

Editorial

Transition from Biology to Anthropology: a Theoretical Challenge

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Editorial

An impressive revolution is occurring in biology. The traditional approach to Darwinian evolution based on the transmission of information through genes is integrated by epigenetic processes, resting instead on cell-to-cell communication [1] and exchange of information between complex networks of organisms, each network of organisms representing a sort of social intelligence. This revolution should be interpreted as the natural consequence of the last remarkable achievement of Physics, in the seventies of the 20th century, namely the renormalization group approach. This theoretical approach established that although the microscopic physical laws are still in action in systems at phase transition, in that condition new criticality-induced collective properties emerge, being completely independent of the details of microscopic dynamics.

In the field of evolutionary game theory, we see biologists successfully in action with the adoption of modelling procedures that are inspired to sociology, in the sense of interaction between human beings, which are proved to fit surprisingly well to the results of the experimental observation of elementary biological processes, for instance the evolution of bacteria, or, the spreading of cancerous cells. This is in line with the end of reductionism established by renormalization group theory, thereby explaining why equally successful results are not yet found along the traditional lines of traditional molecular dynamics. A consistent theoretical perspective can be established using the spontaneous transition to criticality with focus on temporal complexity and transmission of information from one to another complex system through crucial events [2]. The crucial events are equivalent to the change of flying direction of a swarm of birds and consequently to a sort of intelligence making it possible for the self-organized system to adapt itself to the environment. This form of flexibility is quite surprisingly shared by cancer cells to adapt themselves to therapies and, as a consequence, the best therapy to cure cancer is not the one maximizing the killing rate of cancer cells [3].

A significant progress was recently done [2] to supplement the quickly developing field of evolutionary game theory with the tool of criticality, as a source of cognition. The evolution of interacting individuals toward cooperation, in spite of the supposedly selfish inclination of individuals, is based on the principle of network reciprocity, which is disrupted by the social activity of the individuals

of the social network. The dynamics of Self-Organized Temporal Complexity (SOTC) [2] show that the decision making determined by the influence of the nearest neighbors, with the individuals increasing or decreasing their social sensitivity according to the received payoff, leads the system toward cooperation, thereby satisfactorily settling the conflict between selfishness and altruism, one of most important paradoxes that have been stimulating over the year the progress of science [4]. SOTC is a bottom-up process explaining why cooperation spontaneously emerges at the biological level.

If SOTC is artificially realized by adopting a top-down prescription, the intelligence of crucial events is disrupted: crucial events turn into organizational collapses [5]. This apparent contradiction of SOTC is actually a sign that the transition from biology to anthropology requires a refinement of the mathematical modelling of societal organization. In fact, the payoff of the games adopted by biologists must be extended so as to take into account the psychological reward [6]. It is difficult to adopt the Ibn Klaldun concept of *asabiyya*, social solidarity [6], at a merely biological level. This is so because *asabiyya* is closely connected to the concept of sacred values [7], which makes it necessary for us to move from life evolution to human cultural evolution. In other words, this requires a transition from biology to anthropology. This is not a merely theoretical and academic issue, insofar the concept of sacred value [7] is of fundamental importance for a successful approach to fighting terrorism in the same way as a successful cancer therapy should rest on detecting and understanding the intelligence of cancerous cells [3].

The sacred value concept is of anthropological significance. Thus, should the current debate on whether or not anthropology is compatible with Darwinism reach a conclusion in favor of compatibility, the current progress made in the field of evolutionary game theory with the help of SOTC may lead to a successful extension of Darwinian evolution approach from the merely biological to the anthropological level:

A challenge for mathematical modelling.

For non-significant change.

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