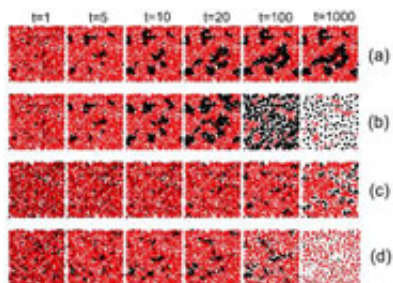


Physicists decipher social cohesion issues

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Migrations happen for a reason, not randomly. A new study, based on computer simulation, attempts to explain the effect of so-called directional migration – migration for a reason – on cooperative behaviours and social cohesion. These results appear in a study about to be published in *European Physical Journal B* by Hongyan Cheng from Beijing University of Posts and Telecommunications and colleagues.

The authors devised a computer simulation of what they refer to as selfish individuals – those who are mainly concerned with their own interests, to the exclusion of the interests of others. In this study, they propose a new migration rule, dubbed directional migration, in existing models referred to as evolutionary game theory. This takes into account the fact that individuals in animal and human society make migration choices that are often motivated by the need to search for food or to look for alliances, for example.

Cheng and colleagues found that when they introduce a directional migration trend in their [computer model](#), the cooperation level among individuals is greatly improved compared to situations with no migration. They also found that directional migration has a profound impact on the [population structure](#). It drives individuals to form a number of dense clusters, which resembles [social cohesion](#). In these clusters, individuals organise into a well-functioning group in which there are shared goals and a readiness to cooperate with others.

The authors expect that their model can be further improved in the future by incorporating some factors reflecting real-life situations. For example, the model could introduce a range of interaction that differs for each individual, or vary the [collective interaction](#) ranges of a given cluster of individuals in keeping with the number of individuals in the cluster. By combining these real factors, this approach could provide a deeper understanding of the emergence of cooperation among individuals.

More information: H. Y. Cheng et al. (2013), Effects of directional migration on prisoner's dilemma game in a square domain, *European Physical Journal B*, [DOI 10.1140/epjb/e2013-40076-5](https://doi.org/10.1140/epjb/e2013-40076-5)

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