role in such a progress. At the same time, it is expected that social simulation itself would be complimented and improved by such a heuristic contamination. This is the main reason why the book can be stimulating reading for both social scientists and social simulation practitioners. To conclude, there is nothing left but to express our gratitude to the author.



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