



Social crises. A network model approach

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HIGHLIGHTS

- Increase of complexity causes the appearance of concentrator, a source of disagreement.
- Preferential attachment model in endogenous crises generates exponential distributions of crises.
- Endogenous crisis scenario manifests a complex or critical dynamic.

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ABSTRACT

Crisis, conflict and complexity are concepts that are deeply related in the evolutionary history of social dynamical systems. The spontaneous increase of complexity of adaptive systems, including social systems, entails critical processes where the organization of the system, or part of it, is questioned. In this study we address the phenomenon of social crises through models of society based in networks that combine the increase in complexity with the clash of forces in conflict which could lead to a crisis for the system. The simulations suggest that there is a positive correlation between the increase in the complexity of the system and the emergence of crises as a complex phenomenon itself where its mitigation can have unexpected results.

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1. Introduction

Life would be impossible without the conflict between opposite dynamic forces [1]. Complexity, conflict and crisis have always been related in the history of adaptation of systems giving shape to the world we see.

The transition from a routine situation to a state of social crisis, or fluid critical juncture [2], is determined by contingency, but also by uncertainty. Here the confluence of apparently unrelated events and the destabilizing influence of abrupt changes play an important role [3]. The relatively simple idea that we have of the crises phenomenon, collides with its complex behavior characterized by explosions of intense and unexpected activity, unpredictable resulting scenarios and complex

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temporal and spatial expression patterns [4–8]. This is why few concepts as “crisis” refer to such diverse connotations [3] for a phenomenon that seems to be common, natural and inevitable within the evolutionary history of a system in continuous adaptation.

As suggested by J. Tainter [9], the social system operates as an Adaptive Complex System [10] and, therefore, during its adaptation acquires complexity by diversifying the roles of its components and improving their combination. As a result there is creation of new norms, bureaucracy, infrastructure, social values, institutionalism, among other adjustments. According to Tainter, this complexity has an associated cost that contributes to the destabilization of the system. The traditional view that the complexity of the system would contribute to its robustness had already been questioned by works such as R. May [11] explaining the fragility of complex ecological systems. Today, new background [12–14] supports this idea, suggesting that crises in economic systems are due largely to their integration and diversification, both manifestations of the system’s complexity.

Social crises have been commonly understood as processes that can lead to breaks in the functioning of institutions, not necessarily legitimate, threatening their continuity [2]. Added to this is the perception of the massive and violent character that usually accompanies them. An example of this are the recent multi-sector mobilizations carried out in different countries around the world, expressing diverse social, cultural, political and economic demands. However, crises are not necessarily violent, nor do they necessarily affect the entire system, neither they require massive participation. Critical episodes can occur in small social organizations such as a family [15] or school [16,17], as well as in larger subsystems, such as neighborhoods [18] or countries [19,20].

Considering the above, our working hypothesis is that crises are manifestations of the evolutionary dynamics of an adaptive system linked to the constant and spontaneous increase of its complexity or internal information. This increase in complexity would generate local and/or global adaptive pressures from internal or external triggering events, putting the system’s capabilities at stake to find solutions. In our research we approach our hypothesis through toy models of society based in networks, using different mechanisms in which the increase in complexity and social disagreement are considered as central phenomena.

In relation to these mechanisms, social sciences have recognized in inequality and social exclusion, key factors for the increase of social conflict. The critical sociology of K. Marx [21] places the cause of conflict in the unequal distribution of private property of production goods. The comprehensive sociology of M. Weber [22,23] does the same with the unequal distribution of power (goods and values). Most of the contemporary sociology inherits these traditions. R. Dahrendorf [24,25] discovers in the unequal positioning of “authority” and “obedience” an essential variable in the tension and disturbance of society. A unique aspect is offered by L. Coser [26] in suggesting that conflict is associated with the frustration derived from “relative deprivation” that arises in the comparison of unequal expectations among actors in similar positions. In his thesis conflict would fulfill functions that would prevent the system from ossifying, generating forces for its continuous change.

A. Schutz [27] adds that the subjective perception of inequality must be considered. It emanates from the shared universes of a collective, which internalize in a common way what seems to be good, correct, just, desirable and from where inequality is perceived as certain reality. On the other hand, A. Touraine [28] warns that the unequal concentration of knowledge monopolized by a technocratic elite, generates a continuous social tension with the citizen majorities that only have knowledge of the human from the human. Particularly when facing the question of who defines what is best for society.

All these traditional theories of sociology of conflict identify inequality in its various expressions, linked to the dynamics of the evolution of social systems [29]. Today we understand that as the complexity of the system grows, these inequalities tend to be experienced and perceived in different ways (discrimination, injustice, exclusion) causing different behaviors (disgust, hostility, disagreement). Considering this theoretical background, one of the mechanisms of disagreement proposed in our model is related to the population’s reaction to inequality within the system. In this case, we load the relationships between individuals with those asymmetries described above (e.g., power, authority, goods, etc.).

However, M. Dobry [2], analyzing the interactions that occur in the critical processes of the political system, emphasizes the model of Almond and Flanagan [30], who warns of the influence not only of internal variables, such as the inequality mentioned above, but also of the influence of external information.

This information acquires an important connotation today. The accelerated production of available global information and the greater access and massive use of information technologies allow a direct connection with a new reality of a world in constant change. This information converted into an exogenous variable, including the adoption of new social valuations, leads today more than ever to permanent processes of adaptation. E. Morin [31] suggests that they are not exempt from critical processes when referring to the crisis of development and discovery of the “foreign magical world”. In response to this, a second mechanism of disagreement was implemented in the proposed model considering the role of external information and its propagation among the population through the system’s relations.

The resulting behavior of both mechanisms of disagreement (inequality and effects of external information) will depend on the structure of the relations in the social system given by other mechanisms that increase the complexity of the system, based on the principle of selectivity of relations [21,32–34]. In this way, the structural complexity of the system is related to the internal dynamics of the disagreement of its components, understood as a social crisis.

The organization of this work is as follows. In Section 2 we present a general description of the model. In Section 3, we present the results of the simulations. Finally, in Section 4 we summarize the highlights of the study and present final conclusions and projection of future work.

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