Sociophysics: A Physicist's Modeling of Psycho-Political Phenomena (Understanding Complex Systems)

Galam, Serge
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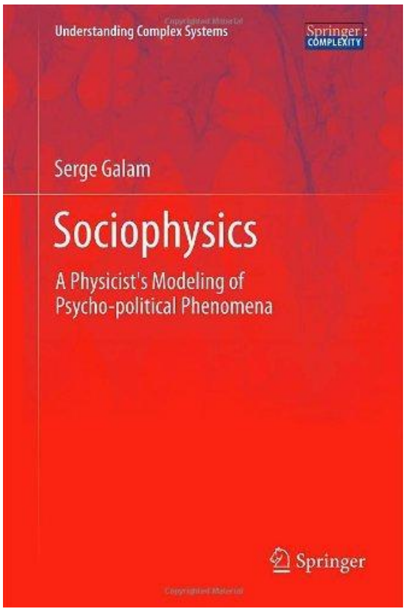

This interesting and enjoyable book written by the father of sociophysics himself is both a historical account of the development of the field and a summary of the author's models on social science phenomena, matured over a time span of roughly thirty years.

As framed by the author, sociophysics is "the use of concepts and techniques that are taken from statistical physics to investigate some social and political behavior" (page xviii). The book constitutes a thought-provoking outlook to considering "humans behaving like atoms", and deploys a perspective on how such a consideration can sometimes offer alternatives to understand the complexity of social interaction.

The book is divided into four parts. The first part (chapters 1 to 4) comprises a historical review of the field, along with philosophical and epistemological grounds that give support to when and how the statistical physics approach can be used to understand social behaviour. The second part (chapters 5 to 10) introduces several models that range from group decision making and coalition formation, to terrorism, bottom-up hierarchical voting and opinion dynamics. The third part (chapters 12 to 16) offers a detailed treatment of democratic voting in bottom-up hierarchical structures with the presence of two competing candidates / opinions, and the final, fourth part, is devoted to extend bottom-up hierarchical voting to the case of three competing candidates.

From the second part onwards, Galam presents an interesting set of models and their corresponding variations. He illustrates, for instance, how extreme positions can emerge from a group whose individuals seek to minimize interpersonal conflict (chapter 6), how dictatorships might naturally emerge from democratic bottom-up hierarchies with two candidates (cf. chapter 7 and part II), and how marginal opinions can turn out to become the majority's opinion as a by-product of social interaction (chapter 10). Particularly, in the case of a bottom-up hierarchical voting system, the author illustrates how small, even group sizes at each level of the hierarchy that engage in majority rule voting might offer a considerable advantage for the ruling party to remain in office. In addition, the author shows how undesirable “geometric nesting” at the lower levels of the hierarchy could facilitate the least prevalent opinion to climb up to the top of the hierarchy and win an election (cf. page 285).

After relating his not-so-positive experience with interdisciplinary work (page 57), Galam sets out a set of guidelines for sociophysics, which states that the field should remain an endeavour of physicists only, in order to grow as a solid science (pages 72-73). The author emphasizes some of the achievements of sociophysics, such as the elaboration of new conceptual frameworks and computer simulations that have enlighten explanations on social phenomena. Unfortunately, he ignores the computational modelling efforts that political scientists have developed over the last two decades (e.g., Laver and Sergenti 2011). Indeed, physicists have mainly focused on processes of agreement dynamics (Castellano *et al*. 2009) while they have disregarded a complementary simulation literature in political science, where it is considered that voting dynamics very much depends on party strategic behaviour and spatial competition (Laver and Sergenti 2011). I do not want to suggest that integration of different modelling efforts would be beneficial. I would just like to paraphrase what Scott Page argued: an understanding of social complexity should contemplate the development of many - and different - types of models (Page 2007). For this, the book is a good contribution.

It is worth noting that Galam’s approach is different from how models are traditionally built in the tradition of political and economic sciences. Economists have long argued that “economics is not only a social science, it is a genuine science” because, “like the physical sciences, economics uses a methodology that produces refutable implications and tests these implications using solid statistical techniques” (Lazear 2000, 99). For economists, “rigor need not take the form of mathematics, but much of economic rigor relies on its mathematical precision” (Lazear 2000, 100). Interestingly, unlike economics, Galam argues that “physics does not care about mathematical rigor” since what matters is “the capability to reproduce particular properties using *some* mathematics” (page 27, italics added). In physics, “where sophisticated mathematics is common [...] mathematical rigor is considered an impediment for creative theorizing” (Gintis 2009, xv).

Even considering that Galam’s book is highly technical, the author adopts the physicist’s viewpoint where empirical power of the proposed models to replicate real-world features is more important than mathematical rigourousness. Yet, Galam makes clear that his approach does not pretend to replace or substitute in any way the tradition in the social sciences (page 74).

All in all, I find this book inspiring, with the caveat that considering “humans behaving like atoms” should be carefully looked upon and complemented with other (mathematical of computational) modelling efforts in the social sciences.