

Book Review

A review of *Complexity Theory and the Social Sciences, An Introduction*, by David Byrne, 1998. New York: Routledge, 206 pp. ISBN 0415162963. \$44.95 USD.

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The plethora of books, which appeared during the 1990s on complexity and chaos theory, left many social scientists and educational researchers with an appetite for further knowledge. Prigogine and Stengers (1984), Gleick (1987), Waldrop (1992), and others laid the foundation for this provocative knowledge base, which draws from general systems, chaos, and complexity theories. This bold vision was greeted as a potential universal foundation for science, bringing together life sciences, math, and physics to prompt new understandings of social phenomena. Utilizing an abundance of metaphors and illustrative examples, these authors evoked an appealing potential to speak about the “social” in terms of chaotic and complex systems. There is, however, a step between these figurative metaphors and the articulation of an operational model. The challenge of building bridges between complexity and social theories, and their interrelations within diverse social dimensions, still remains yet to be firmly established.

In his book *Complexity Theory and the Social Sciences*, David Byrne attempts to address this significant absence. In his analysis, Byrne is keen to demonstrate how social systems are not only complex manifestations within the individual, which is already a given, but also how this proves to be interpreted by complexity and chaos theories. Building his own theory, drawing from a provocative ontological base developed by Reed and Harvey (1992), Byrne elaborates one of the rare practical points between these two worlds. His book proposes a scientific model of the social sciences by integrating the accepted terms and concepts known in complexity theory. In undergoing this difficult challenge, he attempts to expose, in concrete

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words, advanced methodological principles integrating specific techniques of statistics as currently used in other sciences. As well, he applies his model to some sociological issues.

For example, Byrne chooses to look at the management of human resources and student distribution in schools, which is a primary issue of sociology and management in education. Beyond the subject of education, he also addresses three other sociological issues by referring primarily to the context of the United Kingdom: the coexistence of humans in today's complex spaces of cities and neighborhoods; epidemics developing unevenly depending on social inequalities and the related health management issues; the urban governance limitations in complex sociopolitical contexts. Previous sociological models that have attempted to address these (and other issues) have experienced significant limitations, however, the complexity-informed approach that Byrne undertakes opens up new scientific perspectives and analytic lenses that may be of significant interest and utility within the social sciences.

Among the examples investigated in his book, education remains a critical site for social science investigation. For example, Byrne discusses how management theory has reached an impasse in working with underprivileged social classes to recognize and challenge their marginalization. Historical data show that teachers and school directors, given known management theories, budgetary constraints and social restrictions, recurrently attempted to improve general school successes without significant results. Byrne's work aspires to prove the applicability of this new social theoretical model to answer these very important social questions.

The first interest of Byrne's model is to make links between complexity theory and social theories. He almost "translates" complex theory phenomenon such as bifurcations, chaos, randomizations, perturbations, and evolutions in perspective with human and social issues. Instead of discussing modernity and post-modernity or micro versus macro predominant influences, he admits straightaway the complex interaction of all these tendencies. He underlines that in times of crisis, which force social structures to recompose, the agency of a few individuals can often orientate a dramatic reconfiguration of complex systems. To follow complex social trajectories of social action is similar to airplanes situating themselves in heavy winds, as he states: they steer a course but must reorient themselves when it is blustery and turbulent. Therefore, the author recognizes that science will never be able to fully predict social developments, but it may be able to understand and anticipate possible future outcomes or turbulences.

Overall, Byrne delivers an intelligible complexity theory for social scientists without over generalizing difficult concepts, as is often the case with popularized writings on complexity theory. In an effort to avoid this fatal error, Byrne matches change and adapted social contexts with the precise

phenomenon of complexity theory. He reminds us that, where social sciences usually analyze phenomenon in discontinuity, complexity theory can, on the contrary, create a framework to understand phenomenon with a relative continuity.

The second point of interest outlined in Byrne's text proposes a methodological link between the sociological model and sociological analysis of complexity. It promotes a holistic systems approach and the use of multidimensional statistics as analysis of contingency tables and cluster analysis, the former serving to find attractors that underlie social trends. He reminds us of the relevance of log-linear techniques and of correspondence analysis as analytical tools. Byrne often refers to historical social developments and to *time series*. Using these methods, he promotes longitudinal and historical studies, and limits his focus on local complexity as well as cross-sectional data. The usage of time series turns out to be the methodological focal point in Byrne's work; generally, other methods to study phenomenological and local complexity are put on the backburner in his analysis.

A complementary developing methodology to the Byrne's work would be to propose methods for qualitative data and punctual phenomena. These could be repeated in diverse social or psychosocial settings. Byrne is more interested in the robust aspects of chaos in the long term, which can be found within the chaotic order hidden within the hubbub of daily activities. He remains conservative in his scientific propositions by assuring the validity and reliability of these propositions. This demonstrates that he is quite aware of the Pandora's box that he opens in this book. It would be interesting, therefore, if other authors proposed a version of complex social science theories taking into account the notion of experience, since this is what allows understanding and guides social movements despite the fluidity of meaning over time.

This theory may develop as highly appealing for the social sciences. However, despite his attempt to challenge those who abusively use the "complexity" concept, when they do not take it seriously into account, his defense may not address the proper issue. Although such an applied theory of complexity to the social sciences proves to be bridging the diverse sciences, Byrne's theoretical approach may be seen in competition with other social theories that have already taken steps to explore complexity independently from the hard sciences. He does not consider how competitive emergent complexity theories can be applied with similar theoretical issues as his own. Amongst other social theories, it would be interesting to see how the theory of "open systems", as developed by Emery and Trist (Emery, 2000), can elaborate on the practice of similar questions. The marginal knowledge and comprehension won by agreeing on one approach over another remains to be discussed. One unresolved dilemma is: How one can mediate the onslaught of the multiple theories existing on the social terrain?

Even if his conclusion is somehow abrupt and incomplete, I would still submit this text to doctoral students in sociology of education or in social intervention for critical analysis. I find important its theoretical dynamic and the understanding exposed by this approach.

Generally, Byrne's discourse is heavy and hard to understand by individuals accustomed to reading metaphors of complexity, and does not offer important nor realistic new theoretical developments; rather it provides a new, single vision of the "social" through complexity lenses. Furthermore, practitioners of education, habituated as they are to filling scientific holes with their own experience and complementary approaches, have yet to have any significant breakthroughs. Still, despite its limitations, this new social theoretical approach is not without appeal, to be completely convincing, his approach would need a wider set of applications in different social contexts.

The complex social science vision, as evocated at the end of the last millennium, is still preparing its scientific revolution and is looking for a theory to bring theoreticians and practitioners together. This leading theory should be able to solve and improve, without contest, the social existence of the most humble and marginalized peoples. Could we hope that this revolution will gain the respect of all leading social actors? Certainly. However, this revolution in social sciences has not yet arrived.

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